California Air Resources Board

# Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions

# Final Statement of Reasons for Rulemaking, Including Summary of Comments and Agency Response

***Public Hearing Date: December 9, 2021***
***Agenda Item No.: 21-13-2***

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# List of Acronyms and Abbreviations

§ - section

15-Day Notice – Notice of Public Availability of Modified Text and/or Additional Documents

45-Day Notice – Notice of Public Hearing

AACOG – Alamo Area Council of Governments

AB – California Assembly Bill

ABT – Averaging, Banking, and Trading

ADAC - Allgemeiner Deutscher Automobil Club (German Automobile Club)

AGZA – American Green Zone Alliance

AIR – Air Improvement Resource, Inc.

ANSI – American National Standards Institute

APA – Administrative Procedure Act

ARA – American Rental Association

ARB – California Air Resources Board

ASLA – American Society of Landscape Architects

ASTM – ASTM International

BAAQMD – Bay Area Air Quality Management District

Board – California Air Resources Board

$C_2H_6$ - Ethane

CAG – California Alliance for Golf

CalRVDA – California Recreation Vehicle Dealers Association

CARB – California Air Resources Board

CCR – California Code of Regulations

CETA – Cleaning Equipment Trade Association

CEQA – California Environmental Quality Act

CFR – Code of Federal Regulations

$CH_4$ – Methane

CHA – Clean Healthy Air - Clean Healthy Altadena

CLCA – California Landscape Contractors Association

CNG – Compressed natural gas

CO – Carbon monoxide

$CO_2$ – Carbon dioxide

$CO_2e$ – Carbon dioxide equivalents

CORE – Clean Off-Road Equipment Voucher Incentive Project

COVID-19 – Coronavirus Disease 2019

CP – Certification Procedure
CPUC – California Public Utilities Commission
CSUDN – California Sea Urchin Divers Network
CSUF – California State University, Fullerton
CSUF SSRC – California State University, Fullerton Social Science Research Center
DF – Deterioration factor
DTSC – Department of Toxic Substance Control
EA – Environmental Analysis
EFELD – Evaporative Family Emission Limit Differential
El Dorado AQMD – El Dorado County Air Quality Management District
EMA – Truck and Engine Manufacturers Association
EMEL – Evaporative Model Emission Limit
EO – Executive Order
EHP&A – E.H. Pechan & Assoc., Inc.
EVR – Enhanced vapor recovery
FACTS – Families Advocating for Chemical and Toxics Safety
FEL – Family Emission Level
federal Part 1054 – U.S. EPA, Title 40, Code of Federal Regulations, Part 1054
federal Part 1065 – U.S. EPA, Title 40, Code of Federal Regulations, Part 1065
FID – Flame-ionization detector
FSOR – Final Statement of Reasons
FTIR – Fourier transform infrared
FWEDA – Far West Equipment Dealers Association
GHG – Greenhouse gas
GPA – Gas Processors Association
$H_2O$ – Water
HC – Hydrocarbons
Honda – American Honda Motor Co., Inc.
HSC – Health and Safety Code
ICE – Internal combustion engine
IQR – Interquartile range
ISO – International Organization for Standardization
ISOR – Initial Statement of Reasons (see also Staff Report)
IWG – Interagency Working Group
LAO – California Legislative Analyst's Office
LNG – Liquefied natural gas

LPG – Liquefied petroleum gas

LSI – Large spark-ignition

MECA – Manufacturers of Emission Controls Association

MSS – CARB's 2020 Mobile Source Strategy

MY – Model Year

NAAQS – National Ambient Air Quality Standards

NALP – National Association of Landscape Professionals

NAR – National Association of Realtors

NASEM – National Academies of Science, Engineering, and Medicine

NEMA – National Electrical Manufacturers Association

NIST – National Institute of Standards and Technology

NMHC – Nonmethane hydrocarbon

NMMA – National Marine Manufacturers Association

$NO_x$ – Oxides of nitrogen

OAL – Office of Administrative Law

OMB – Office of Management and Budget

OPEI – Outdoor Power Equipment Institute

OSHA – Occupational Safety and Health Administration

PCTA – Pacific Crest Trail Association

PEMS – Portable emission measurement system

PGMA – Portable Generator Manufacturers Association

PM – Particulate matter

$PM_{2.5}$ – Particulate matter with diameter of 2.5 micrometers or less

PRC – Public Resource Code

Proposed Amendments – Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions

PSPS – Public Safety Power Shutoff

RAMP – Regional Asthma Management and Prevention

REMI – Regional Economic Models, Inc.

ROG – Reactive organic gases

RVDA – National RV Dealers Association

RVIA – RV Industry Association

SAE – SAE International

SCC – Social cost of carbon

SCNA – Sierra Curtis Neighborhood Association

SCAQMD – South Coast Air Quality Management District

SCI – Steam Cleaners, Inc.

SD-SEQUEL – San Diegans for Sustainable, Equitable, and Quiet Equipment in Landscaping

SHED – Sealed housing for evaporative determination

SI – Système International d'Unités

SIP – State Implementation Plan

SORE – Small off-road engines

SRIA – Standardized Regulatory Impact Analysis or Standardized Regulatory Impact Assessment

Staff Report – see also ISOR

STIHL – Andreas Stihl AG & Co. KG

SURF - San Diego Ultra Running Friends

TAC – Toxic Air Contaminant

TCIA – Tree Care Industry Association

TERI – The Energy and Resources Institute

TP – Test Procedure

tpd – Tons per day

USCPSC – United States Consumer Product Safety Commission

U.S. EPA – United States Environmental Protection Agency

UV – Ultraviolet

WPGA – Western Propane Gas Association

WUD – Western United Dairies

ZEE – Zero-emission equipment

## Units of Measure

° – degrees

% – percent

cc – cubic centimeter

cf/min – cubic feet per minute

$cm^3$ – cubic centimeter

dB – decibel

g – gram

g/kWh or $g \cdot kWh^{-1}$ – grams per kilowatt hour

hp – horsepower

kg – kilogram

km – kilometer

kW – kilowatt

kWh – kilowatt hours

lbs – pounds

m – meter

m/s – meters per second

$m/s^2$ – meters per second squared

$m^3$ – cubic meter

$m^3/h$ – cubic meters per hour

min – minute

mm – millimeter

mmol/mol – millimoles per mole

mph – miles per hour

tpd – tons per day

# I. General

The Staff Report: Initial Statement of Reasons for Rulemaking (Staff Report or ISOR), entitled "Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions" (Proposed Amendments), released October 12, 2021, is incorporated by reference herein. The ISOR contained a description of the rationale for the Proposed Amendments. On October 12, 2021, all references relied upon and identified in the ISOR were made available to the public. Additional supporting documents were made available to the public on November 12, 2021.

**Background**

Small off-road engines (SORE) are spark-ignition engines with rated power at or below 19 kilowatts (25.5 horsepower) used in non-stationary equipment. The California Air Resources Board (CARB or Board) regulates SORE emissions by adopting and enforcing emission standards, certification procedures (CP), test procedures (TP), and other requirements for engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce (collectively, SORE regulations). As a result of SORE regulations and increasing adoption of zero-emission equipment (ZEE) by residential and professional users, SORE emissions have decreased by 50 percent since 2000. However, emissions from SORE are still significant, and emissions of smog forming pollutants from SORE already exceed those from light-duty passenger cars in California. SORE emissions are expected to increase as California's population grows and are forecast to be nearly twice those from light-duty passenger cars in 2031. The purpose of the Proposed Amendments is to transition from SORE equipment to ZEE as soon as possible. The Proposed Amendments are necessary to achieve SORE emission reductions expected under the Revised Proposed 2016 State Strategy for the State Implementation Plan (2016 State SIP Strategy), to meet the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible, and to meet the requirement of California Assembly Bill (AB)1346 (Chapter 753, Stats. of 2021) to adopt cost-effective and technologically feasible regulations by July 1, 2022, to prohibit engine exhaust and evaporative emissions from new small off-road engines. The Proposed Amendments are designed to achieve the maximum degree of technologically feasible, cost-effective emission reductions from SORE by the earliest practicable date, as required by Health and Safety Code section 43018, and to maximize health benefits as required by California Health and Safety Code section 43000, subsection (b).

The Proposed Amendments would update emission standards for new SORE manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce and would not affect equipment already in use. This would be achieved by setting SORE emission standards to zero in two phases. First, for model year (MY) 2024 and all subsequent model years, exhaust emission standards for most engines would be set to zero (0.00 grams per kilowatt-hour or $g \cdot kWh^{-1}$), except for carbon monoxide (CO). Evaporative emission standards for most engines would also be set to zero (0.00 grams per test or $g \cdot test^{-1}$). The evaporative emission standards would include "hot soak" emissions (representing emissions that occur when placing a hot engine in storage after use on a hot summer day) to better evaluate emissions from real-world use of SORE equipment. These emission standards of zero would apply for all engines except pressure washer engines with displacement greater than or equal to 225 cubic centimeters (cc) and portable generator engines. Emission standards for engines used in these high-power pressure washers and portable generators would be more stringent than the existing emission standards starting in MY 2024, but would not be zero. The second phase would be implemented starting in

MY 2028, when the emission standards for engines used in portable generators and high-power pressure washers would be zero.

The Proposed Amendments would also amend existing emission reduction credit programs to improve consistency and add flexibility for manufacturers. The exhaust emission regulations include an emission reduction credit averaging, banking, and trading (ABT) program, where manufacturers can generate credits with engines that emit below the emission standards and use them to produce engines that emit above the emission standards. This averaging of emissions gives manufacturers the flexibility to certify those higher-emitting engines. Exhaust emission reduction credits may be banked for up to five years, to be used later, or may be traded with other manufacturers. The existing evaporative emission reduction credit program only includes averaging and banking. In the Proposed Amendments, trading would be added to the evaporative credit program. In addition, the Proposed Amendments would allow manufacturers to earn evaporative emission credits for all engines with displacement less than or equal to 80 cc before emission standards of zero are implemented for most engines beginning in MY 2024. New zero-emission generator credit programs would be added to the ABT programs, which would allow manufacturers to earn emission reduction credits for zero-emission generators.

Other Proposed Amendments to the regulations include sunsetting the voluntary "Blue Sky Series" engine requirements and repealing the variance provisions in the evaporative emission regulations. The Blue Sky Series engine requirements were developed to allow manufacturers to receive recognition for certifying to lower emission standards, but CARB has no record of any manufacturer taking advantage of the program for engines. Under the current evaporative emission regulations, a manufacturer that cannot meet one or more requirements, due to extraordinary reasons beyond the manufacturer's reasonable control, may apply in writing for a variance. Repealing the variance provisions would ensure equity for all manufacturers, because all manufacturers would be required to meet the requirements of the regulations. The Proposed Amendments to the evaporative emission test procedures would add further instructions for a fuel tank pressure test, a new fuel cap and tether test, a tilt test to check for fuel leaks, and instructions for accelerated preconditioning of engines. The Proposed Amendments to evaporative emissions test procedure TP-901 would ensure fuel tank testing configurations were closer to those of production fuel tanks by requiring the hole for a fuel line and grommet system to be present in the fuel tanks and requiring fuel tanks to be tested with the same production fuel cap throughout testing. Evaporative emission control system certification procedure CP-902 would be used for all engines, including those with displacement less than 80 cc, which currently use a different certification procedure. In addition, the Proposed Amendments would allow manufacturers to certify all engines with displacement less than or equal to 80 cc to the existing diurnal emission standards through MY 2023.

Most of the Proposed Amendments to the exhaust emission test procedures are intended to align them with updates to the federal test procedures that have been adopted since CARB adopted its test procedures. The Proposed Amendments also include California-specific changes necessary to maintain the stringency of California emission standards, provide consistency with other California SORE regulations, prevent redundant effort and confusion for testers, or provide additional flexibility. For example, the requirements for exhaust emission compliance testing would be changed from testing "a reasonable number of engines" to "one or more engines." Procedure text that provides examples based on equipment or fuel types that are not relevant to SORE, such as locomotives and compression-ignition engines, would be removed to prevent confusion. References to NIST-traceable standards would be changed to Système International d'Unités (SI)-traceable standards to allow flexibility for manufacturers around the world to use other recognized international standards while still maintaining the consistency necessary to ensure test data accuracy, precision, and comparability to the emission standards. CARB also considered and adopted other changes to the sections affected

during the course of this rulemaking process, as described in the ISOR and public notices detailed below.

**Rulemaking Summary**

On December 9, 2021, following a 45-day comment period, CARB conducted a public hearing to consider the Proposed Amendments, as described in the ISOR and associated Notice of Public Hearing (45-Day Notice). The Proposed Amendments amend sections 2400, 2401, 2402, 2403, 2404, 2405, 2405.1, 2405.2, 2405.3, 2406, 2407, 2408, 2408.1, 2750, 2751, 2752, 2753, 2754, 2754.1, 2754.2, 2755, 2756, 2757, 2758, 2759, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2767.1, and 2771, add sections 2408.2 and 2754.3, and repeal section 2768, Title 13 California Code of Regulations.

The formal 45-day comment period for the Proposed Amendments opened October 15, 2021, and closed November 29, 2021. Written comments were received from more than 1,300 individuals or organizations during the 45-day comment period. Additional supporting documents were made available to the public through a "Notice of Public Availability of Additional Documents and Information" (November 2021 15-Day Notice). The 15-day comment period for the November 2021 15-Day Notice period opened on November 12, 2021, and closed November 29, 2021. Some of the individuals and organizations who submitted comments during the 45-day comment period included comments on those additional supporting documents released on November 12, 2021, in their comments on the material released on October 12, 2021, the "ISOR Proposed Amendments." During the Board hearing on December 9, 2021, 66 stakeholders provided oral testimony and 46 additional written comments were submitted by individuals or organizations.

At the conclusion of the hearing, the Board approved Resolution 21-28 for adoption of the Proposed Amendments. In accordance with Government Code section 11346.8, the Board directed the Executive Officer to adopt the Proposed Amendments after making any appropriate conforming modifications, as well as any additional supporting documents and information, available to the public for a period of at least 15 days. The Board further provided that the Executive Officer shall consider such written comments as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the Proposed Amendments to the Board for further consideration if warranted.

Subsequent to the hearing, CARB staff proposed modifications (15-day modifications) to the ISOR Proposed Amendments to address the direction given by the Board as well as the comments received. On March 30, 2022, CARB released a "Notice of Public Availability of Modified Text and Availability of Additional Documents" (March 2022 15-Day Notice), which was available for public comment from March 30, 2022, through April 14, 2022. CARB received written comments from 22 individuals or organizations during the 15-day public comment period for the March 2022 15-Day Notice. On May 27, 2022, CARB released a "Notice of Public Availability of Additional Documents and Information" (May 2022 15-Day Notice), which was available for public comment from May 27, 2022, through June 13, 2022. CARB received written comments from nine individuals or organizations during the May 2022 15-Day Notice comment period.

The 45-Day and 15-Day Notices were published to the California Regulatory Notice Register. To ensure extensive outreach, the Notices were posted to CARB's website for this rulemaking at https://ww2.arb.ca.gov/rulemaking/2021/sore2021 and were sent to over 5,000 subscribers to the "SORE Working Group" and "Mobile Source Program Mailouts" public email list serves. The "Mobile Source Program Mailouts" list includes all persons who submitted oral or written comments at the hearing or during comment periods, or requested notification of any proposed changes, per section 44(a), title 1, California Code of Regulations, and Government Code section 11340.85. The

Board staff compiled a record for this rulemaking action, which includes all the information upon which the proposal is based. This material was made available for inspection upon request to the contact persons identified in the Notices.

This Final Statement of Reasons (FSOR) updates the ISOR by identifying and providing the rationale for the modifications made to the originally proposed regulatory text. The FSOR also contains a summary of the comments received during the formal rulemaking process by CARB on the Proposed Amendments or the process by which they were adopted, and CARB's responses to those comments.

## A. Mandates and Fiscal Impacts to Local Governments and School Districts

The Board has determined that this regulatory action will result in a mandate to local agencies and school districts that could create costs or savings. However, the Board finds that that these costs are not reimbursable pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code, because the regulatory requirements apply equally to all regulated entities and unique requirements are not imposed on local agencies or school districts. In addition, the Board finds that the regulatory requirements do not impose a mandate on local agencies or school districts that is required to be reimbursed pursuant to Section 6 of Article XIII B of the California Constitution.

## B. Consideration of Alternatives

For the reasons set forth in the ISOR, in CARB staff's comments and responses at the hearing, and in this FSOR, the Board determined that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulatory action was proposed, or would be as effective and less burdensome to affected private persons, or would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provisions of law than the action taken by the Board.

Government Code section 11346.2(b)(4)(B) requires a description of reasonable alternatives to the regulation that would lessen any adverse impact on small businesses and the agency's reasons for rejecting those alternatives. The Proposed Amendments to the SORE regulations could have an impact on costs to small businesses. The primary category of small business directly impacted by the regulation would be landscapers, who would have a higher upfront cost for ZEE compared to SORE equipment.

The Small Business Alternative described in ISOR section VIII.C would push the increase in adoption of ZEE to a later time than the Proposed Amendments and would avoid the higher upfront cost of lower emitting SORE equipment. Current emission standards would remain in place through MY 2027. For MY 2028, the emission standards would be zero for all small off-road equipment, except generators. Beginning in MY 2028, generators would be subject to the same emission standards as they would in MYs 2024 through 2027 under the Proposed Amendments (ISOR Tables II-1 and II-2). These emission standards would remain in place through MY 2031. For MY 2032, the generator emission standards would be zero. This alternative would delay the adoption of ZEE to continue to allow for the further development of the ZEE market, especially for professional equipment. ISOR section VIII.C provides a detailed description of the costs and emissions modelling for this alternative.

CARB rejected the Small Business Alternative due to its failure to meet expected emission reductions in the 2016 State SIP Strategy. The 2016 State SIP Strategy includes expected emission reductions from SORE of 4 tons per day (tpd) of oxides of nitrogen ($NO_x$) and 36 tpd of reactive organic gases (ROG) in 2031. Emission benefits under the Small Business Alternative in 2031 would be 3.5 tpd and 28.7 tpd of $NO_x$ and ROG, respectively. Under the Small Business Alternative, only 83.9 percent of equipment subject to the SORE regulations would be ZEE in 2035. Approximately 10 percent less of the small off-road equipment population would be ZEE in 2035 under the Small Business Alternative than with the Proposed Amendments. The Small Business Alternative would, also, fail to maximize health benefits that can be achieved. As provided in CARB's enabling statutory authority, "[t]he control and elimination of … air pollutants is of prime importance for the protection and preservation of the public health and well-being, and for the prevention of irritation to the senses, interference with visibility, and damage to vegetation and property." (HSC section 43000, subd. (b)). Therefore, since public health benefits are one of the primary purposes of CARB's statutory mandate for adopting and implementing regulations, such as the Proposed Amendments, the Small Business Alternative's failure to maximize health benefits to the same extent as the Proposed Amendments would not be consistent with HSC section 43000, subsection (b), and it must be rejected for this reason, and on the other listed grounds.

In oral and written comments at the hearing and during comment periods, stakeholders suggested several variations of the Small Business Alternative evaluated in the ISOR that are intended to reduce costs for businesses, particularly for small landscaping businesses. As described in section IV.A.2.4 of this FSOR, some of the suggested variations would delay implementation of the emission standards of zero for landscaping equipment, all commercial SORE equipment, or for all SORE equipment, by varying periods compared to the implementation timeline under the Proposed Amendments. Other variations would require less stringent emission standards, while others would include exemptions for specific uses, equipment types, and/or regions. Even if some of the suggested alternatives could meet expected emission reductions in the 2016 State SIP Strategy, allowing emissions to continue for SORE equipment that have feasible zero-emission options would fail to maximize emission reductions and associated health benefits that could be achieved and would make less progress towards meeting the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible, and other mandates. The suggested alternatives would make it more difficult for California to meet its SIP commitments by delaying or not ever requiring implementation of zero-emission technologies. As described in the ISOR (sections II.A.1 and III.A.3), current SORE regulations will not achieve emission reductions expected under the 2016 State SIP Strategy due in part to noncompliance. The noncompliance rate with current evaporative emission standards is high (~40 percent since MY 2015, see ISOR section II.A.1), so previously expected emission reductions will not be realized. Potential emission impacts from ongoing noncompliance would still not be addressed if implementation of the Proposed Amendments' emission standards of zero were delayed or abandoned. For these reasons, none of the suggested alternatives are viable alternatives for the rulemaking.

# II. Modifications Made to the Original Proposal

## A. Modifications Approved at the Board Hearing and Provided for in the March 2022 15-Day Notice

Subsequent to the hearing, CARB made modifications to the ISOR Proposed Amendments to address the direction given by the Board as well as the comments received. On March 30, 2022, CARB

released the following summary as part of the March 2022 15-Day Notice, which was available for public comment from March 30, 2022, through April 14, 2022. The following summary does not include all modifications to correct typographical or grammatical errors, changes in numbering or formatting, nor does it include all the non-substantive revisions made to improve clarity.

## A.1. Modifications to SORE Exhaust Emission Regulations

a. In sections 2401(a)(7), 2401(a)(25), 2403(c)(4)(C), 2403(e)(1), 2404(l)(1), 2407(b)(4)(B), 2407(b)(4)(C), 2407(b)(5)(B)3., 2407(c)(2)(B)1., 2407(c)(3)(A)1., 2407(c)(4)(E)3., 2408(b)(5), 2408(f)(1), 2408(h)(1)(B), 2408.1(b)(4), 2408.1(h)(1)(B) and 2408.2(b)(4) the terms "family emissions levels" and "family emission levels" were replaced with "family emission limits," and "family emission level" was replaced with "family emission limit." This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to change the term "Family Emission Limit" to "Family Emission Level" to restore consistency of term usage throughout the exhaust emission regulations and increase clarity for manufacturers and other readers. The California SORE regulations traditionally use the term "Family Emission Level" while federal regulations for small nonroad spark-ignition engines use the term "Family Emission Limit." The term "Family Emission Limit" has inadvertently been used interchangeably with "Family Emission Level" because, as noted on ISOR page 155, their definitions are virtually identical. However, manufacturers commented that they prefer to make the term usage consistent with federal regulations. This change to use the term "Family Emission Limit" throughout the exhaust emission regulations does not affect SORE emission standards nor testing requirements, and satisfies clarity requirements under California regulations (Title 1, California Code of Regulations [CCR], section (§) 16(a)(4)).

b. In section 2401(a)(19), the definition of "engine," the text, "…a complete, operational engine. Any engine block or kit with the parts necessary to assemble an engine block with or without an installed crankshaft is also considered an engine. Gas turbine engines are excluded from this definition." was replaced with the text, "…an engine block with an installed crankshaft. Gas turbine engines are excluded from this definition. The term engine does not include engine blocks without an installed crankshaft, nor does it include any assembly of reciprocating engine components that does not include the engine block. (Note: For purposes of this definition, any component that is the primary means of converting an engine's energy into usable work is considered a crankshaft, whether or not it is known commercially as a crankshaft.)" This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed a new definition of "engine." Commenters requested the definition of "engine" in the SORE regulations be harmonized with the definition of "engine" in federal regulations. This change will largely harmonize the two definitions. Gas turbine engines will continue to be excluded from the definition of "engine," as described on ISOR page 157. This change to the definition of "engine" does not affect SORE emission standards nor testing requirements, and satisfies clarity requirements under California regulations (Title 1, CCR, § 16(a)(4)).

c. In section 2401(a)(32), criteria beyond engine displacement for the proposed definition of "handheld" were removed, by changing it to read ""Handheld" means relating to off-road equipment using an engine with displacement less than or equal to 80 cc." This change was made in response to public comments regarding potential conflicts between federal and California definitions of "handheld." In the ISOR Proposed Amendments, staff proposed a new definition of "handheld" in section 2401(a)(32) of the exhaust emission regulations and replaced the existing definition of "handheld" in Part 1054 with a reference to section 2401, as described on ISOR pages 158-159 and 305-308. Although the federal definition specifies criteria that must be met for equipment to be considered handheld, federal 40 CFR Part 1054

also specifies in section 1054.101(e), in part, "For purposes of the requirements of this part, engines at or below 80 cc are considered handheld engines, but may be installed in either handheld or nonhandheld equipment." The existing California definition in Part 1054 similarly read "*Handheld* means equipment that contains an engine with a displacement of less than 80cc." This change was necessary to ensure the definitions of "handheld" in California and federal regulations are harmonized and ensure regulatory certainty for manufacturers when testing and certifying their engines. This change to the definition of "handheld" does not affect SORE emission standards, will ensure testing requirements for handheld engines remain applicable to engines with displacement less than or equal to 80 cc, and satisfies clarity requirements under California regulations (Title 1, CCR, § 16(a)(4)).

d. In section 2401(a), a new definition for "pressure washer engine", "(39) "Pressure washer engine" means an engine installed exclusively in a pressure washer," was added, and definitions (39) through (60) in the ISOR Proposed Amendments were renumbered to (40) through (61) accordingly. The addition of a definition for pressure washer engine was necessary to support and improve regulatory certainty for the proposed modification of emission standards for pressure washer engines with displacement greater than or equal to 225 cc in section 2403(b)(1) described in the next paragraph in this FSOR section. Renumbering the definitions that were previously included in this section was necessary to maintain a correctly numbered, alphabetical list of definitions and to increase clarity for the reader.

e. In section 2403(b)(1), language was added to one of the exhaust emission standards tables, and a new exhaust emission standards table was added, which would implement for pressure washers with engine displacement greater than or equal to 225 cc the same emission standards proposed for generators for model years 2024 through 2027. The emission standards for pressure washers with engine displacement greater than or equal to 225 cc for model year 2028 and later would be zero, as are the emission standards proposed for generators for model year 2028 and later. These modifications were necessary to allow more time for higher-power pressure washers used by professional cleaning services to comply with emission standards of zero. The proposed modifications were made in response to public comments asking for more time to allow the zero-emission commercial pressure washer market to develop. Chapter I of the ISOR discusses technological feasibility of the Proposed Amendments and potential challenges for ZEE deployment. A transition to ZEE is technologically feasible, as discussed in the ISOR. As described in the ISOR Appendix I Standardized Regulatory Impact Assessment (SRIA) (pages 44-45), there are challenges with zero-emission pressure washers, including a lack of availability of cordless zero-emission pressure washers. More than 30 commenters stated that the initial proposal would significantly impact the ability of professional cleaners to provide sanitation in public areas because they often use pressure washers in places where outlets are not available to plug in a corded unit, and the pressure washers they use have high power demands. The proposed modifications allow more time for the specific engine displacement category of 225 cc and larger to comply with emission standards of zero because pressure washers with such engines have greater pressure ratings and water flow rates that are used in professional cleaning work. As a result of these features, pressure washers with engine displacement greater than or equal to 225 cc cost significantly more to purchase than pressure washers with engine displacement less than 225 cc. The cost and size of pressure washers with engine displacement greater than or equal to 225 cc make them less practical for users other than professional cleaning services, so users such as residential users are less likely to purchase or use them. The unique features of pressure washers with engine displacement greater than or equal to 225 cc and the high cost of professional zero-emission pressure washers set them apart from other equipment types and necessitated this change. Emission standards of zero would apply to pressure washers

with engine displacements less than 225 cc for model years 2024 and later, consistent with the requirements under the Proposed Amendments described in the ISOR for all other SORE equipment except generators. Such pressure washers are more likely to be used by users other than professional cleaning services.

CARB expects this change in emission standards for pressure washer engines with displacement greater than or equal to 225 cc will result in fewer emission reductions being achieved than those that were described in the ISOR. The ISOR listed summer average emission reductions in 2031 of 7.9 tons per day (tpd) of oxides of nitrogen ($NO_x$) and 64.5 tpd of reactive organic gases (ROG). Summer average emission reductions in 2031 with this change would be 7.7 tpd of $NO_x$ and 64.1 tpd of ROG. Although these emission reductions are fewer than those under the ISOR Proposed Amendments, they would exceed the expected emission reductions of $NO_x$ and ROG in the 2016 State SIP Strategy measure for SORE of 4 and 36 tons per day (tpd), respectively, in 2031. These emission reductions are needed to help California attain National Ambient Air Quality Standards (NAAQS).

f. In section 2405.3(a)(1)(B), the text "Subchapter 1.25," which is part of a reference to hearing provisions that was replaced in the ISOR Proposed Amendments, was removed. The reference to Subchapter 1.25 was inadvertently not removed in the ISOR Proposed Amendments. The new reference, to Article 1, Chapter 15, Title 13, California Code of Regulations, Section 2771, does not contain a Subchapter 1.25. This change was necessary to increase clarity for the reader.

g. In section 2408.2(b)(4)(B), the reference 2408.2(b)(5)(C) was corrected to 2408.2(b)(4)(C). Section 2408.2(b)(4)(B) requires the zero-emission generator engine family to meet durability requirements, unless they cannot achieve the full durability period. Section 2408.2(b)(4)(C) describes the requirements for a zero-emission generator engine family that cannot achieve the full durability period. Therefore, this change was necessary to provide consistency with section 2408.2(b)(4)(B).

## A.2. Modifications to SORE Evaporative Emission Regulations

a. In section 2751(c)(1), language was added to clarify that, although the evaporative emission regulations do not usually apply to engines or equipment powered with compressed natural gas (CNG), propane, liquefied petroleum gas (LPG), or liquefied natural gas (LNG), a manufacturer may voluntarily certify and label its engines pursuant to the evaporative emission regulations. This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to allow manufacturers to generate evaporative emission credits for engines powered by CNG, propane, LPG, or LNG, as described on ISOR page 230. This change was necessary to provide consistency with the ISOR Proposed Amendments, and satisfies clarity requirements under California regulations (Title 1, CCR, § 16(a)(4)).

b. In section 2752(a)(22), language was removed from the definition of "passively-purged carbon canister." This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to add a definition for "passively-purged carbon canister," as described on ISOR page 216. The definition specified that a passively-purged carbon canister draws in ambient air to purge adsorbed compounds using a vacuum created within the fuel tank by normal diurnal temperature variations. Commenters stated that passively-purged carbon canisters are also purged during engine operation. The text, "by normal diurnal temperature variations" was removed from the definition to increase clarity for readers. This change was necessary to provide clarity in the definition of "passively-purged carbon canister."

c. In section 2753(c), language was added that would allow an applicant to certify an evaporative emission control system for engines with displacement less than or equal to 80 cc to the diurnal emission standards in section 2754 in lieu of the permeation emission standards in section 2755 and follow the certification procedures outlined in CP-902, adopted July 26, 2004, and amended September 18, 2017. Similarly, language was added in section 2754(a)(1) that would allow engines with displacement less than or equal to 80 cc to certify to the existing diurnal emission standards through model year 2023. These proposed modifications were necessary for manufacturers to be able to earn more evaporative emission credits than could occur under the Proposed Amendments in the ISOR. The modifications were made in response to public comments expressing the desire to be able to earn evaporative emission credits for engines with displacement less than or equal to 80 cc before emission standards of zero are implemented for most engines in model year 2024. Under the ISOR Proposed Amendments, generators may certify to the proposed hot soak plus diurnal emission standards in model year 2022 or 2023 to earn credits. However, engines with displacement less than or equal to 80 cubic centimeters are not currently subject to the existing diurnal emission standards. The proposed hot soak plus diurnal emission standards for engines with displacement less than or equal to 80 cc other than generator engines for model year 2024 and later are zero. The option proposed in the ISOR to certify to the hot soak plus diurnal emission standards through model year 2023 does not enable manufacturers to earn evaporative emission credits for engines with displacement less than or equal to 80 cc other than generator engines. With this modification, all engines with displacement less than or equal to 80 cc may certify to the existing diurnal emission standards and follow the certification procedures outlined in CP-902, adopted July 24, 2004, and amended September 18, 2017, through model year 2023.

d. In the text of section 2754(a)(3), "except for generator engines" was changed to "except for generator engines and ≥ 225 cc pressure washer engines," and in the title of Table 2, "Except Generator Engines" was changed to "Except Generator Engines and ≥ 225 cc Pressure Washer Engines." New subsections 2754(a)(7) and 2754(a)(8), including a new Table 4 in 2754(a)(7), were added. These changes will implement for pressure washers with engine displacement greater than or equal to 225 cc the same emission standards proposed for generators for model years 2024 through 2027. The emission standards for pressure washers with engine displacement greater than or equal to 225 cc for model year 2028 and later will be zero, as are the emission standards proposed for generators for model year 2028 and later. These modifications were necessary to allow more time for higher-power pressure washers used by professional cleaning services to comply with emission standards of zero. The proposed modifications were made in response to public comments asking for more time to allow the zero-emission commercial pressure washer market to develop. Please refer to the rationale for the proposed modifications to section 2403(b)(1) included in the "1. Modifications to SORE Exhaust Emission Regulations" subsection of this FSOR section for additional explanation.

e. In sections 2754(f) and 2754(g), language was added to clarify the applicability of the fuel line testing in accordance with ANSI/OPEI B71.10-2013 and ANSI/OPEI B71.10-2018. This change was made in response to public comments. The scope of ANSI/OPEI B71.10-2013 and ANSI/OPEI B71.10-2018, described in section 1 of each standard, includes "gasoline fuel systems for off-road ground-supported outdoor power equipment with spark ignition engines of less than one liter displacement." ANSI/OPEI B71.10-2013 section 4.4 and ANSI/OPEI B71.10-2018 section 4.2.1. state that all fuel line connection designs except fuel lines of less than 50 mm (2 inches) in length and which are held in place by compression after assembly and fuel line assembly connections which cannot be exposed to a tensile pull in the end use shall be qualified. This change was necessary to clarify that fuel line assembly testing is

required only for engines and fuel lines for which ANSI/OPEI B71.10-2013 or ANSI/OPEI B71.10-2018 is applicable.

f. In section 2754(h), language was added to clarify that approval of a determination that running loss emissions are controlled from being emitted into the atmosphere is not required for engines with displacement less than or equal to 80 cc. This change was made in response to public comments. This change was necessary because engines with displacement less than or equal to 80 cc use sealed fuel tanks and do not use carbon canisters. As a result, the test procedures in TP-902 for demonstrating that running loss emissions are controlled from being emitted into the atmosphere are not suited to engines with displacement less than or equal to 80 cc. The use of sealed fuel tanks on these engines also results in some control of running loss emissions. This change did not affect SORE emission standards, will ensure requirements for demonstrating control of running loss emissions remain applicable to engines with displacement greater than 80 cc that do not use actively-purged carbon canisters meeting the requirements of the regulations, and satisfies clarity requirements under California regulations (Title 1, CCR, § 16(a)(4)).

g. In section 2754.1(f)(1), language was modified to clarify that evaporative emission credits must be rounded to the nearest hundredth of a gram. This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to delete the requirement for emission credit calculation results to be rounded to the nearest tenth of a gram, as described on page 234. Commenters stated that the proposed text was unclear with regards to handling rounding of digits. Replacing text that specifies the requirement for rounding credits and requiring rounding to the nearest hundredth of a gram was necessary to ensure credit calculations will reflect the same number of decimal places as the emission standards for model year 2024 and subsequent model years. Thus, the modification will ensure that credits are accurately used to meet the SORE emission standards during the certification process. This change was also necessary to provide clarity.

h. In section 2755, a new subsection (c) was added to clarify that engines that optionally certify to the diurnal emission standards set forth in section 2754 do not need to meet the requirements of section 2755. Section 2755 is specific to engines with displacement less than or equal to 80 cc, so if manufacturers choose to optionally certify to the diurnal emission standards in section 2754 (which are for engines with displacement greater than 80 cc) to earn evaporative emission credits, they do not need to also certify to the emission standards in section 2755.

i. In section 2765(a)(5), language was added to clarify that the hot soak test shall be performed at the temperature at which the hot soak test was performed during certification testing. This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to provide the option to perform the hot soak test at 40.6 °C to enable passively-purged carbon canisters to experience a greater amount of purging during the forced cooling, as described on pages 268-269 of the ISOR. Commenters asked whether during compliance testing the hot soak test would be performed at the same temperature at which the manufacturer performed the hot soak test during certification testing. This change was necessary to provide regulatory certainty to manufacturers that the hot soak test will be performed at the temperature at which the hot soak test was performed during certification testing.

## A.3. Modifications to SORE Evaporative Emissions Test Procedure, TP-901, Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Fuel Tanks

a. In section 7, language providing an example circumstance in which balance manufacturer's calibration instructions may require calibration more frequently than annually was removed. This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to add "or more often as needed per the manufacturer instructions (e.g., if the balance is moved)," as described on ISOR pages 254-255. The changes to specify that instruments and equipment shall be calibrated more often as needed per manufacturer instructions were necessary to provide certainty for testers who need to calibrate instruments or equipment more frequently than annually and to ensure that instruments and equipment are properly calibrated and produce valid data. Commenters stated that balances may be moved for calibration purposes. This section requires calibration per manufacturer instructions, so it is not necessary to provide an example circumstance in which balance manufacturer instructions may require calibration more frequently than annually. This change was necessary to increase clarity for those who will be performing testing according to TP-901.

b. In section 9, language was added to clarify the temperature range required during section 8.2 through 8.5 of the durability demonstration for the time of the durability demonstration to be counted as part of the preconditioning procedure. This change was made in response to public comments. The preconditioning procedure may be conducted concurrently with section 8.2 through 8.5 of the durability demonstration if the temperature remains within the specified temperature range. Section 9 requires that the temperature never falls below 38 °C during preconditioning. Commenters suggested specifying the temperature range as greater than or equal to 38 °C in the sentence that discusses counting the time of the durability demonstration in section 8.2 through 8.5 as part of the preconditioning procedure. This change was necessary to increase clarity for those who will be performing testing according to TP-901.

c. In section 9, two instances of "fresh fuel" were changed to "fresh test fuel." This change was made in response to public comments on the use of "fresh fuel" in TP-902. The ISOR Proposed Amendments included new sentences in section 9 that refer to "fresh fuel." Commenters stated that the ISOR Proposed Amendments introduced a new term, "fresh fuel," and suggested the use of "test fuel" instead. The term "fresh test fuel" is used in section 8.5 of the ISOR Proposed Amendments to TP-901 and in the current text of section 5.1 of TP-902. The test fuels that may be used for testing according to TP-901 are specified in section 6. Using "fresh test fuel" rather than "fresh fuel" was necessary to increase clarity for those who will be performing testing according to TP-901.

## A.4. Modifications to SORE Evaporative Emissions Test Procedure, TP-902, Test Procedure for Determining Evaporative Emissions from Small Off-Road Engines

a. In section 4.3, language providing an example circumstance in which balance manufacturer's calibration instructions may require calibration more frequently than annually was removed. This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to add "or more often as needed per the manufacturer instructions (e.g., if the balance is moved)," as described on ISOR pages 274-276. The changes to specify that instruments and equipment shall be calibrated more often as needed per manufacturer instructions are necessary to provide certainty for testers who need to calibrate instruments or

equipment more frequently than annually and to ensure that instruments and equipment are properly calibrated and produce valid data. Commenters stated that balances may be moved for calibration purposes. This section requires calibration per manufacturer instructions, so it is not necessary to provide an example circumstance in which balance manufacturer instructions may require calibration more frequently than annually. This change was necessary to increase clarity for those who will be performing testing according to TP-902.

b. In sections 5.1 and in section 5.2, three instances of "fresh fuel" were changed to "fresh test fuel." This change was made in response to public comments. The ISOR Proposed Amendments included new sentences in sections 5.1 and 5.2 that refer to "fresh fuel." Commenters stated that the ISOR Proposed Amendments introduced a new term, "fresh fuel," and suggested the use of "test fuel" instead. The term "fresh test fuel" is used in section 2.1(f) of the ISOR Proposed Amendments to TP-902 and in the current text of section 5.1. The test fuels that may be used for testing according to TP-902 are specified in section 6. Using "fresh test fuel" rather than "fresh fuel" was necessary to increase clarity for those who will be performing testing according to TP-902.

c. In section 5.2 and 5.4, language was added to make measuring and recording the carbon canister mass optional. This change was made in response to public comments. In the ISOR Proposed Amendments, staff proposed to add requirements to measure and record the carbon canister mass during the test sequence, as described on ISOR pages 279-283. Commenters stated that canister removal and reinstallation may damage the hoses of an evaporative emission control system. Commenters did not provide data to support this assertion. Measuring and recording carbon canister mass can provide useful information regarding the ability of carbon canisters to capture and store venting emissions until they are purged to help understand emission test results. However, the test sequence in section 5 may be conducted without such information. Information on the change in mass of a carbon canister is most useful when an engine fails to meet the applicable emission standard. In such a case, a tester may choose to measure and record the mass of the carbon canister to help determine whether the canister may be malfunctioning. When an engine does meet the applicable emission standard, information on the change in mass of its carbon canister can be useful but is not needed to complete the test sequence in section 5 of TP-902. This change was necessary to provide flexibility to those who will be performing testing according to TP-902.

d. In section 7, the word "diurnal" was removed from the phrase "such as the use of a mini-SHED to measure diurnal evaporative emissions" to increase clarity. This change was made in response to public comments. Commenters suggested that "diurnal" should be deleted from this sentence. The proposed evaporative emission standards for model year 2024 and subsequent model years include hot soak emissions, and TP-902 is used to measure hot soak emissions. This change was necessary to clarify the example of a circumstance that would necessitate the approval of an alternative test procedure, and satisfies clarity requirements under California regulations (Title 1, CCR, § 16(a)(4)).

e. In Attachment 1 section 6.2, language was changed to specify that actively-purged carbon canisters would be purged with "air" rather than "dry air or nitrogen." This change was made in response to public comments. This change accounts for different canister designs and ensures the test procedure allows for purging canisters by drawing ambient air into the purge port, as engines do when carbon canisters are installed, as described on ISOR pages 279-282. Commenters stated that the requirement to use "dry air or nitrogen" in section 6.2 of Attachment 1 to TP-902 and the requirement to use "air" in the ISOR Proposed Amendments to section 5.2 of TP-902 were inconsistent. This change was necessary for consistency with TP-902 section 5.2, which includes the sentence, "Purging for an actively-purged carbon

canister consists of drawing 400 bed volumes of air through the canister at the canister manufacturer's recommended purge rate," in the ISOR Proposed Amendments.

## A.5. Modifications to California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1054)

Language in Part 1054 was changed to align with language in federal test procedures. As described in the ISOR (pages 49-50 and 300-305), CARB staff proposed updates to the CARB exhaust test procedures in Part 1054 to harmonize with federal test procedures adopted by the U.S. Environmental Protection Agency (U.S. EPA) in Title 40, Code of Federal Regulations, Part 1054 ("federal Part 1054"). Subsequent to CARB's adoption in 2012 of Part 1054 into the California Code of Regulations, U.S. EPA has made a number of terminology changes and other amendments to federal Part 1054. This harmonization simplifies testing for manufacturers and allows for easier comparison of the test procedures. Changes to federal Part 1054 were not incorporated in the ISOR Proposed Amendments if they were less stringent than CARB's SORE requirements. The following modifications were made in response to public comments. Commenters stated that additional changes are needed to provide consistency with federal Part 1054 per the amendments published in the United States Federal Register Volume 86, Issue 122, on June 29, 2021. None of these modifications affected the stringency of CARB's SORE requirements.

a. In Part 1054.2, a sentence defining the party responsible for compliance with evaporative emission requirements was moved from paragraph (b) to paragraph (a).

b. In Part 1054.30, paragraphs (a) through (d), text which is redundant with the requirements specified in 1054.825 was replaced with a requirement to send all reports and requests for approval to the Designated Compliance Officer, unless otherwise specified, along with a reference to additional requirements in section 1054.825.

c. In Part 1054.103(c) and Part 1054.105(c), the text "emission standards for hydrocarbons" was changed to "emission standards for hydrocarbon."

d. In Part 1054.125(c), the sentence, "All special maintenance instructions must be consistent with good engineering judgment," was added.

e. In Part 1054.125(e), a sentence was reworded to read, "You may not perform this nonemission-related maintenance on emission-data engines more often than the least frequent intervals that you recommend to the ultimate purchaser."

f. In Part 1054.205(p), the text "Report all test results involving measurement of pollutants for which emission standards apply. Indicate whether there are test results from invalid tests" was changed to "Report all valid test results involving measurement of pollutants for which emission standards apply. Also indicate whether there are test results from invalid tests."

g. In Part 1054.220, the section title was changed to "How do I amend my maintenance instructions?"

h. In Part 1054.225, the section title was changed to "How do I amend my application for certification?"

i. In Part 1054.230(a)(9), two instances of "family emission levels" were changed to "family emission limits."

j. In Part 1054.235(c)(3), the text was changed to read, "We may set the adjustable parameters of your engine to any point within the physically adjustable ranges (see section 1054.115(b))."

k. In Part 1054.235(c)(4), text describing actions CARB may take to calibrate an engine before testing it was changed.

l. In Part 1054.235(d)(1), the text "We may waive this criterion" was changed to "We may waive this paragraph (d)(1)."

m. In the section title of Part 1054.255, the text "my Executive Order" was changed to "an Executive Order."

n. In Part 1054.255(a), Part 1054.255(b), and Part 1054.255(d), the text "this part 1054" was changed to "this part."

o. In Part 1054.255(a), the text "your engine family" was changed to "the emission family."

p. In Part 1054.255(b) and Part 1054.255(f), the text "your application" was changed to "an application."

q. In Part 1054.255(b), the text "your engine family" was changed to "an emission family."

r. In Part 1054.255(c)(2), a reference to paragraph (e) of the same section was removed and the sentence, "This includes doing anything after submitting an application that causes submitted information to be false or incomplete," was added.

s. In Part 1054.255(c)(3), the text "Render inaccurate any test data" was changed to "Cause any test data to become inaccurate."

t. In Part 1054.255(d), Part 1054.255(e), and Part 1054.255(f), the text "your Executive Order" was changed to "an Executive Order."

u. In Part 1054.255(d), the text "do not keep the records we require or do not give us information as required under" was changed to "fail to keep records, send reports, or give us information as required under."

v. In Part 1054.501(b)(2), a sentence was changed to read, "Use gasoline specified for general testing except as specified in paragraph (d) of this section."

w. In Part 1054.505(b)(2), the text "cycle-validation criteria in Part 1065.514" was changed to "cycle-validation criteria in paragraph (a)(1) of this section," and "this paragraph (a)(2)" was changed to "this paragraph (b)(2)."

x. In Part 1054.601(d), the text "either of those defined terms" was changed to "the definitions in this part of either dual-fuel or flexible-fuel."

y. Section 1054.640, relating to special provisions for branded engines, was removed.

z. In Part 1054.655, the text "as long as it is done consistent with the manufacturer's instructions" was changed to "if it is done consistent with the manufacturer's instructions."

aa. In Part 1054.801, the text "Family emission level" was changed to "Family emission limit."

bb. In Part 1054.801, in the definition entry for Fuel type, the text "such as low-temperature or all-season gasoline" was changed to "such as premium gasoline, regular gasoline, or low-level ethanol-gasoline blends."

cc. In Part 1054.805, the text "Family Emission Level" was changed to "Family Emission Limit."

## A.6. Modifications to California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1065)

Language in Part 1065 was changed to align with language in federal test procedures. As described in the ISOR (pages 49-50 and 336-379), CARB staff proposed updates to the CARB exhaust test procedures in Part 1065 to harmonize with federal test procedures adopted by U.S. EPA in Title 40, Code of Federal Regulations, Part 1065 ("federal Part 1065"). Subsequent to CARB's adoption in 2012 of Part 1065 into the California Code of Regulations, U.S. EPA has made a number of terminology changes and other amendments to federal Part 1065. This harmonization simplifies testing for manufacturers and allows for easier comparison of the test procedures. Changes to federal Part 1065 were not incorporated in the ISOR Proposed Amendments if they were less stringent than CARB's SORE requirements. The following modifications were made in response to public comments. Commenters stated that additional changes are needed to provide consistency with federal Part 1065 per the amendments published in the United States Federal Register Volume 86, Issue 122, on June 29, 2021. None of these modifications affected the stringency of CARB's SORE requirements.

a. In Part 1065.2(c), the text "this would also apply" was changed to "this paragraph (c) would also apply."

b. In Part 1065.15(a)(3), the text "Particulate mass, PM" was changed to "Particulate matter, PM."

c. In Table 1 of 1065.190, "(percent)" was deleted after "Expected sulfuric acid fraction of PM," percentage symbols were added to the values below "Expected sulfuric acid fraction of PM," trailing zeroes to the right of the decimal point were deleted from temperatures specified in several cells, and corresponding changes were made to two headings.

d. In Part 1065.275(b)(4), the text "You may use a photoacoustic analyzer that has compensation algorithms that are functions of other gaseous measurements. T" was deleted.

e. In Part 1065.280(a), the text "You may use $O_2$ measurements with intake air or fuel flow measurements to calculate exhaust flow rate according to § 1065.650" was changed to "You may use good engineering judgment to develop calculations that use $O_2$ measurements with a chemical balance of fuel, intake air, and exhaust to calculate exhaust flow rate." The most recent federal regulations also reference diesel exhaust fluid ("DEF"), in the federal text "…a chemical balance of fuel, DEF, intake air, and exhaust…" To increase clarity per the rationale on pages 380-381 of the ISOR, the proposed text in Attachment F does not incorporate the federal text ", DEF" because California SORE regulations are not applicable to diesel engines.

f. In Part 1065.307(d)(6)(i), the text "Connect a span gas to the gas-divider inlet" was changed to "Connect a span gas containing only a single constituent of interest with balance of purified air or purified $N_2$ to the gas-divider inlet."

g. In Part 1065.307(e)(3), the text "during the linearity verification" was changed to "during linearity verification."

h. In Part 1065.307(f), the subsection title "Performance criteria for measurement systems," was added.

i. In Part 1065.309(d)(2), the text "water" was changed to "$H_2O$," a comma was added after "$N_2$" in the clause "We recommend humidifying your NO-CO-$CO_2$-$C_3H_8$-$CH_4$, balance $N_2$ blended gas," the text "flowing the gas mixture through a sealed vessel that humidifies the

gas by bubbling it through distilled water" was changed to "bubbling the gas mixture that meets the specifications in § 1065.750 through distilled $H_2O$ in a sealed vessel," the second instance of the text "If the sample does not pass through a dryer" was corrected to "If the sample passes through a dryer," and the text "humidify your span gas to an $H_2O$ at or above the level determined in § 1065.145(e)(2)" was changed to "humidify your span gas to an $H_2O$ level at or above the level determined in § 1065.145(e)(2) for that dryer."

j. In the introductory paragraph of Part 1065.341, the text "It may also apply" was changed to "The first method may also apply."

k. In Part 1065.341(a), the text "§ 1065.640 and § 1065.642" was changed to "§§ 1065.640 and 1065.642" in two places.

l. In Part 1065.341(f), the table title "Table 1 of § 1065.341 - Troubleshooting Guide for Propane Checks," was added.

m. In Part 1065.350(d)(7), the text "(0 ±0.4) mmol/mol" was changed to "(0.0 ±0.4) mmol/mol."

n. In Part 1065.365(f), the proposed deletion of a comma was reverted to match most recent federal text.

o. In Part 1065.365(f)(9), the text "$C_2H_6$ combined response factor and penetration fraction" was changed to "combined $C_2H_6$ response factor and $C_2H_6$ penetration fraction" and the text "§ 1065.660(b)(2)(iii), § 1065.660(d)(1)(iii), or § 1065.665" to "§ 1065.660(b)(2)(iii) or (d)(1)(iii) or § 1065.665."

p. In Part 1065.375(d)(7), the sentence "When performed with all the gases simultaneously, this is the combined interference," was added.

q. In Part 1065.410(c), the text "update your application" was changed to "update your application for certification," and the text "bad engine components" was changed to "malfunctioning components."

r. In Part 1065.514(f)(3), a change from the ISOR Proposed Amendments was reverted so the text "paragraph (f)(1) or (f)(2)" reverted to "paragraph (f)(1) or (2)."

s. In Part 1065.530(a)(2)(iii), the text "either as the point at which the engine thermostat controls engine temperature or as the point at which the engine coolant, block, or head absolute temperature is within ±2% of its mean value for at least 2 min" was changed to "as the point at which the engine thermostat controls engine temperature or as the point at which measured operating temperature has stayed within ±2% of the mean value for at least 2 min."

t. In Part 1065.543(b)(2)(ii), the text "$L_{\varepsilon aCrate}$ = 0.31· 230.0 = 71.300 g/hr" was changed to "$L_{\varepsilon aCrate}$ = 71.300 g/hr."

u. In Part 1065.640(d)(1), the text "1.837" in an example was corrected to "1.838."

v. In Part 1065.640(d)(2), the text "versus $Re^{\#}$, using paired values of ($Re^{\#}$, $C_d$)," was deleted.

w. In the section title of Part 1065.642, the text "SSV, CFV, and PDP" was changed to "PDP, SSV, and CFV."

x. In Part 1065.642(b), a comma was added after "$\dot{n}$" in the text "Calculate SSV molar flow rate, $\dot{n}$ as follows," and the text "$C_f$ = flow coefficient, as determined in §1065.640(c)(2)(ii)" was updated to reflect renumbering of the section in which $C_f$ is defined to § 1065.640(c)(3)(ii).

y. In Part 1065.642(c), the sentence, "Some CFV flow meters consist of a single venturi and some consist of multiple venturis, where different combinations of venturis are used to meter

different flow rates," was deleted, and the text "the ratio of the square root of the sum of the active venturi throat diameters, $d_t$, to the diameter of the common entrance to all the venturis, D" was changed to "the ratio of the square root of the sum of the active venturi throat diameters ($d_t$) to the diameter of the common entrance to all the venturis (D)."

z. In Part 1065.642(c)(1), the text "R = 8.314472 J/(mol·K)" in an example was changed to "R = 8.314472 J/(mol·K) = 8.314472 ($m^2$·kg)/($s^2$·mol·K)."

aa. In the introductory paragraph of Part 1065.644, the text "Eq.," referring to an equation number that was replaced by the text "the following equation" in the ISOR Proposed Amendments, was deleted.

bb. In Part 1065.650(c)(3)(ii), instructions for calculations were separated into subparagraphs "(A)," "(B)," and "(C)," text in the new subparagraph (B) was changed to "Calculate $\overline{M}$ for PM or any other analysis of a batch sample that yields a mass per mole of sample using the following equation," the text "The following example illustrates a calculation of $m_{PM}$:" was added after "(C)," and the label "Example:" was deleted prior to the example in the new subparagraph (C).

cc. In Part 1065.650(d)(7), the text "$C_{rev}$ = 2·π rad/rev" in an example calculation was changed to "$C_{rev}$ = 2·π rad/r."

dd. In Part 1065.655(b)(1), a reference to subsection 1065.650(e) was updated to refer to 1065.650(f).

ee. In Part 1065.655(d), the text "$M_H$ = 1.01" was changed to "$M_H$ = 1.00794," and the text "$w_c$ = 0.8205" was changed to "$w_c$ = 0.8206."

ff. In the introductory paragraph of Part 1065.655(e), a reference to "Table 1 of this section" was updated to refer to "Table 2 of this section."

gg. In Part 1065.655(f)(3), the text "Based on $\dot{m}_{fuel}$, calculate $\dot{n}_{exh}$ as follows" was changed to "Calculate $\dot{n}_{exh}$ based on $\dot{m}_j$ using the following equation," equation 1065.255-25 was updated, the text "$\dot{m}_{fuel}$" was changed to "$\dot{m}_1$" in the accompanying example calculation, and the indexing subscript "1" was added to four other terms in the accompanying example calculation.

hh. In 1065.660(c)(2), the text "145.6—0.970×18.9—1.02×10.6" in an example was changed to "145.6 - 0.970·18.9 - 1.02·10.6."

ii. In Part 1065.1001, the text "*Test interval* means a duration of time over which you determine brake-specific emissions" was changed to "*Test interval* means a duration of time over which you determine mass of emissions."

jj. In the introductory paragraph of Part 1065.1005, a reference to § 1065.25 was updated to refer to § 1065.20.

kk. In Part 1065.1005, titles for Tables 1, 3, 4, 5, 7, and 10 were added to match the latest federal Part 1065.

ll. In Table 1 of Part 1065.1005(a), the symbol for "atomic hydrogen-to-carbon ratio" was changed from "A" to "α," entries for "power-specific carbon mass error coefficient," *c*, "power-specific carbon mass rate absolute error coefficient," *d*, "atomic sulfur-to-carbon ratio," γ, and "differential static pressure," Δ*p* were added, the text "brake-specific basis" was changed to "brake-specific emission or fuel consumption," the unit symbol for "brake-specific emission or fuel consumption" was updated from "g/(kW·h)" to "g/(kW·hr)," the units

in terms of SI base units for "brake-specific emission or fuel consumption" were updated to "$3.6^{-1}\cdot10^{-9}\cdot m^{-2}\cdot s^{2}$," and the footnotes a and b were changed back to 1 and 2 to match the most recent federal text.

mm. In Table 5 of Part 1065.1005, entries for "absolute," a, "ambient," amb, "carbon mass," C, "related to a difference or error quantity," ε, "fluid stream," fluid, "relative (e.g., relative difference or error)," r, and "slip," s, were added.

nn. In Table 7 of Part 1065.1005, an entry for the molar mass of ethane, $M_{C2H6}$, was added, the footnotes a, b, and c were changed back to 1, 2, and 3 to match the most recent federal text, and periods were added at the ends of the footnotes.

oo. In the section title of Part 1065.1010, the text "Reference materials" was changed to "Incorporation by Reference."

## A.7. Modifications to Emissions and Economic Analyses

The emission benefits analysis conducted using SORE2020 and described in the ISOR was updated to reflect the 15-day modification to emission standards for pressure washers that use engines with displacement 225 cc or larger. Table 1 in Attachment G of the March 2022 15-Day Notice (Table D-1 in Attachment D to this FSOR) shows the resulting annual emission reductions for $NO_x$, ROG, particulate matter with diameter of 2.5 micrometers or less ($PM_{2.5}$), and carbon dioxide ($CO_2$). In 2031, the annual average emission reductions are expected to be approximately 7.2 tpd of $NO_x$ and 54.6 tpd of ROG. These are 2.7 percent and 0.73 percent lower than under the ISOR Proposed Amendments. The emission reductions are 42 percent and 50 percent of $NO_x$ and ROG emissions under the Baseline Scenario, respectively. These emission reductions, although fewer than those in the ISOR, would exceed the expected emission reductions of $NO_x$ and ROG in the 2016 State SIP Strategy measure for SORE of 4 and 36 tpd, respectively, in 2031, as compared to the Baseline Scenario emissions described in the ISOR. The cumulative total emission reductions from 2023 through 2043 as a result of the Proposed Amendments with 15-day modifications are approximately 58,844 tons of $NO_x$ and 421,924 tons of ROG compared to the Baseline Scenario emissions. In 2035, 93.2 percent of the small off-road equipment population subject to the SORE regulations would be ZEE under the Proposed Amendments with 15-day modifications, as compared to 93.4 percent under the ISOR Proposed Amendments, which is a difference of 0.2 percent.

The updated emission reductions were used to update the health benefits analysis. Table 2 in Attachment G of the March 2022 15-Day Notice (Table D-2 in Attachment D to this FSOR) shows the updated annual statewide avoided premature mortality and morbidity incidents under the Proposed Amendments with 15-day modifications. Overall, premature cardiopulmonary mortality would decrease by 887 over the regulatory horizon under the Proposed Amendments with 15-day modifications. The number of avoided premature deaths would be 5 fewer than under the ISOR Proposed Amendments.

In response to public comments, and in light of the 15-day modifications listed above, two modifications were made to the economic analysis.

a. The economic analysis was updated to account for the longer transition period in light of the 15-day modification to emission standards for pressure washers that use engines with displacement 225 cc or larger. The population of SORE and ZEE pressure washers in the regulatory scenario was updated to account for the continued sale of pressure washers that use engines with displacement 225 cc or larger in 2024-2027. The price used in the economic

analysis for a pressure washer that would meet the MY2024 emission standards is the price for this equipment type in Alternative 2 described in the ISOR.

b. In response to public comments, the price estimate for the professional ZEE lawn mower used in the economic analysis was updated using new information [Husqvarna, 2020 and 2022[1]]. Commenters stated that the professional ZEE lawn mower used in the economic analysis was "low-end" and was being compared to a "high-end" professional SORE lawn mower. The characteristics of the updated professional ZEE lawn mower more closely match those of the professional SORE lawn mower used in the economic analysis.

The other 15-day modifications described above would have negligible effects and did not warrant further modifications to the economic or emissions analyses.

Given these updates, resultant total costs and benefits have changed. Tables 3 through 7 in Attachment G of the March 2022 15-Day Notice show the updated net costs and benefits. Tables D-3 through D-7 in Attachment D to this FSOR incorporate these updates, as well as other minor updates described in section II.D of this chapter.

## A.8. Non-Substantive Modifications

In addition to the modifications described above, additional modifications correcting capitalization, formatting, numbering of sections, grammar, punctuation, and spelling were made in Part 1065. These changes are non-substantive. Below is a summary of the non-substantive changes CARB made.

a. In the title of Part 1065.260, "Flame ionization" was changed to "Flame-ionization".

b. In Part 1065.260(a), "flame ionization" was changed to "flame-ionization".

c. In Part 1065.307(e)(3)(vii), the omission of an overdot for flow rate $\dot{n}_{max}$ was corrected.

d. In Part 1065.341(e)(3), the text "instead the effective molar mass of HC" was corrected to read "instead of the effective molar mass of HC."

e. In Part 1065.543(b)(2)(ii), an erroneous period was deleted from the text "<u>If measured. $P_{max}$ is not available, use a manufacturer-declared value for $P_{max}$</u>."

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[1] The cost information for the new professional ZEE lawn mower was obtained from the following two documents, which were added to the rulemaking record as described in section III of this FSOR chapter:

Husqvarna. 2020. Husqvarna Battery BLi300. https://www.husqvarna.com. 2020; archived at Wayback Machine: http://web.archive.org/web/20200921141137/https://www.husqvarna.com/us/accessories/battery/battery-bli300/967071901/; citing a capture dated September 21, 2020.

Husqvarna. 2022. Husqvarna W520i Push Walk-Behind Mower. (Web link: https://www.husqvarna.com/us/walk-behind-mowers/w520i/. Last accessed: February 10, 2022.)

These prices were then combined with the price of the battery charger already included in the ISOR:

Husqvarna. 2020d. Husqvarna QC330. (Web link: https://www.husqvarna.com/us/accessories/battery/qc330-battery-charger/967091403/?q=967326812. Last accessed: November 6, 2020.)

f. In Part 1065.642(c)(2), the entirety of Equation 1065.642-6, which did not display correctly in the ISOR Proposed Amendments, was included.

g. In Part 1065.650(c)(3)(ii)(C), the "g" unit erroneously appended to the text "$m_{PM}$ =144.0·10$^{-6}$·57.692·1200" in the example calculation was deleted.

h. In Part 1065.655(e), an erroneous semicolon in the introductory paragraph introduced as a typographical error was deleted.

i. In Part 1065.655(e)(4), an erroneously-omitted overdot in the variable "$\dot{m}_j$" was added in the text "$\dot{m}_j$ = the mass flow rate of the fuel or any injected fluid j."

j. In Part 1065.750(a)(2)(iii), "flame ionization" was changed to "flame-ionization".

k. In Table 10 of Part 1065.1005, "flame ionization" was changed to "flame-ionization" in the definition of FID.

## A.9. Existing Environmental Analysis Remains Applicable to and Adequate for the Project

The modifications described throughout this FSOR chapter do not change implementation of the regulations in any way that affects the conclusions of the environmental analysis included in the ISOR. The modifications primarily consist of revisions that allow manufacturers to earn more emissions credits through certification of certain engines, allow more time for pressure washer manufacturers that produce units which use engines with displacement 225 cc or larger to develop zero-emission technology, and provide clarifying language to ensure internal and federal regulatory consistency, none of which alter the compliance responses.

The ISOR includes compliance responses for the transition of SORE to zero-emission equipment; the later transition of pressure washers that use engines with displacement 225 cc or larger merely delays the pressure washer manufacturers' compliance response implementation since the zero-emission standard for these engines will be effective starting in model year 2028 instead of model year 2024. Thus, the modifications would not create the potential for any new or more severe significant environmental impacts which were not previously examined in the ISOR. None of the modifications has the potential to increase emissions above the Baseline Scenario emissions or otherwise cause any significant environmental impacts, as the proposed regulations would remain more stringent than under existing regulatory conditions. While one element of the modifications would allow pressure washers that use engines with displacement 225 cc or larger to follow the Proposed Amendments' emission standards schedule for portable generators which are less stringent than the emission standards originally proposed for pressure washers of this size, emission standards for portable generators in the Proposed Amendments are still significantly more stringent than what is allowed under California's existing emission standards. The existing environmental analysis remains applicable to and adequate for the project. Therefore, no additional environmental analysis is required for the modifications identified in the FSOR.

# B. Additional Documents Added to the Record

In the interest of completeness and in accordance with Government Code section 11347.1, subdivision (a), through the three 15-Day Notices (released November 12, 2021, March 30, 2022, and May 27, 2022), CARB added to the rulemaking record and invited comments on the following additional documents.

1. AACOG. 2013. Commercial Lawn and Garden Emission Inventory. Technical Report. Alamo Area Council of Governments; Natural Resources/Transportation Department (AACOG). December 31, 2013. Available at: https://www.aacog.com/ DocumentCenter/View/36123/Commerical_Lawn_and_Garden_Report_123113---PDF?bidId=. Last accessed: May 2, 2022.
2. Allen. 2017. The SAGE Encyclopedia of Communication Research Methods. Volume 1. Mike Allen, Editor; SAGE Publications. "Geometric Mean," Melissa Ann Tafoya, pages 935-937. April 2017.
3. American Honda Motor Co, Inc. 2022. American Honda Motor Co, Inc. (Honda) Owner's Manual: Generator EU2200i / EU22001 Companion. Available at: https://cdn.powerequipment.honda.com/pe/pdf/manuals/00X31Z446130.pdf. Last accessed: April 29, 2022.
4. ATB. 2017. Challenges of Inventory Preparation: Activity Data, Emission Factors and Models. Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB). Presented by Professor Dr. Barbara Amon at the International Symposium on Emissions of Gas and Dust from Livestock, EmiLi 2017. May 22, 2017. Available at: https://colloque.inrae.fr/emili2017_eng/content/ download/4097/ 44257/version/1/ file/B_Amon_inventories_EMILI2017.pdf. Last accessed: May 2, 2022.
5. Automotive Testing Laboratories. 2003. Collection of Evaporative Emissions Data from Off-Road Equipment. Report prepared by the Automotive Testing Laboratories, Inc. for the California Air Resources Board and California Environmental Protection Agency, Air Resources Board Contract #00-315. November 24, 2003.
6. California Energy Commission. 2021a. TN 236983 California Energy Demand Forecast Update, 2020 - 2030 Baseline Forecast - Mid Demand Case for the State Planning Area, Corrected February 2021. Microsoft Excel spreadsheet report downloaded on November 3, 2021, from the California Energy Commission website available at: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=20-IEPR-03. Last accessed: November 3, 2021.
7. California Energy Commission. 2021b. California Energy Consumption Database: Electricity Consumption by County (GWh) in 2020. Microsoft Excel spreadsheet report downloaded on November 8, 2021, from the California Energy Commission online database available at: http://www.ecdms.energy.ca.gov/. Last accessed: November 8, 2021.
8. California Department of Tax and Fee Administration. 2021. California City and County Sales and Use Tax Rates: Rates Effective 04/1/2021 through 06/30/2021. Available at: https://cdtfa.ca.gov/taxes-and-fees/Archive-Rates-04-1-2021-06-30-2021.pdf. Last accessed: March 23, 2022.
9. California Department of Transportation. 2021. Transportation Funding in California 2021. Available at: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/data-analytics-services/transportation-economics/transportation-funding-booklet/final-2021-transportation-funding-1-25-22-a11y.pdf. Last accessed: March 23, 2022.
10. Call2Recycle. 2022. Battery & Cellphone Dropoff Locations. Available at: https://www.call2recycle.org/locator/?l=95814. Last accessed: February 10, 2022.
11. CARB. 2003a. OFFROAD Modeling Change Technical Memo, Addition of Evaporative Emissions for Small Off-Road Engines. Revised April 21, 2003.

12. CARB. 2003b. OFFROAD Modeling Change Technical Memo, Change in Population and Activity Factors for Lawn and Garden Equipment. Revised June 13, 2003.

13. CARB. 2018. 2012 California Survey of Residential Lawn and Garden Equipment Owners: Population and Activity. Prepared by staff of the Air Quality Planning and Sciences Division. Revised October 1, 2018.

14. CARB. 2020. Executive Order U-U-008-0316. Executed December 8, 2020.

15. CARB. 2021a. Executive Order U-U-008-0312-1. Executed May 11, 2021.

16. CARB. 2021b. Executive Order U-U-008-0314-1. Executed May 11, 2021.

17. CARB. 2021k. Technical Support Document: Potential Increase in Electricity Demand from Added Charging Requirements for Zero-Emission Small Off-Road Equipment under Proposed Amendments to the Small Off-Road Engine Regulations. Prepared by staff of the Monitoring and Laboratory Division, California Air Resources Board. November 2021.

18. CARB. 2022a. Technical Support Document: Model Year 2018 Small Off-Road Engine Generator California Production Volume Based on Production Line Testing Reports, Redacted. Summary table prepared by staff of the Monitoring and Laboratory Division. March 2022.

19. CARB. 2022b. Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI. Microsoft Excel workbook prepared by staff of the Air Quality Planning and Science Division. March 2022.

20. CARB. 2022c. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

21. Champion Power Equipment. 2022. Champion Global Power Equipment Owner's Manual & Operating Instructions: 3400 Starting watts / 3100 Running watts Portable Inverter Generator, model Number 100233. Available at https://www.championpowerequipment.com/wp-content/uploads/2017/08/100233-om-english.pdf. Last accessed: April 29, 2022.

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23. CSUF SSRC. 2018a. Social Science Research Center New Hire Training Guide. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF). December 5, 2018.

24. CSUF SSRC. 2018b. Social Science Research Center Shift Supervisor Training Manual. Prepared by CSUF SSRC. September 24, 2018.

25. CSUF SSRC. 2018c. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Household Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. December 12, 2018.

26. CSUF SSRC. 2019a. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Vendor Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. May 10, 2019.

27. CSUF SSRC. 2019b. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Business Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. May 30, 2019.

28. Department of Toxic Substance Control. 2021. How is California Doing with Recycling Rechargeable Batteries? October 5, 2021.

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30. Edelstein, Stephen. 2021. Report: EV battery costs hit another low in 2021, but they might rise in 2022. Green Car Reports. December 1, 2021.

31. EGO. 2022. POWER+ 42" Z6 Zero Turn Riding Mower (ZT4204L). Available at: https://egopowerplus.com/zero-turn-riding-mower-zt4204l/. Last accessed: February 9, 2022.

32. EHP&A, Inc. 1997. Guidance for Estimating Lawn and Garden Equipment Activity Levels; Volume IV, Chapter 3. Prepared by E. H. Pechan & Assoc., Inc. (EHP&A) for U.S. Environmental Protection Agency, Mobile Source Committee Emission Inventory Improvement Program. September 1997. Available at: https://www.epa.gov/sites/default/files/2015-08/documents/iv03.pdf. Last accessed: May 2, 2022.

33. Energy and Environmental Analysis. 1997. Documentation of Input Factors for the New Off-Road Mobile Source Emissions Inventory Model. Report prepared by Energy and Analysis, Inc., for the California Air Resources Board. February 1997.

34. ERV. 2022. ERV – The World's 1st Fully Electric Caravan. Available at: https://www.e-rv.com/. Last accessed May 13, 2022.

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43. Husqvarna. 2020. Husqvarna Battery BLi300. https://www.husqvarna.com. 2020; archived at Wayback Machine: http://web.archive.org/web/20200921141137/https://www.husqvarna.com/us/accessories/battery/battery-bli300/967071901/; citing a capture dated September 21, 2020.

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# C. Non-Substantive Modifications

Subsequent to the March 2022 15-Day Notice public comment period mentioned above, CARB made the following additional non-substantive changes to the regulation:

## C.1. Non-Substantive Modifications to the SORE Exhaust Emission Regulations

a. In § 2400(a)(59), a tab space was inserted before the "(59)" to align the spacing of this subsection with the other numbered definitions for formatting purposes.

b. In § 2400(a)(60), a tab space was inserted before the "(60)" to align the spacing of this subsection with the other numbered definitions for formatting purposes.

## C.2. Non-Substantive Modifications to the SORE Evaporative Emission Regulations

a. In § 2761(d), the comma and the following blank space after "Compliance" were struck out in the first sentence. They were inadvertently not struck out in the ISOR Proposed Amendments.

## C.3. Non-Substantive Modifications to SORE Evaporative Emissions Test Procedure, TP-901, Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Fuel Tanks

a. In the Table of Contents, text and page numbers were updated to reflect the proposed additions and deletions to the text, tables, and figures described in the ISOR and in the March 2022 15-Day Notice and formatting changes elsewhere to improve page breaks for existing tables and figures.

## C.4. Non-Substantive Modifications to SORE Evaporative Emissions Test Procedure, TP-902, Test Procedure for Determining Evaporative Emissions from Small Off-Road Engines

a. In the Table of Contents, text and page numbers were updated to reflect the proposed additions and deletions to the text, tables, and figures described in the ISOR and in the March 2022 15-Day Notice and formatting changes elsewhere to improve page breaks for existing tables and figures.

## C.5. Non-Substantive Modifications to SORE Evaporative Emission Control System Certification Procedure, CP-902, Certification Procedure for Evaporative Emission Control Systems on Small Off-Road Engines

a. In the title of section 5.14, "Submission of an engine or equipment unit" was changed to "Submission of an Engine or Equipment Unit" to be consistent with the capitalization formatting of other section titles.

## C.6. Non-Substantive Modifications to California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1054)

a. In the Table of Contents, text and page numbers were updated to reflect the proposed additions and deletions to the text, tables, and figures described in the ISOR and in the March 2022 15-Day Notice and formatting changes elsewhere to improve page breaks for existing tables and figures.

   i. The title for § 1054.220 was updated to reflect the change to the section title proposed in the March 2022 15-Day Notice, as described in section II.A.5 of this FSOR. This change was inadvertently not made to the Table of Contents.

   ii. The title for § 1054.225 was updated to reflect the change to the section title proposed in the March 2022 15-Day Notice, as described in section II.A.5 of this FSOR. This change was inadvertently not made to the Table of Contents.

   iii. The title for § 1054.255 was updated to reflect the change to the section title proposed in the ISOR Proposed Amendments. This change was inadvertently not made to the Table of Contents.

   iv. The title for § 1054.640 was removed from the Table of Contents to reflect the removal of § 1054.640 from Part 1054 proposed in the March 2022 15-Day Notice, as described in section II.A.5 of this FSOR. The title was inadvertently left in Table of Contents.

b. In Part 1054, "Part 1054 – Control of Emission from New, Small Nonroad Spark-Ignition Engines and Equipment" was underlined because the underline formatting for new text was inadvertently omitted in the ISOR Proposed Amendments.

c. In Part 1054.240(d), " in subpart B of this part" was underlined at the end of the first underlined sentence. The underline formatting for new text was inadvertently omitted in the ISOR Proposed Amendments.

## C.7. Non-Substantive Modifications to California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1065)

a. In the Table of Contents, text and page numbers were updated to reflect the proposed additions and deletions to the text, tables, and figures described in the ISOR and in the March 2022 15-Day Notice and formatting changes elsewhere to improve page breaks for existing tables and figures.

b. In Part 1065.15(a)(2)(iii), a period was added that was inadvertently omitted when the new text was added in the ISOR Proposed Amendments.

c. In Part 1065.145(b), a period was deleted that was inadvertently left when the second-to-last sentence was deleted in the ISOR Proposed Amendments.

d. In Part 1065.170(a)(1), the strikeout formatting was removed from the space between the second and third sentences for grammatical purposes.

e. In Part 1065.170(b), a period was added at the end of the second-to-last sentence because it was inadvertently omitted in the ISOR Proposed Amendments.

f. In Part 1065.220(a)(1)(iii), a period was added at the end of the new sentence because it was inadvertently omitted in the ISOR Proposed Amendments.

g. In Part 1065.284(b), a period was deleted that was inadvertently left when the last sentence was deleted in the ISOR Proposed Amendments.

h. In Part 1065.303, Table 1, the strikeout formatting was removed from the space between "Minimum" and "frequency" in the header of the second column. The strikeout formatting was inadvertently included in the text in the ISOR Proposed Amendments.

i. In Part 1065.307(c)(7), the strikeout formatting was removed from the space between "and" and "good" in the first sentence. The strikeout formatting was inadvertently included in the text in the ISOR Proposed Amendments.

j. In Part 1065.310(a), the strikeout formatting was removed from the space at the beginning of the second sentence. The strikeout formatting was inadvertently included in the text in the ISOR Proposed Amendments.

k. In Part 1065.310(c)(1), the strikeout formatting was removed from the period at the end of the second to last sentence. The strikeout formatting was inadvertently included in the text in the ISOR Proposed Amendments.

l. In Part 1065.340(g)(4), the "$T$" in "$T_{in}$" was underlined. This subsection is new text in the Proposed Amendments, but the underline formatting was inadvertently omitted from the "$T$" in the ISOR Proposed Amendments.

m. In Part 1065.340(g)(6)(i), the "$\overline{n}$" in both occurrences of "$\overline{n}_{ref}$" was underlined. This subsection is new text in the Proposed Amendments, but the underline formatting was inadvertently omitted from the "$\overline{n}$" in the ISOR Proposed Amendments.

n. In Part 1065.340(g)(6)(ii), the "$\overline{T}$" in "$\overline{T}_{dew}$" was underlined. This subsection is new text in the Proposed Amendments, but the underline formatting was inadvertently omitted from the "$\overline{T}$" in the ISOR Proposed Amendments.

o. In Part 1065.340(g)(6)(iii), the "$\overline{T}$" in "$\overline{T}_{in}$" was underlined. This subsection is new text in the Proposed Amendments, but the underline formatting was inadvertently omitted from the "$\overline{T}$" in the ISOR Proposed Amendments.

p. In Part 1065.340(h)(4), the "(" in "(4)" was underlined. This subsection was renumbered, but the underline formatting was inadvertently omitted from the "(" in the ISOR Proposed Amendments.

q. In Part 1065.340(h)(7), the underline formatting from the "$\overline{P}$" in "$\Delta\,\overline{P}_{cfv}$" was underlined This is current text and was inadvertently underlined in the ISOR Proposed Amendments.

r. In Part 1065.350(d)(2), the strikeout formatting was removed from the space before "passe~~d~~s" for correct formatting.

s. In Part 1065.350(d)(5), the strikeout formatting was removed from the space between "judgment" and "to" in the first sentence that was inadvertently struck out in the ISOR Proposed Amendments.

t. In Part 1065.390(c), the period, which was proposed in the ISOR Proposed Amendments, at the end of the first sentence, was underlined. The underline formatting was inadvertently omitted in the ISOR Proposed Amendments.

u. In Part 1065.501(c)(2)(i), the strikeout formatting was removed from the space between "data" and "for" that was inadvertently struck out in the ISOR Proposed Amendments.

v. In Part 1065.512(b)(2), the period at the end of the struck out second sentence was struck out. The strikeout formatting was inadvertently omitted in the ISOR Proposed Amendments.

w. In Part 1065.545(a), the comma between "rates" and "where" was struck out in "rates~~,~~ ~~where~~", in the first sentence. The comma was inadvertently not struck out in the ISOR Proposed Amendments.

x. In Part 1065.545(b), the comma between "rates" and "where" was struck out in "rates~~,~~ ~~where~~", in the first sentence. The comma was inadvertently not struck out in the ISOR Proposed Amendments.

y. In Part 1065.602(h)(1), Eq. 1065.602-9, "$y$=1051.1" was changed to "$y$= 1050.1" to correct a typographical error that was present in federal 40 CFR 1065 when these procedures were adopted by CARB in 2012.

z. In Part 1065.602(j)(1), the "-" in "~~Eq. 1065.602-11.~~" was struck out. The "-" was inadvertently not struck out in the ISOR Proposed Amendments.

aa. In Part 1065.610(a)(2), the formula of Eq. 1065.610-2 was underlined. This equation is new text in the Proposed Amendments, but the underline formatting was inadvertently omitted from the ISOR Proposed Amendments.

bb. In Part 1065.640(c), the strikeout formatting was removed from the space following the second struck out sentence and from the space between the "Z=1," and "you" in "…Z=1, you…" as both were inadvertently struck out in the ISOR Proposed Amendments.

cc. In Part 1065.640(d)(3), the strikeout formatting was removed from the space between "~~regression statistics,~~" and "SEE" in "~~regression statistics,~~ SEE" as it was inadvertently struck out in the ISOR Proposed Amendments.

dd. In Part 1065.640(d)(5), the strikeout formatting was removed from the space between "however" and "~~Y~~you" in "…however ~~Y~~you…" as it was inadvertently struck out in the ISOR Proposed Amendments.

ee. In Part 1065.640(d)(7), a period was added at the end of the sentence because it was inadvertently omitted in the ISOR Proposed Amendments.

ff. In Part 1065.650(e)(2), a period was added after "Eq" in "…Eq 1065.650-13…" in the seventh sentence for correct formatting.

gg. In Part 1065.655(d), the strikeout formatting was removed from the space between "$\gamma$ =" and "atomic" in "$\gamma$ = atomic sulfur-to-carbon…" as it was inadvertently struck out in the ISOR Proposed Amendments.

hh. In Part 1065.655(d), the strikeout formatting was removed from the space between "$M_N$ =" and "molar" in "$M_N$ = molar mass of nitrogen" as it was inadvertently struck out in the ISOR Proposed Amendments.

ii. In Part 1065.655(f), strikeout formatting was added to the first parenthesis in "(~~e~~)." The strikeout formatting was inadvertently omitted in the ISOR Proposed Amendments.

jj. In Part 1065.660(c)(2), ":" was added to the end of the first paragraph for correct formatting as it was inadvertently omitted from the ISOR Proposed Amendments.

kk. In Part 1065.675(d), the underline formatting was removed from the fifth to last and fourth to last equations, as well as from "~~(−0.00939−0.01109)·100% = −2.0048% = -2%~~", as they are also struck out and meant to be deleted. The underline formatting was inadvertently added to the ISOR Proposed Amendments.

ll. In Part 1065.1001 Definitions, *Idle Speed*, the strikeout formatting was removed from the space before "~~Note that warm~~…" in the last sentence, as the strikeout formatting was inadvertently included in the ISOR Proposed Amendments.

mm. In Part 1065.1001 Definitions, *Mode (3)*, the r in "or" was struck out as the entire word was intended to be struck out in the ISOR Proposed Amendments.

The above-described modifications constitute non-substantive changes to the regulatory text because they more accurately reflect the numbering of a section and correct spelling and grammatical errors, but do not materially alter the requirements or conditions of the proposed rulemaking action.

## D. Updated Economic Impacts Information

CARB included updated rates for sales and gasoline excise taxes in the economic analysis and identified the proportion of the State gas excise tax revenue that is shared with local governments and associated fiscal impacts under the Proposed Amendments. The statewide average sales tax rate increased from 8.5 to 8.6 percent.[2] The local average gas sales tax rate increased from 2.25 percent to 3.7 percent. As described in section C.1.c of ISOR Appendix I (SRIA), the sales tax is added to the equipment prices to estimate direct costs to all affected entities (residents, nonlandscaping businesses, landscapers, and government), under the Proposed Amendments. CARB also corrected the price for the professional-grade ZEE pressure washer. In previous versions of the economic analysis it was reported and used in calculations as $2,799.00. As cited in the ISOR, the correct pre-tax price is $2,799.99. As described in section II.A.7, CARB updated the economic analysis to account for the longer transition period for pressure washers that use engines with displacement 225 cc or larger and the updated cost of the professional ZEE lawn mower.

Given these updates, the resultant total costs and benefits have changed. The net direct cost of the Proposed Amendments to businesses and individuals increased $323.59 million over the regulatory horizon as compared to the ISOR Proposed Amendments due to the update to the professional ZEE lawn mower cost. The net direct cost of the Proposed Amendments increased $4.40 million over the regulatory horizon as compared to the ISOR Proposed Amendments due to the 15-day modification to emission standards for pressure washers that use engines with displacement 225 cc or larger. The net direct cost of the Proposed Amendments increased $9.99 million over the regulatory horizon as compared to the ISOR Proposed Amendments due to the updated tax rates and corrected pre-tax price for the professional-grade ZEE pressure washer. Overall, the Proposed Amendments with 15-day modifications and updated values have a net direct cost of $4.41 billion accrued through 2043. Professional users are expected to experience a total net direct cost through 2043 of $1.45 billion,

[2] The sales tax varies across the state from a minimum of 7.25 percent up to 10.50 percent in some municipalities; a value of 8.6 percent was used for the economic analysis based on a statewide average weighted by economic output. Based on economic output data from REMI PI+ (https://www.remi.com/model/pi/) and tax rate data from California Department of Tax and Fee Administration (California City and County Sales and Use Tax Rates: Rates Effective 04/1/2021 through 06/30/2021. Available at: https://cdtfa.ca.gov/taxes-and-fees/Archive-Rates-04-1-2021-06-30-2021.pdf. Last accessed: March 23, 2022).

while residential users are expected to experience a total net direct cost of $2.97 billion. Annual net direct costs are shown in Tables D-3 through D-5 in Attachment D. When the valuation of health impacts is considered, through 2043 (shown in Table D-6 of Attachment D), the Proposed Amendments with 15-day modifications and updated values are estimated to have a net benefit of $3.81 billion and a benefit-cost ratio of 1.26. The net benefit is 11 percent lower than under the ISOR Proposed Amendments. The resulting economic effects are summarized and compared to the results in the ISOR in Table D-7 of Attachment D.

Updated estimated fiscal impacts on local and State government are shown in Tables D-8 and D-9, respectively. CARB's updated economic analysis estimates fiscal impact to local governments would be a net gain of $68.80 million over the first three fiscal years (FY) of implementation of the Proposed Amendments and a net loss of $248.25 million accrued over the period FY23-24 through FY42-43. The initial annual gains due to increased sales tax revenue would be increasingly offset by reductions in gasoline tax revenue, as more of the equipment population becomes ZEE. Similarly, the updated economic analysis estimates fiscal impact to State government would be a net gain of $58.14 million over the first three fiscal years of the implementation of the Proposed Amendments and a net loss of $262.73 million accrued over the period FY23-24 through FY42-43 as there will be reductions in gasoline excise tax revenue as more of the equipment population becomes ZEE.

# III. Documents Incorporated by Reference

The Proposed Amendments incorporated by reference the following amended certification and test procedures and standards in the specified sections of the regulations:

- CARB. Small Off-Road Engine Evaporative Emissions Test Procedure, TP-901, Test Procedure for Determining Permeation Emissions from Small Off-Road Engine Fuel Tanks. Adopted July 26, 2004, and last amended [insert amended date]; incorporated by reference in 13 CCR, sections 2755(b) and 2758(b)(4)(A)2.
- CARB. Small Off-Road Engine Evaporative Emissions Test Procedure, TP-902, Test Procedure for Determining Evaporative Emissions from Small Off-Road Engines. Adopted July 26, 2004, and last amended [insert amended date]; incorporated by reference in 13 CCR, section 2758(a)(4)(B).
- CARB. Small Off-Road Engine Evaporative Emission Control System Certification Procedure, CP-902, Certification Procedure for Evaporative Emission Control Systems on Small Off-Road Engines. Adopted July 26, 2004, and last amended [insert amended date]; incorporated by reference in 13 CCR, section 2753(a).
- CARB. California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1054). Adopted October 25, 2012, and last amended [insert amended date]; incorporated by reference in 13 CCR, section 2403(d).
- CARB. California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1065). Adopted October 25, 2012, and last amended [insert amended date]; incorporated by reference in 13 CCR, section 2403(d).

The Proposed Amendments incorporated by reference the following documents in the specified sections of the regulations. These are copyrighted documents and will be on file as part of the public record.

1. American National Standards Institute, Inc. (ANSI)/National Electrical Manufacturers Association (NEMA). 2016. ANSI/NEMA WD 6-2016, Wiring Devices - Dimensional Specifications. ANSI Approval Date: February 11, 2016; incorporated by reference in 13 CCR, section 2401(a)(36).
2. American National Standards Institute, Inc. (ANSI)/Outdoor Power Equipment Institute (OPEI). 2018. ANSI/OPEI B71.10-2018, American National Standard for Off-Road Ground-Supported Outdoor Power Equipment – Gasoline Fuel Systems – Performance Specifications and Test Procedures. Published November 12, 2018; incorporated by reference in 13 CCR, section 2752(a)(3).
3. SAE International (SAE). 2011. Surface Vehicle Standard SAE J1527, Marine Fuel Hoses. Revised February 2011; incorporated by reference in 13 CCR, section 2752(a)(29).
4. SAE. 2012. Surface Vehicle Standard SAE J30, Fuel and Oil Hoses. Revised February 2012; incorporated by reference in 13 CCR, section 2752(a)(28).
5. SAE. 2013. Surface Vehicle Recommended Practice SAE J2996, Small Diameter Fuel Line Permeation Test Procedure. Issued January 2013; incorporated by reference in 13 CCR, section 2752(a)(32).
6. SAE. 2017. Surface Vehicle Recommended Practice SAE J1930, Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms - Equivalent to ISO/TR 15031-2. Revised March 2017; incorporated by reference in 13 CCR, sections 2404(c)(4)(D) and 2752(a)(31).
7. SAE. 2019. Surface Vehicle Recommended Practice SAE J1737, Test Procedure to Determine the Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assemblies by Recirculation. Revised August 2019; incorporated by reference in 13 CCR, sections 2752(a)(30) and 2754(b)(2).

The Proposed Amendments incorporated by reference the following documents in the specified sections of the "California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1054)":

8. Title 40, Code of Federal Regulations, Part 1051—Control of Emissions from Recreational Engines and Vehicles, section 1051.505. Last amended June 29, 2021; incorporated by reference in section 1054.501(d).
9. Title 40, Code of Federal Regulations, Part 1068—General Compliance Provisions for Highway, Stationary, and Nonroad Programs, sections 1068.103(f) and 1068.215. Last amended June 29, 2021; incorporated by reference in sections 1054.10(g) and 1054.601(b) and (c).

The Proposed Amendments incorporated by reference the following documents in the specified sections of the "California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1065)". All of these documents except the CARB test procedures and certification procedure, federal test procedures, and National Institute of Standards and Technology (NIST) publications, are copyrighted documents. All of these documents will be on file as part of the public record.

10. Title 40, Code of Federal Regulations, Part 63, Appendix A—Test Methods, Test Method 320—Measurement of Vapor Phase Organic and Inorganic Emissions by Extractive Fourier Transform Infrared (FTIR) Spectroscopy. Last amended December 2, 2020; incorporated by reference in sections 1065.266 and 1065.275.

11. Title 40, Code of Federal Regulations, Part 86—Control of Emissions from New and In-Use Highway Vehicles and Engines, section 86.132-96(j). Last amended June 29, 2021; incorporated by reference in section 1065.405(e)(2) [re-lettered to 1065.405(f)(2) by the Proposed Amendments].

12. Title 40, Code of Federal Regulations, Part 1090—Regulation of Fuels, Fuel Additives, and Regulated Blendstocks. Last amended December 4, 2020; incorporated by reference in section 1065.701(d)(2).

13. ASTM International (ASTM). 1995. D2986 – 95a, Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Dioctyl Phthalate) Smoke Test. Approved September 10, 1995; incorporated by reference in section 1065.170(c).

14. ASTM. 2009. F1471 – 09, Standard Test Method for Air Cleaning Performance of a High-Efficiency Particulate Air Filter System. Approved March 1, 2009; incorporated by reference in section 1065.1001.

15. ASTM. 2010. D5291 – 10, Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants. Approved May 1, 2010; incorporated by reference in section 1065.655(e).

16. ASTM. 2010. D5599 – 00 (Reapproved 2010), Standard Test Method for Determination of Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detection. Approved October 1, 2010; incorporated by reference in section 1065.655(e).

17. ASTM. 2012. D4629 – 12, Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection. Approved April 15, 2012; incorporated by reference in section 1065.655(e).

18. ASTM. 2012. D5762 – 12, Standard Test Method for Nitrogen in Petroleum and Petroleum Products by Boat-Inlet Chemiluminescence. Approved April 15, 2012; incorporated by reference in section 1065.655(e).

19. ASTM. 2012. D6348 – 12$^{\varepsilon 1}$, Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy. Approved February 1, 2012; incorporated by reference in sections 1065. 266(b) and 1065.275(b).

20. ASTM. 2020. D1835 – 20, Standard Specification for Liquefied Petroleum (LP) Gases. Approved May 1, 2020; incorporated by reference in section 1065.701.

21. CARB. 2012. California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. Amended December 6, 2012; incorporated by reference in section 1065.701.

22. CARB. 2018. California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. Amended December 19, 2018; incorporated by reference in section 1065.701.

23. GPA Midstream Association. 2017. GPA Midstream Standard 2140-17, Liquefied Petroleum Gas Specifications and Test Methods. Adopted as Recommended Procedures 1931, revised 2017; incorporated by reference in section 1065.701.

24. International Organization for Standardization (ISO). 2020. ISO 8178-1, Reciprocating internal combustion engines — Exhaust emission measurement — Part 1: Test-bed measurement systems of gaseous and particulate emissions. Reference number ISO 8178-1:2020(E). Published June 2020; incorporated by reference in section 1065.601(c)(1).

25. National Institute of Standards and Technology (NIST). 1994. NIST Technical Note 1297, 1994 Edition, Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results. September 1994; incorporated by reference in section 1065.1001.

26. NIST. 2008. Special Publication 811, 2008 Edition, Guide for the Use of the International System of Units (SI). March 2008; incorporated by reference in sections 1065.20(a) and 1065.1005.

27. SAE. 2011. Surface Vehicle Recommended Practice SAE J1151, Methane Measurement Using Gas Chromatography. Stabilized September 2011; incorporated by reference in sections 1065.267(b) and 1065.750(a)(2)(i).

These documents are necessary to ensure that all SORE test procedures are following the most current version of procedures and guidance on engines.

These documents were incorporated by reference because it would be cumbersome, unduly expensive, and otherwise impractical to publish them in the California Code of Regulations. In addition, some of the documents are copyrighted, and cannot be reprinted or distributed without violating the licensing agreements. The documents are lengthy and highly technical test methods and engineering documents that would add unnecessary additional volume to the regulation. Distribution to all recipients of the California Code of Regulations is not needed because the interested audience for these documents is limited to the technical staff at a portion of reporting facilities, most of whom are already familiar with these methods and documents. Also, the incorporated documents were made available by CARB upon request during the rulemaking action and will continue to be available in the future. The documents are also available from college and public libraries or may be purchased directly from the publishers.

# IV. Summary of Comments and Agency Responses

Written comments were received during the 45-day comment period in response to the October 12, 2021, public hearing notice, and written and oral comments were presented at the Board Hearing. Table 1 lists the individuals and organizations who provided written comments during the 45-day comment period. Table 2 lists the individuals and organizations who provided written comments during the Board Hearing. Table 3 lists the individuals and organizations who provided oral comments during the Board Hearing. Written comments also were received during the 15-day comment period in response to the March 2022 15-Day Notice. Table 4 lists the individuals and organizations that provided written comments during the 15-day public comment period for the March 2022 15-Day Notice. Table 5 lists the individuals and organizations that provided written comments during the 15-day public comment period for the May 2022 15-Day Notice. Subsection A of this Chapter IV provides the text or a summary of each comment submitted during the 45-day and hearing comment periods, including every objection or recommendation specifically directed at the Proposed Amendments, together with an agency response. Subsection B of this Chapter IV provides

the text or a summary of each 15-day comment submitted during the 15-day comment period in response to the March 2022 15-Day Notice, including every objection or recommendation specifically directed at the 15-day modifications to the original Proposed Amendments, together with an agency response. Subsection C of this Chapter IV provides the text or a summary of each 15-day comment submitted during the 15-day comment period in response to the May 2022 15-Day Notice, together with an agency response. In addition, three stakeholders provided comments tabulated in Microsoft Excel spreadsheets. These comment spreadsheets, together with agency responses, are presented as tables in the following attachments to this FSOR:

- Attachment A: Outdoor Power Equipment Institute (OPEI) "Annex A" comments, which accompanied OPEI's first November 29, 2021, letter submitted by Greg Knott during the 45-day comment period
- Attachment B: Truck and Engine Manufacturers Association (EMA) "Exhibit F" comments, which accompanied EMA's November 29, 2021, letter submitted by Patricia Hanz during the 45-day comment period
- Attachment C: American Honda Motor Co., Inc. (Honda) spreadsheet comments, which were attached to Honda's April 14, 2022, email submitted by Matthew Johnson during the 15-day public comment period for the March 2022 15-Day Notice

Note, Table 1 and subsection A are particularly extensive—Table 1 alone is nearly 50 pages—because comment letters and emails were submitted by more than 1,300 individuals or organizations.

Tables 1 through 5 each have fields that indicate the commenter names, comment submission dates, commenter affiliation, and commenter code. Commenter codes are assigned to each written comment submission and oral testimony to help identify each commenters' written and/or oral comment in the comments/responses which follow in sections IV.A, IV.B, and IV.C. Commenter codes are included in parentheses at the end of each comment paragraph. Some commenters have multiple commenter codes because they submitted multiple written comments to the docket or via email or submitted both written and oral comments.

In addition, Tables 1, 2, 4 and 5 note the submission method for written comments. Many stakeholders submitted written comments using CARB's web-based Comments Log docket ("docket") described in the notices and available at *https://ww2.arb.ca.gov/applications/public-comments?p=comm&s=bccommlog&l=sore2021*. Other stakeholders chose to submit comments only via email to Board Members and/or CARB staff, and others submitted comments via email and the docket. If a stakeholder submitted identical comments via both the docket and email, only the docket version is included in this FSOR chapter. In addition, many stakeholders submitted identical comments via email to multiple CARB staff and Board Members, and some stakeholders submitted identical comments multiple times to the docket. Such duplicate comments are included only once in this FSOR chapter. All email and docket versions of written comments are included in the rulemaking record.

Table 1 also indicates in the "Form Letter?" field whether a written comment is a form letter, that is, a comment letter submitted to the docket or via email by more than one stakeholder that has identical comment text but with a different name, salutation, and/or introductory information.[3] For example, commenter codes 128.001 and 557 in Table 1 have identical comment letters as commenter code 128

[3] Tables 2 and 4 do not have columns to indicate form letters because no form letters were submitted during the hearing and 15-day comment periods.

in Table 1. CARB grouped comments by form letter. CARB identified 11 form letters and labelled them A through K. Table 1 indicates in the "Form Letter Category" field which form letter corresponds to a given commenter code. Form letters are included only once in this FSOR chapter regardless of how many stakeholders sent the letter, and the form letter category is included in parentheses after each form letter comment paragraph instead of commenter codes. This approach is necessary to improve the readability of the comments because, while some form letters were sent by only two stakeholders and therefore would have only two associated commenter codes, others were sent by more than 200 stakeholders:

| | | |
|---|---|---|
| Form Letter A: 2 stakeholders | Form Letter E: 2 stakeholders | Form Letter I: 113 stakeholders |
| Form Letter B: 63 stakeholders | Form Letter F: 21 stakeholders | Form Letter J: 283 stakeholders |
| Form Letter C: 2 stakeholders | Form Letter G: 240 stakeholders | Form Letter K: 4 stakeholders |
| Form Letter D: 4 stakeholders | Form Letter H: 30 stakeholders | |

Form Letters A through I express opposition to the Proposed Amendments. Form Letters A, B, F, G, and H have very similar content, including several identical sentences and paragraphs, and focus on concerns about potential impacts under the Proposed Amendments to professional landscape contractors and outdoor power equipment dealers. Form Letters C and D have similar content, focusing on concerns about pressure washers and potential impacts to industrial equipment suppliers and commercial cleaning businesses. Form Letters E and I focus on concerns about potential impacts to landscape and garden professionals.

Form Letter J expresses support for the Proposed Amendments and Form Letter K expresses support with a request that CARB require 100 percent of SORE sold in California to be zero-emission. Form Letter J in its entirety was submitted by 258 stakeholders, while a variety of combinations of one to five of its six parts were submitted by 25 stakeholders. Table 1 indicates in the "Form Letter Category" which parts were submitted by each of these 25 stakeholders, and the form letter parts are coded as "Form Letter J Part 1" through "Form Letter J Part 6" in section IV.A.1.

Numerous stakeholders submitted form letters that included additional, unique comment sentences or paragraphs, or personalized versions of some of the form letter sentences. Table 1 indicates these with a carat symbol (^). Such personalized comment text is included in section IV.A and annotated with the associated commenter code. If a stakeholder personalized multiple paragraphs of a form letter, the stakeholder's entire comment letter is included in section IV.A and annotated with the associated commenter code, even though substantial portions may be identical to a form letter.

A "Commenter and Form Letter Index" is provided in section VI.A of this FSOR that lists each commenter and form letter code with references to the pages where they occur, and a "Comment and Response Index" is provided in section VI.B that lists the heading titles for the comment/response groupings.

Note that most written comments were scanned or otherwise electronically converted, so they may include formatting that is not consistent with the originally submitted comment letters. However, all content reflects the submitted comments. All typographical errors are as stated in the originally submitted comment letters and have not been corrected here. The written comments submitted to the docket for the 45-day, hearing, and 15-day comment periods are available here: *https://ww2.arb.ca.gov/applications/public-comments?p=comm&s=bccommlog&l=sore2021*. The written comments submitted via email are included in the rulemaking record and are available upon request. The transcript and video recording of oral comments presented during the Board hearing is available here: *https://ww2.arb.ca.gov/2021-board-meetings* (see December 9, 2021).

**Table 1. Written Comments Received During the 45-Day Comment Period**

| Commenter | Date | Affiliation | Commenter Code[4] | Submission Method | Form Letter? | Form Letter Category[5] |
|---|---|---|---|---|---|---|
| A, J | 11/11/21 | [none provided] | 44 | Docket | No | |
| Abramowitsch, Miriam | 11/17/21 | California resident | 128.04 | Docket | Yes | Form Letter J |
| Acebo, Ryan | 11/17/21 | California resident | 128.188 | Docket | Yes | Form Letter J |
| Acharya, Nimisha | 11/18/21 | Small business owner | 831 | Email | Yes | Form Letter G |
| Adams, Leigh | 11/17/21 | California resident | 335 | Docket | Yes | Form Letter J^ |
| Addiego, Frank | 11/22/21 | Small business owner | 874 | Email | Yes | Form Letter G |
| Adkins, Tim | 11/22/21 | Small business owner | 910 | Email | Yes | Form Letter G |
| Agee, Will | 11/17/21 | God's Grace Outreach Ministries, International | 128.199 | Docket | Yes | Form Letter J |
| Aghevli, Roshanne | 11/17/21 | California resident | 128.12 | Docket | Yes | Form Letter J |
| Aguilar, Edgar, Chair | 11/29/21 | Asthma Coalition of Kern County | 519 | Docket | No | |
| Aird, Bruce, Ph.D. | 11/26/21 | [none provided] | 496 | Docket | No | |
| Akatsuka, Lilia | 11/22/21 | Small business owner | 887 | Email | Yes | Form Letter G |
| Albert, Shan | 11/17/21 | [none provided] | 143 | Docket | No | |
| Alcantar, Santiago | 11/15/21 | Small business owner | 619 | Email | Yes | Form Letter G |
| Aldridge, Ruth | 11/18/21 | Landscape Professional | 125.08 | Docket | Yes | Form Letter I |
| Alexander, Donald | 11/23/21 | Small business owner | 921 | Email | Yes | Form Letter G |
| Alexander, John | 11/17/21 | [none provided] | 349 | Docket | No | |
| Alexander, Kim | 11/29/21 | Mow Better co-convener | 562 | Docket | No | |
| Alexander, Nancy | 11/19/21 | [none provided] | 423 | Docket | No | |
| Alfaro, Jose | 11/17/21 | Landscape Professional | 125.011 | Docket | Yes | Form Letter I |
| Alfred, Voskian | 10/20/21 | Syska Voskian Consulting | 570 | Email | No | |
| Allen, Christopher | 11/17/21 | California resident | 128.016 | Docket | Yes | Form Letter J |
| Allen, Dennis | 11/17/21 | [none provided] | 361 | Docket | No | |

[4] An asterisk symbol (*) indicates that a commenter submitted identical copies of their comments as separate submissions to the web docket.

[5] A carat symbol (^) indicates that a commenter submitted a form letter that includes unique additions or personalized form letter text.

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Allen, Kenneth | 11/17/21 | Landscape Professional | 125.036 | Docket | Yes | Form Letter I |
| Allison, Roy | 11/22/21 | Small business owner | 902 | Email | Yes | Form Letter G |
| Al-Shamma, Nabeel | 11/17/21 | California resident | 128.027 | Docket | Yes | Form Letter J |
| Altstatt, Jessica | 11/17/21 | California resident | 128.067 | Docket | Yes | Form Letter J^ |
| Alvarado, Joseph | 11/17/21 | [none provided] | 282 | Docket | No | |
| Alvarez, Federico | 10/23/21 | Small business owner | 624 | Email | Yes | Form Letter B |
| Alvarez, Oscar | 11/17/21 | California resident | 128.104 | Docket | Yes | Form Letter J |
| Amber, Glenn | 11/24/21 | Westerbeke Corporation | 488 | Docket | No | |
| Amber, Glenn | 11/24/21 | Westerbeke Corporation | 598 | Email | No | |
| Ames, Mary | 11/18/21 | California resident | 381 | Docket | Yes | Form Letter J Part 1^ |
| Anacker, Celeste | 11/17/21 | California resident | 128.108 | Docket | Yes | Form Letter J |
| Anacleto, Aaron | 11/17/21 | Small business owner | 804 | Email | Yes | Form Letter G |
| Ancira, Al | 11/12/21 | [none provided] | 92 | Docket | No | |
| Andersen, Chris | 11/22/21 | Landscape Professional | 125.089 | Docket | Yes | Form Letter I |
| Andersen, Peter | 11/17/21 | Sierra Club | 245 | Docket | No | |
| Anderson, LD | 11/17/21 | [none provided] | 329 | Docket | No | |
| Anderson, Stephanie | 11/18/21 | Small business owner | 830 | Email | Yes | Form Letter G |
| Anderson, Stephen | 11/17/21 | [none provided] | 362 | Docket | No | |
| Anderson, Terrence | 11/7/21 | Small business owner | 648 | Email | Yes | Form Letter B |
| Anderson, Yujin | 11/9/21 | Commercial cleaning business servicing/small business owner | 21 | Docket | No | |
| Anderson-Miles, Eleanor | 11/17/21 | [none provided] | 135 | Docket | No | |
| Andre, Joseph | 11/22/21 | Small business owner | 882 | Email | Yes | Form Letter F |
| Andre, Michelle | 11/17/21 | Landscape Professional | 125.026 | Docket | Yes | Form Letter I |
| Andrews, Jill | 11/17/21 | [none provided] | 292 | Docket | No | |
| Andrews, Zach | 11/20/21 | Small business owner | 849 | Email | Yes | Form Letter G |
| Angell, JL | 11/17/21 | [none provided] | 157 | Docket | No | |
| Angier, Martin | 11/15/21 | Small business owner | 695 | Email | Yes | Form Letter G |
| Antonowitsch, James | 11/11/21 | [none provided] | 67 | Docket | No | |
| Aoyagi, Cassy | 11/12/21 | FormLA Landscaping, Inc | 94 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Applegate, William | 11/29/21 | Small business owner | 532 | Docket & Email | Yes | Form Letter G |
| Arbuckle, Bonnie | 11/17/21 | California resident | 128.007 | Docket | Yes | Form Letter J |
| Armstrong, Noah | 11/17/21 | California resident | 128.14 | Docket | Yes | Form Letter J |
| Arnold, Jon | 11/22/21 | Small business owner | 883 | Email | Yes | Form Letter G |
| Arriola, Ricardo | 11/17/21 | Landscape Professional | 125.042 | Docket | Yes | Form Letter I |
| Arrivee, David | 11/17/21 | Resident of Arroyo Grande | 185 | Docket | No | |
| Arzeta, Reyes | 11/16/21 | Small business owner | 786 | Email | Yes | Form Letter H |
| Askeland, Ron, Dr. | 11/29/21 | SD-SEQUEL | 545 | Docket | No | |
| Askeland, Ron, Dr. | 11/29/21 | San Diegans for Sustainable, Equitable, and Quiet Equipment in Landscaping (SD-SEQUEL) | 557 | Docket | Yes | Form Letter J^ |
| Askey, Jerry | 11/10/21 | [none provided] | 27 | Docket | No | |
| Askren, Misha | 11/24/21 | Sierra Club | 480 | Docket | No | |
| Aspeitia, Miguel | 11/21/21 | Global Sun Landscape | 450 | Docket | No | |
| Auerbach, Lee | 11/17/21 | [none provided] | 173 | Docket | No | |
| Avila, Anthony | 11/25/21 | California resident | 128.246 | Docket | Yes | Form Letter J |
| Avila, Leo | 11/24/21 | LandscapePro | 482 | Docket | No | |
| Avila, Leo | 11/24/21 | Small business owner | 941 | Email | Yes | Form Letter G |
| Avila, Marino | 11/22/21 | Landscape Professional | 125.095 | Docket | Yes | Form Letter I |
| Avila, Olivia | 11/24/21 | Small business owner | 944 | Email | Yes | Form Letter G |
| Aziz, Fadi | 11/15/21 | Small business owner | 679 | Email | Yes | Form Letter G |
| Baba, Doug | 11/3/21 | Small business owner | 628 | Email | Yes | Form Letter B |
| Babcock, Phil | 11/22/21 | Small business owner | 895 | Email | Yes | Form Letter G |
| Bailey, James | 11/12/21 | Commercial pressure washer | 88 | Docket | No | |
| Baker, Joy | 11/17/21 | [none provided] | 289 | Docket | No | |
| Baker, Matthew | 11/29/21 | Planning and Conservation League | 545 | Docket | No | |
| Bal, Steven | 11/17/21 | California resident | 128.19 | Docket | Yes | Form Letter J |
| Balaban, Orest | 11/19/21 | [none provided] | 425 | Docket | No | |
| Balogh, Andrew | 11/18/21 | Landscape Professional | 125.077 | Docket | Yes | Form Letter I |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Banuelos, Ulisses | 11/17/21 | Landscape Professional | 125.071 | Docket | Yes | Form Letter I |
| Barba, Linda | 11/16/21 | Small business owner | 776 | Email | Yes | Form Letter G |
| Barnaba, Anthony | 11/11/21 | Small landscape business | 50 | Docket | No | |
| Barrantes, Rafael | 11/12/21 | Small business owner | 663 | Email | Yes | Form Letter B |
| Barrett, Richard | 11/12/21 | Small business owner | 659 | Email | Yes | Form Letter B |
| Barretto, Craig | 11/9/21 | Owner Operator | 22 | Docket | No | |
| Barry, Regan | 11/29/21 | California Landscape Contractors Association (CLCA) | 554 | Docket | No | |
| Bassett, Steven | 11/15/21 | Small business owner | 718 | Email | Yes | Form Letter G |
| Batchelor, Kenneth | 11/17/21 | [none provided] | 302 | Docket | No | |
| Bates, Philip | 11/17/21 | Landscape Professional | 125.052 | Docket | Yes | Form Letter I |
| Baty, Michael | 11/16/21 | Small business owner | 777 | Email | Yes | Form Letter H |
| Baumgarten, Steve | 11/15/21 | Small business owner | 714 | Email | Yes | Form Letter G |
| Baxter, Brandon | 11/18/21 | Kern Turf Supply | 402, 403* | Docket | No | |
| Baxter, Joslyn | 11/22/21 | Sierra Club | 128.238 | Docket | Yes | Form Letter J |
| Bean, Steve | 11/17/21 | [none provided] | 363 | Docket | No | |
| Bedzyk, Michael | 11/15/21 | Small business owner | 700 | Email | Yes | Form Letter G |
| Beebe, Russ | 11/17/21 | California resident | 128.103 | Docket | Yes | Form Letter J |
| Beliak, Elise | 11/17/21 | California resident | 128.033 | Docket | Yes | Form Letter J |
| Bell, Elizabeth | 11/18/21 | [none provided] | 372 | Docket | No | |
| Bell, Terry | 11/16/21 | Small business owner | 795 | Email | Yes | Form Letter G |
| Bello, Carlos, MPH, CHES, Treasurer | 11/29/21 | Asthma Coalition of Kern County | 519 | Docket | No | |
| Bellonio, Bridgett | 11/4/21 | Small business owner | 643 | Email | Yes | Form Letter B |
| Belt, Annie | 11/17/21 | [none provided] | 129 | Docket | No | |
| Bemus, Corin | 11/18/21 | Landscape Professional | 125.073 | Docket | Yes | Form Letter I |
| Bender, Kae | 11/17/21 | Resident of Southern California | 177 | Docket | No | |
| Benites, McKayla | 11/12/21 | California Valley Landscape, Inc. | 99 | Docket | No | |
| Bennett, Louis | 11/17/21 | California resident | 128.051 | Docket | Yes | Form Letter J |
| Benton, Annette | 11/17/21 | [none provided] | 273 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Benz, Christina | 11/26/21 | Napa Climate NOW! | 494 | Docket | Yes | Form Letter J Part 1^ |
| Berger, Dan | 11/17/21 | California resident | 128.155 | Docket | Yes | Form Letter J |
| Berlage, Bob | 11/29/21 | Big Creek Lumber Co | 517 | Docket | No | |
| Bernal, Raul | 11/17/21 | Landscape Professional | 125.048 | Docket | Yes | Form Letter I |
| Bernhaut, Jerry | 11/17/21 | River Watch | 280 | Docket | No | |
| Bersentes, Evan | 11/10/21 | [none provided] | 31 | Docket | Yes | Form Letter E |
| Berteaux, Elizabeth | 11/17/21 | [none provided] | 356 | Docket | Yes | Form Letter J Parts 2, 4, 6^ |
| Bettenhausen, Elizabeth | 11/17/21 | California resident | 128.022 | Docket | Yes | Form Letter J |
| Beyeler, Arturo | 11/17/21 | California resident | 128.093 | Docket | Yes | Form Letter J |
| Beyer, Janice | 11/17/21 | [none provided] | 198 | Docket | No | |
| Bezanson, David | 11/29/21 | [none provided] | 523 | Docket | No | |
| Bhence, Blaze | 11/18/21 | [none provided] | 374 | Docket | No | |
| Bissonnette, Kevin | 11/17/21 | [none provided] | 279 | Docket | No | |
| Blackmore, Bryan | 11/16/21 | Small business owner | 731 | Email | Yes | Form Letter G |
| Blackwell-Marchant, Patricia | 11/17/21 | [none provided] | 138 | Docket | No | |
| Blair, Allison | 11/17/21 | [none provided] | 328 | Docket | No | |
| Blasco, Natalie | 11/17/21 | California resident | 128.077 | Docket | Yes | Form Letter J |
| Bliss, Casey | 11/15/21 | Small business owner | 671 | Email | Yes | Form Letter G |
| Bloom, Amanda | 11/17/21 | [none provided] | 344 | Docket | No | |
| Blumer, Jacques | 11/17/21 | [none provided] | 166 | Docket | No | |
| Bobele, Merrill | 11/17/21 | [none provided] | 286 | Docket | No | |
| Bobias, Patrick | 11/22/21 | Landscape Professional | 125.093 | Docket | Yes | Form Letter I |
| Bocchetti, Ralph | 11/17/21 | [none provided] | 337 | Docket | No | |
| Bodily, Melissa | 11/22/21 | Small business owner | 856 | Email | Yes | Form Letter G |
| Bohnert, Allen | 11/17/21 | Retired | 128.187 | Docket | Yes | Form Letter J |
| Bokelman, Tommy | 11/17/21 | Landscape Professional | 125.043 | Docket | Yes | Form Letter I |
| Bollock, Margaret | 11/17/21 | Sierra Club | 128.146 | Docket | Yes | Form Letter J |
| Bonelli, Ricco | 11/17/21 | [none provided] | 170 | Docket | No | |
| Bonfield, Tim | 11/17/21 | [none provided] | 224 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Bonifas, Alan | 11/29/21 | Cleaning Equipment Trade Association (CETA) | 536 | Docket | No | |
| Bonus, Kenneth | 10/15/21 | San Diego Ultra Running Friends (SURF) | 1 | Docket | No | |
| Borello, Gino | 11/17/21 | Landscape Professional | 125.007 | Docket | Yes | Form Letter I |
| Boyer, David | 11/17/21 | California resident | 128.162 | Docket | Yes | Form Letter J |
| Boynton, Richard | 11/12/21 | Landscaper | 75 | Docket | No | |
| Bozzelli, Benny | 11/4/21 | Small business owner | 633 | Email | Yes | Form Letter B |
| Bozzelli, Benny (Vice President Owner) and Bozzelli, Debbie (President Owner) | 11/4/21 | Commercial cleaning business servicing/small business owner | 10 | Docket | No | |
| Bozzelli, Debbie | 11/4/21 | Small business owner | 634 | Email | Yes | Form Letter B |
| Braaksma, Darryl | 11/29/21 | Green Valley Aloha Saw and Mower | 514[6] | Docket | No | |
| Braband, Taryn | 11/17/21 | [none provided] | 171 | Docket | No | |
| Brady, Nicole | 11/4/21 | Commercial cleaning business servicing/small business owner | 11 | Docket | No | |
| Brady, Sierra | 11/17/21 | Landscape Professional | 125.031, 125.053,* 125.060,* 125.064* | Docket | Yes | Form Letter I |
| Brady, William | 11/4/21 | Small business owner | 636 | Email | Yes | Form Letter B |
| Brainin, Sylvia | 11/17/21 | California resident | 128.113 | Docket | Yes | Form Letter J |
| Brakensiek, Jay | 11/24/21 | [none provided] | 485 | Docket | No | |
| Brandt, Michael | 11/17/21 | California resident | 128.001 | Docket | Yes | Form Letter J |
| Bravo, Harold | 11/17/21 | Landscape Professional | 125.05 | Docket | Yes | Form Letter I |

[6] For Comment Log docket entry 514, the commenter submitted a comment letter as an attachment, copied it into the Comment Log docket's comment field, and made changes to some of the comment paragraphs in the docket comment field compared to the attachment. Comment paragraphs that are identical in both versions are included only once in this FSOR chapter. The comment log version and attachment are included in their entirety in the rulemaking record and both can be accessed in the Comments Log docket available at *https://ww2.arb.ca.gov/applications/public-comments?p=comm&s=bccommlog&l=sore2021*.

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Bray, Andrew | 11/12/21 | National Association of Landscape Professionals (NALP) and California Landscape Contractors Association (CLCA)[7] | 586 | Email | No | |
| Bray, Andrew | 11/19/21 | Landscape Professional | 125.085 | Docket | Yes | Form Letter I |
| Bray, Andrew | 11/29/21 | NALP | 533 | Docket | No | |
| Brehm, Angelica | 11/17/21 | California resident | 128.023 | Docket | Yes | Form Letter J^ |
| Brennan, Brett | 11/17/21 | Urban Habitat Environmental Landscapes | 125 | Docket | Yes | Form Letter I |
| Brewer, George | 11/17/21 | [none provided] | 248 | Docket | No | |
| Briley, Michael | 11/19/21 | [none provided] | 418 | Docket | No | |
| Briner, George | 11/17/21 | Small business owner | 805 | Email | Yes | Form Letter F |
| Brink, Steven | 11/15/21 | California Forestry Association | 121 | Docket | No | |
| Brodsky, Gregg | 11/29/21 | Alkota Cleaning Systems | 559 | Docket | No | |
| Brooks, Marilee | 11/17/21 | [none provided] | 152 | Docket | No | |
| Brown, Clair | 11/17/21 | Prof of Economics, UC Berkeley | 182 | Docket | No | |
| Brown, Joshua | 11/15/21 | Small business owner | 693 | Email | Yes | Form Letter G |
| Brown, Justin | 11/18/21 | Small business owner | 827 | Email | Yes | Form Letter G |
| Brown, Kevin | 11/15/21 | Small business owner | 696 | Email | Yes | Form Letter G |
| Bruce, Curt | 11/14/21 | [none provided] | 112 | Docket | No | |
| Bruce, William | 11/22/21 | Small business owner | 904 | Email | Yes | Form Letter G |
| Bryant, Paul | 11/22/21 | Small business owner | 889 | Email | Yes | Form Letter G |
| Buckley, Sean | 11/15/21 | Small business owner | 668 | Email | Yes | Form Letter B |
| Buddiga, Praveen, MD, FAAAI | 11/29/21 | Family Allergy Asthma Clinic (Fresno) | 519 | Docket | No | |
| Buder, Henry | 11/15/21 | North Coast Chapter | 119 | Docket | No | |

[7] The email submitted by Andrew Bray on November 12, 2022, included two attachments, (1) a joint CLCA/NALP letter dated November 9, 2021, and signed by Sandra Giarde, CAE, CLCA Executive Director, and Andrew Bray, NALP VP Government Relations, and (2) a Microsoft Excel spreadsheet containing CLCA and NALP Battery Powered Equipment Survey results. These attachments also were included as Appendix A and Appendix B, respectively, to NALP's November 29, 2022 letter submitted by Andrew Bray to the web docket (commenter code 533). CARB's responses to these attachments are included with CARB's responses to NALP's November 29, 2022 letter.

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Buethe, Brad | 11/17/21 | California resident | 128.081 | Docket | Yes | Form Letter J |
| Buhman, Tammy | 11/22/21 | Small business owner | 914 | Email | Yes | Form Letter G |
| Bunch, Ron | 11/9/21 | [none provided] | 25 | Docket | No | |
| Burns, Bruce | 11/17/21 | [none provided] | 339 | Docket | No | |
| Burns, Elizabeth | 11/19/21 | Landscape business | 427 | Docket | No | |
| Burt, Michele | 11/15/21 | Small business owner | 703 | Email | Yes | Form Letter G |
| Busch, Brian | 11/15/21 | Small business owner | 670 | Email | Yes | Form Letter G |
| Busek, Linda | 11/17/21 | California resident | 128.07 | Docket | Yes | Form Letter J^ |
| Bushala, George | 11/17/21 | Landscape Professional | 125.069 | Docket | Yes | Form Letter I |
| Butler, Sam | 11/17/21 | Resident of Los Angeles | 191 | Docket | Yes | Form Letter J^ |
| C, Jena | 11/10/21 | [none provided] | 30 | Docket | No | |
| Caballero, Eric | 11/17/21 | Landscape Professional | 125.028 | Docket | Yes | Form Letter I |
| Cabitto, Tim | 11/3/21 | Small business owner | 631 | Email | Yes | Form Letter B |
| Cahn, Lynda | 11/17/21 | California resident | 128.176 | Docket | Yes | Form Letter J |
| Caldwell, James | 11/12/21 | Small business owner | 665 | Email | Yes | Form Letter B |
| Calhoun, Charles | 11/17/21 | California resident | 237 | Docket | Yes | Form Letter J Parts 1, 2, 6 |
| Callenbach, Joanna | 10/12/21 | Stonebrae L.P. | 563 | Email | No | |
| Cam, Clint | 11/10/21 | [none provided] | 29 | Docket | No | |
| Camarena, Alex | 11/17/21 | Landscape Professional | 125.01 | Docket | Yes | Form Letter I |
| Campbell, Ian | 11/11/21 | Industry | 39 | Docket | No | |
| Campbell, Jeff | 11/11/21 | Small business owner | 42 | Docket | No | |
| Campisi, Vincent | 11/17/21 | California resident | 128.164 | Docket | Yes | Form Letter J |
| Cancel, Jon | 11/18/21 | Landscape Professional | 125.074 | Docket | Yes | Form Letter I |
| Canning, Thomas | 11/28/21 | [none provided] | 505 | Docket | No | |
| Cannon, Matthew | 11/18/21 | Brightview Landscape Services | 395 | Docket | No | |
| Caplan, Michael | 11/17/21 | California resident | 128.057 | Docket | Yes | Form Letter J |
| Cardenas, Albertano | 11/17/21 | Landscape Professional | 125.012 | Docket | Yes | Form Letter I |
| Cardenas, Edgar | 11/17/21 | Landscape Professional | 125.014 | Docket | Yes | Form Letter I |
| Careccia, Maryfrances | 11/17/21 | [none provided] | 169 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Carleson, Eric | 11/22/21 | Associated California Loggers | 466 | Docket | No | |
| Carlino, Thomas | 11/18/21 | California resident | 128.221 | Docket | Yes | Form Letter J |
| Carlton, Melanie | 11/16/21 | Small business owner | 803 | Email | Yes | Form Letter H |
| Carlton, Spencer | 11/12/21 | LUSA Holdings, LLC | 105 | Docket | No | |
| Carmona, Eric | 11/17/21 | Landscape Professional | 125.049 | Docket | Yes | Form Letter I |
| Carrel, Marc, President & CEO | 11/29/21 | BREATHE Southern California | 519 | Docket | No | |
| Carrillo, Omar | 11/22/21 | Landscape Professional | 125.099 | Docket | Yes | Form Letter I |
| Carrington, Martha | 11/17/21 | California resident | 128.191 | Docket | Yes | Form Letter J |
| Carson, Frank | 11/18/21 | landscape and garden professional | 377 | Docket | Yes | Form Letter I |
| Carter, Fred | 11/9/21 | Pressure Washing Company | 23 | Docket | No | |
| Cass, Elaine | 11/17/21 | [none provided] | 252 | Docket | No | |
| Castro, Melissa | 11/15/21 | Small business owner | 702 | Email | Yes | Form Letter G |
| Castro, Rick | 11/15/21 | Small business owner | 725 | Email | Yes | Form Letter G |
| Cate, Sharon | 11/28/21 | [none provided] | 501 | Docket | No | |
| Cathcart, Artie | 11/22/21 | Small business owner | 858 | Email | Yes | Form Letter G |
| Cathcart, Lehiem | 11/23/21 | Small business owner | 931 | Email | Yes | Form Letter G |
| Cathcart, Sylace | 11/22/21 | Small business owner | 907 | Email | Yes | Form Letter G |
| Caulkins, James | 11/17/21 | California resident | 128.028 | Docket | Yes | Form Letter J |
| Cavalier, Bradley | 11/15/21 | [none provided] | 114 | Docket | No | |
| Cavasian, Edward | 11/17/21 | California resident | 128.091 | Docket | Yes | Form Letter J |
| Cerny, Jayne | 11/17/21 | [none provided] | 149 | Docket | No | |
| Cha, Gary | 11/16/21 | Small business owner | 752 | Email | Yes | Form Letter G |
| Chamberlain, Emily | 11/16/21 | Small business owner | 750 | Email | Yes | Form Letter G |
| Chamberlain, Emily | 11/3/21 | [none provided] | 581 | Email | No | |
| Chamberlain, Tanya | 11/11/21 | [none provided] | 36 | Docket | No | |
| Chan, B. | 11/18/21 | California resident | 128.22 | Docket | Yes | Form Letter J |
| Chandy, Asha, Communications Coordinator | 11/29/21 | Asthma Coalition of Kern County | 519 | Docket | No | |
| Chang, Daniel | 11/16/21 | Small business owner | 744 | Email | Yes | Form Letter G |
| Chapman, Gregory | 10/15/21 | Small business owner | 604 | Email | Yes | Form Letter B |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Chase, Esther | 11/19/21 | [none provided] | 421 | Docket | No | |
| Chau, Steven | 11/11/21 | J J & J Landscape Management, Inc | 57 | Docket | No | |
| Chenel, Laura | 11/17/21 | California resident | 128.071 | Docket | Yes | Form Letter J |
| Chenoweth, Jamaica | 11/20/21 | [none provided] | 448 | Docket | No | |
| Cherwink, Robert | 11/17/21 | California resident | 128.038 | Docket | Yes | Form Letter J |
| Chew, Brad | 10/27/21 | Amador County resident | 577 | Email | No | |
| Chinn, Jason | 11/17/21 | California resident | 128.06 | Docket | Yes | Form Letter J |
| Chinn-Smoot, Laura | 11/17/21 | [none provided] | 357 | Docket | No | |
| Choong, Yvonne, Vice President, Center for Health Policy | 11/29/21 | California Medical Association | 519 | Docket | No | |
| Chun, Anthony | 11/15/21 | Small business owner | 722 | Email | Yes | Form Letter G |
| Chun, Won | 11/22/21 | Small business owner | 916 | Email | Yes | Form Letter G |
| Clark, Adam | 11/15/21 | Small business owner | 684 | Email | Yes | Form Letter G |
| Clark, Stephanie | 11/24/21 | California resident | 128.244 | Docket | Yes | Form Letter J |
| Clarke, Brooke | 11/18/21 | Retired engineer | 592 | Email | No | |
| Clarke, Darrell | 11/17/21 | Resident of Pasadena | 304 | Docket | No | |
| Clifton, Carl | 11/12/21 | Lawnscape Systems | 77 | Docket | No | |
| Clint, Gordon | 11/20/21 | Newbury Park resident | 594 | Email | No | |
| Cochancela, Jerson R., MS | 11/18/21 | Ph.D. Student, Department of Biostatistics, Brown University | 591 | Email | No | |
| Cohen, Howard J | 11/17/21 | California resident | 128.052 | Docket | Yes | Form Letter J |
| Cole, Cheryl | 11/12/21 | Labat's Tree Care | 87 | Docket | No | |
| Coleman, Brad | 11/15/21 | Small business owner | 716 | Email | Yes | Form Letter G |
| Conese, Dee | 11/17/21 | Landscape Professional | 125.068 | Docket | Yes | Form Letter I |
| Conley, Jai | 11/18/21 | [none provided] | 368 | Docket | No | |
| Conly, Helen | 11/20/21 | Board of Directors, www.cfrog.org | 443 | Docket | No | |
| Conner, Kristen | 11/17/21 | Fmr CARB employee & Fmr landscaping spvr | 128.036 | Docket | Yes | Form Letter J |
| Conway, Jim | 11/13/21 | small engine tradesman, shop owner, tech | 108 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Conway, Nancy | 11/12/21 | Small business owner | 667 | Email | Yes | Form Letter B |
| Cook, Carol | 11/17/21 | California resident | 345 | Docket | Yes | Form Letter J |
| Cooper, Madeleine | 11/9/21 | Nielsen Merksamer | 584 | Email | No | |
| Cooper, Ruth | 11/19/21 | Ojai resident | 593 | Email | No | |
| Cordes, John | 11/21/21 | California resident | 128.233 | Docket | Yes | Form Letter J |
| Corl, Alfred | 11/15/21 | Small business owner | 713 | Email | Yes | Form Letter G |
| Corra, Francesca | 11/11/21 | [none provided] | 41 | Docket | No | |
| Cossutta, Renee | 11/17/21 | California resident | 128.083 | Docket | Yes | Form Letter J |
| Costa, Joe | 11/15/21 | Small business owner | 689 | Email | Yes | Form Letter G |
| Costamagna, Gary | 11/17/21 | Residential landowner living on ten acres in the urban interface | 308 | Docket | No | |
| Cotton, Melinda | 11/17/21 | Resident of Long Beach | 167 | Docket | Yes | Form Letter J^ |
| Crabill, Jeff | 11/16/21 | Small business owner | 758 | Email | Yes | Form Letter G |
| Crahan, John | 11/18/21 | California resident | 128.208 | Docket | Yes | Form Letter J |
| Crawford, Chase | 11/3/21 | Small business owner | 629 | Email | Yes | Form Letter B |
| Cremer, Tina | 11/12/21 | Maintenance company | 95 | Docket | No | |
| Cremer, Tina | 11/12/21 | California Landscape Contractors Association (CLCA) | 101 | Docket | No | |
| Crete, Joseph | 11/22/21 | Small business owner | 864 | Email | Yes | Form Letter G |
| Cross, Gregory | 11/29/21 | Nilfisk HPW | 549 | Docket | No | |
| Crow, Garth | 11/23/21 | Small business owner | 924 | Email | Yes | Form Letter G |
| Crum, Martin | 11/3/21 | Small business owner | 632 | Email | Yes | Form Letter B |
| Cruz, William | 11/22/21 | Landscape Professional | 125.098 | Docket | Yes | Form Letter I |
| Cuthbertson, Kelly | 11/17/21 | Sierra Club | 128.117 | Docket | Yes | Form Letter J |
| Cutler, Steven | 11/23/21 | Small business owner | 918 | Email | Yes | Form Letter G |
| D, Llll | 11/17/21 | [none provided] | 240 | Docket | No | |
| D'Adamo, Michael | 11/17/21 | [none provided] | 204 | Docket | No | |
| Dahlheimer, Scott | 11/23/21 | Small business owner | 937 | Email | Yes | Form Letter G |
| Daily, Mark | 11/21/21 | Landscape Professional | 125.088 | Docket | Yes | Form Letter I |
| Danza, Nina | 11/23/21 | [none provided] | 470 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Darlington, Kimble | 11/18/21 | California resident | 128.206 | Docket | No | |
| David, Saul | 11/17/21 | Landscape Professional | 125.055 | Docket | Yes | Form Letter I |
| Davies, Donna | 11/29/21 | [none provided] | 601 | Email | No | |
| Davine, Jill | 11/17/21 | California resident | 128.004 | Docket | Yes | Form Letter J |
| Davis, Brittani | 11/17/21 | Landscape Professional | 125.008 | Docket | Yes | Form Letter I |
| Davis, Eric | 11/17/21 | Hobbyist | 125.034 | Docket | Yes | Form Letter I |
| Dawson, James | 11/17/21 | California resident | 128.005 | Docket | Yes | Form Letter J |
| Day, Alan | 11/12/21 | Ladybuglawn | 97 | Docket | No | |
| De Baca, Sylvia | 11/20/21 | [none provided] | 447 | Docket | Yes | Form Letter J Part 2 |
| De Cecco, Jorge | 11/17/21 | California resident | 128.101 | Docket | Yes | Form Letter J |
| de los Rios, Stephanie | 11/17/21 | California resident | 128.177 | Docket | Yes | Form Letter J |
| De Lu, Janet | 11/17/21 | [none provided] | 264 | Docket | No | |
| Deckman, Daniel | 11/22/21 | Small business owner | 866 | Email | Yes | Form Letter G |
| Deetz, Thomas | 11/17/21 | [none provided] | 229 | Docket | No | |
| DeJarnatt, Elizabeth A | 11/20/21 | Sierra Club member & California resident | 446 | Docket | Yes | Form Letter J |
| DeMotto, Joseph | 11/17/21 | Landscape Professional | 125.057 | Docket | Yes | Form Letter I |
| DeRIggi, Anthony | 11/29/21 | Physician | 556 | Docket | Yes | Form Letter J Parts 3 and 6, and unique comments^ |
| Deutsch, Vivian | 11/17/21 | California resident | 128.024 | Docket | Yes | Form Letter J |
| Deyo, Denise | 11/17/21 | Hotsy of Southern California-Riverside | 123.003 | Docket | Yes | Form Letter D |
| Dias, John | 11/16/21 | Small business owner | 759 | Email | Yes | Form Letter G |
| Diaz, Daniel | 11/12/21 | Small business owner | 655 | Email | Yes | Form Letter B |
| Diaz, Daniel | 11/15/21 | Small business owner | 691 | Email | Yes | Form Letter G |
| Diaz, Daniel | 11/22/21 | Small business owner | 867 | Email | Yes | Form Letter G |
| Dietrick, Jan | 11/17/21 | [none provided] | 354 | Docket | No | |
| Dobbins, Eugene | 11/16/21 | Small business owner | 748 | Email | Yes | Form Letter G |
| Dodd, Catherine, PhD, RN, Advisor | 11/29/21 | Families Advocating for Chemical and Toxics Safety (FACTS) | 519 | Docket | No | |
| Dodd, Ceahana | 11/22/21 | Small business owner | 861 | Email | Yes | Form Letter G |
| Doering, David | 11/17/21 | California resident | 128.037 | Docket | Yes | Form Letter J |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Dolnick, Cody | 11/17/21 | California resident | 128.021 | Docket | Yes | Form Letter J |
| Domingos, Mitch | 11/29/21 | Small business owner | 532.003 | Docket & Email | Yes | Form Letter G |
| Donahoo, Jeffrey | 11/23/21 | Small business owner | 927 | Email | Yes | Form Letter G |
| Donahoo, Larry | 11/23/21 | Small business owner | 929 | Email | Yes | Form Letter G |
| Donaldson, Karen | 11/17/21 | California resident | 128.149 | Docket | Yes | Form Letter J |
| Doney, David | 11/16/21 | Small business owner | 773 | Email | Yes | Form Letter G |
| Donisi, Luca | 11/11/21 | Donisi Landscape Construction | 65 | Docket | No | |
| Donovan, Logan | 11/17/21 | [none provided] | 131 | Docket | No | |
| Doty, Margaret | 11/18/21 | California resident | 128.217 | Docket | Yes | Form Letter J |
| Douglas, Scott | 11/10/21 | Small business owner | 654 | Email | Yes | Form Letter F |
| Doyle, Nora | 11/17/21 | Resident of Los Angeles & Sierra Club | 267 | Docket | Yes | Form Letter J Parts 1, 2, 5^ |
| Drabos, James | 11/17/21 | Landscape Professional | 125.041 | Docket | Yes | Form Letter I |
| Drake, Joshua | 11/22/21 | MTA Distributors | 463 | Docket | No | |
| Drake, Joshua | 11/17/21 | MTA Distributors | 589 | Email | No | |
| Dubansky, Joshua | 11/17/21 | Tahoe Wilderness Medicine LLC | 128.043 | Docket | Yes | Form Letter J |
| Dufau, Peter | 11/12/21 | Landscape contractor | 78 | Docket | No | |
| Duff, Siobhan | 11/17/21 | California resident | 128.048 | Docket | Yes | Form Letter J |
| Dull, Julie | 11/17/21 | [none provided] | 207 | Docket | No | |
| Duncan, Diana | 11/17/21 | [none provided] | 305 | Docket | No | |
| Dunham, Jill | 11/18/21 | California resident | 408 | Docket | Yes | Form Letter J |
| Dunning, Mark | 10/16/21 | Small business owner | 606 | Email | Yes | Form Letter A |
| Dusin, Gary | 11/16/21 | Small business owner | 801 | Email | Yes | Form Letter G |
| Duzanica, James | 11/17/21 | [none provided] | 155 | Docket | No | |
| Dyer, Jym | 11/17/21 | California resident | 128.148 | Docket | Yes | Form Letter J |
| Eastom, Ronald | 11/16/21 | Small business owner | 789 | Email | Yes | Form Letter G |
| Eaton, Chris | 11/17/21 | Sierra Club | 128.189 | Docket | Yes | Form Letter J |
| Eccles, Tom | 11/17/21 | Landscape Professional | 125.029 | Docket | Yes | Form Letter I |
| Echeverria, Damian | 11/22/21 | Landscape Professional | 125.1 | Docket | Yes | Form Letter I |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Edinger, Elizabeth | 11/17/21 | [none provided] | 327 | Docket | No | |
| Edwards, Maurice | 11/17/21 | Architect (rtd)/Illustrator | 128.054 | Docket | Yes | Form Letter J |
| Eggers, Karl | 11/17/21 | California resident | 128.039 | Docket | Yes | Form Letter J |
| Eitan, Alon | 11/19/21 | Small business owner | 838 | Email | Yes | Form Letter F |
| Elicea, Juan | 10/17/21 | Small business owner | 609 | Email | Yes | Form Letter B |
| Elicea, Luis | 10/18/21 | Small business owner | 610 | Email | Yes | Form Letter B |
| Elicea, Paulina | 10/17/21 | Small business owner | 612 | Email | Yes | Form Letter B |
| Ely, David | 11/17/21 | California resident | 128.196 | Docket | Yes | Form Letter J^ |
| Emeterio, Joshua | 11/11/21 | [none provided] | 43 | Docket | No | |
| Emeterio, Joshua | 11/23/21 | Landscape Professional | 125.104 | Docket | Yes | Form Letter I |
| Emeterio, Lauren | 11/23/21 | Landscape Professional | 125.105 | Docket | Yes | Form Letter I |
| Encell, Arlene | 11/17/21 | California resident | 128.047 | Docket | Yes | Form Letter J |
| Enevoldsen, Rachel | 11/19/21 | [none provided] | 416 | Docket | No | |
| Eppinger, Jesse | 11/18/21 | California resident | 128.218 | Docket | Yes | Form Letter J |
| Erickson, Tammy | 11/15/21 | Small business owner | 721 | Email | Yes | Form Letter G |
| Ericson, Eric | 11/17/21 | California resident | 128.182 | Docket | Yes | Form Letter J |
| Ervice, Joel, Associate Director | 11/29/21 | Regional Asthma Management and Prevention (RAMP) | 519 | Docket | No | |
| Espino, Eli | 11/16/21 | Small business owner | 749 | Email | Yes | Form Letter H |
| Espinoza, Lupe | 11/12/21 | [none provided] | 72 | Docket | No | |
| Esposito, Dan | 11/17/21 | California resident | 128.123 | Docket | Yes | Form Letter J |
| Estournes, Peter | 10/15/21 | Gardenworks Inc. | 2 | Docket | No | |
| Estournes, Peter | 11/17/21 | Landscape Professional | 125.006 | Docket | Yes | Form Letter I |
| Estrella, Alicia | 11/17/21 | Landscape Professional | 125.038 | Docket | Yes | Form Letter I |
| Evans, Travis | 11/11/21 | Davey Tree | 63 | Docket | No | |
| Falge, Mike | 11/10/21 | [none provided] | 28 | Docket | No | |
| Falhgren, Patrick | 11/15/21 | Small business owner | 710 | Email | Yes | Form Letter G |
| Fandrich, Elise | 11/23/21 | Sacramento resident | 595 | Email | No | |
| Farrell, Phillip | 11/17/21 | California resident | 128.126 | Docket | Yes | Form Letter J^ |
| Faugno, Miriam | 11/18/21 | Sierra Club | 367 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Feenstra, Darren | 11/12/21 | Long Beach Community College | 80 | Docket | No | |
| Feichtl, James | 11/17/21 | California resident | 128.017 | Docket | Yes | Form Letter J |
| Fergoda, Carolyn | 11/17/21 | Oak Creek Commons HOA | 128.03 | Docket | Yes | Form Letter J |
| Fernandez, John | 10/25/21 | Garvey Equipment Company | 8 | Docket | No | |
| Fielding, Mickey | 11/17/21 | California resident | 199 | Docket | Yes | Form Letter J Parts 1, 2, 3, 4 |
| Fields, Cheryl | 11/12/21 | American Society of Landscape Architects (ASLA) | 74 | Docket | No | |
| Fischer, Donald | 11/17/21 | [none provided] | 341 | Docket | No | |
| Fischer, Doug | 11/19/21 | [none provided] | 413 | Docket | No | |
| Fischer, Jackie | 11/15/21 | Small business owner | 711 | Email | Yes | Form Letter G |
| Fischer, Thomas | 11/16/21 | Small business owner | 756 | Email | Yes | Form Letter G |
| Fishbein, Michael | 11/17/21 | [none provided] | 212 | Docket | No | |
| Fisher Kern, Madeleine | 11/17/21 | [none provided] | 291 | Docket | No | |
| Fisher, Edward | 11/17/21 | California resident | 128.086 | Docket | Yes | Form Letter J |
| Fitzgerald, Denise | 11/17/21 | Landscape Professional | 125.002 | Docket | Yes | Form Letter I |
| Fitzgerald, JJ | 11/17/21 | Landscape Professional | 125.003 | Docket | Yes | Form Letter I |
| Flagg, Bob | 11/17/21 | California resident | 128.064 | Docket | Yes | Form Letter J |
| Flannery, Marcia | 11/18/21 | California resident | 389 | Docket | No | |
| Flatt, Tyme | 11/17/21 | Landscape Professional | 125.051 | Docket | Yes | Form Letter I |
| Fleck, Alison | 11/11/21 | Citizen and landscape professional | 47 | Docket | No | |
| Florio, Howard | 10/18/21 | [none provided] | 4 | Docket | No | |
| Floyd, Kim | 11/17/21 | California resident | 128.106 | Docket | Yes | Form Letter J |
| Fogarty, Sean | 11/22/21 | Small business owner | 905 | Email | Yes | Form Letter G |
| Folkman, Howard | 11/11/21 | CLCA life member | 64 | Docket | No | |
| Fonseca, Filiberto | 11/26/21 | [none provided] | 495 | Docket | No | |
| Forbes, Jane | 11/17/21 | California resident | 128.186 | Docket | Yes | Form Letter J |
| Ford, April | 11/17/21 | California resident | 128.114 | Docket | Yes | Form Letter J |
| Fordham, Sari | 11/8/21 | [none provided] | 17 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Forest, Catherine S., MD, MPH, FAAFP | 11/29/21 | Health Professionals for Clean Air and Climate Action | 519 | Docket | No | |
| Foster, Genette | 11/17/21 | [none provided] | 226 | Docket | No | |
| Fox, Jimmy | 11/11/21 | [none provided] | 58 | Docket | No | |
| Franco, Roberto | 11/17/21 | Concerned Citizen | 125.046 | Docket | Yes | Form Letter I |
| Franken, James | 11/17/21 | California resident | 128.01 | Docket | Yes | Form Letter J |
| Fraynd, Paul | 11/19/21 | Landscape Professional | 125.082 | Docket | Yes | Form Letter I |
| Freeman, Dan | 11/8/21 | Small business owner | 649 | Email | Yes | Form Letter B |
| French, Dennis | 11/28/21 | [none provided] | 504 | Docket | No | |
| French, Dennis | 11/29/21 | [none provided] | 511 | Docket | No | |
| Friedman, Michael | 11/17/21 | California resident | 128.088 | Docket | Yes | Form Letter J |
| Friesen, Rod | 10/22/21 | Gardener | 572 | Email | No | |
| Fritsche, Norma | 11/17/21 | [none provided] | 301 | Docket | No | |
| Fuller, Tad | 11/22/21 | Small business owner | 908 | Email | Yes | Form Letter G |
| Fullerton, Ryan | 11/22/21 | [none provided] | 465 | Docket | No | |
| Fullerton, Ryan | 11/18/21 | Small business owner | 834 | Email | Yes | Form Letter F |
| Fulton, Gregory | 11/16/21 | Small business owner | 792 | Email | Yes | Form Letter H |
| Futernick, Marc, MD | 11/29/21 | Health Professionals for Clean Air and Climate Action | 519 | Docket | No | |
| Gable, Amy | 11/17/21 | [none provided] | 163 | Docket | No | |
| Gachesa, Ellen | 11/17/21 | [none provided] | 338 | Docket | No | |
| Gachina, Dominic | 11/22/21 | Landscape Professional | 125.094 | Docket | Yes | Form Letter I |
| Gallagher, Kaela | 11/17/21 | California resident | 128.098 | Docket | Yes | Form Letter J |
| Gamble, Sandra | 11/17/21 | California resident | 128.065 | Docket | Yes | Form Letter J |
| Gamson, Mary | 11/17/21 | [none provided] | 219 | Docket | No | |
| Garcia, Alberto | 11/16/21 | Small business owner | 728 | Email | Yes | Form Letter G |
| Garcia, Debbie | 11/5/21 | Small business owner | 644 | Email | Yes | Form Letter B |
| Garcia, Joe | 11/15/21 | Small business owner | 690 | Email | Yes | Form Letter G |
| Garcia, Mike | 11/11/21 | Enviroscape LA | 62 | Docket | No | |
| Gardner, Dale | 11/15/21 | Small business owner | 686 | Email | Yes | Form Letter G |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Gardner, Mark | 11/12/21 | Landscaper | 71 | Docket | No | |
| Garton, Tom | 11/16/21 | Small business owner | 797 | Email | Yes | Form Letter H |
| Garwin, Lawrence | 11/17/21 | California resident | 128.02 | Docket | Yes | Form Letter J |
| Gassman, David | 11/19/21 | Bay Area System Change not Climate Change | 128.227 | Docket | Yes | Form Letter J |
| Gay, Thomas | 11/15/21 | Small business owner | 688 | Email | Yes | Form Letter G |
| Galyon, Georgia | 11/15/21 | Small business owner | 681 | Email | Yes | Form Letter G |
| Geer, Ken | 11/19/21 | Engineer | 125.086 | Docket | Yes | Form Letter I |
| Geller, Michael | 11/29/21 | Manufacturers of Emission Controls Association (MECA) | 550 | Docket | No | |
| Georgopoulos, Taso | 11/26/21 | [none provided] | 599 | Email | No | |
| Getter, Michael | 11/9/21 | Commercial cleaning industry | 18 | Docket | No | |
| Giarde, Sandra | 11/29/21 | California Landscape Contractors Association (CLCA) | 542 | Docket | No | |
| Gibberman, Pamela | 11/27/21 | California resident | 128.247 | Docket | Yes | Form Letter J |
| Gibbons, Tracy | 11/17/21 | California resident | 128.173 | Docket | Yes | Form Letter J |
| Gilbert, Camille | 11/18/21 | California resident | 128.201 | Docket | Yes | Form Letter J |
| Gilbert, Chris | 11/17/21 | [none provided] | 165 | Docket | No | |
| Gilbert, Erin | 11/29/21 | Pacific Crest Trail Association (PCTA) | 508 | Docket | No | |
| Gilbert, Erin | 10/25/21 | Pacific Crest Trail Association (PCTA) | 575 | Email | No | |
| Gilbert, Gary | 11/9/21 | Retired [CalFire Region Chief] | 19 | Docket | No | |
| Gilchriest, Joanne | 11/19/21 | Small business owner | 840 | Email | Yes | Form Letter G |
| Gill, Mary | 11/17/21 | [none provided] | 176 | Docket | No | |
| Gillaspy, Merrill | 11/17/21 | California resident | 128.069 | Docket | Yes | Form Letter J |
| Gillette, Ron | 11/24/21 | Small business owner | 945 | Email | Yes | Form Letter F |
| Glick, Jeff | 10/26/21 | Small business owner | 627 | Email | Yes | Form Letter B |
| Gluhaich, Pete | 11/11/21 | Greenstreak Landscaping Inc. | 56 | Docket | No | |
| Goff, Ollie | 11/13/21 | [none provided] | 107 | Docket | No | |
| Goldhammer-Zebouah, Jesica | 11/21/21 | Down to Earth Landscaping | 451 | Docket | No | |
| Goldsmith, John | 11/17/21 | [none provided] | 145 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Golembiewski, Mark | 11/17/21 | California resident | 128.1 | Docket | Yes | Form Letter J |
| Gomez, Carlos | 11/16/21 | Small business owner | 737 | Email | Yes | Form Letter G |
| Gommel, Linda | 11/19/21 | Small business owner | 842 | Email | Yes | Form Letter G |
| Gonzales, Fred | 11/12/21 | Landscaping company | 103 | Docket | No | |
| Gonzales, Tom | 11/22/21 | Small business owner | 913 | Email | Yes | Form Letter G |
| Gonzalez, Adan | 11/23/21 | [none provided] | 479 | Docket | No | |
| Gonzalez, Claudia | 11/22/21 | California resident | 128.235 | Docket | Yes | Form Letter J |
| Gonzalez, Jose | 11/22/21 | Small business owner | 880 | Email | Yes | Form Letter G |
| Goodfellow, Blake | 11/19/21 | Landscape Professional | 125.083 | Docket | Yes | Form Letter I |
| Goran, Susan | 11/17/21 | California resident | 128.087 | Docket | Yes | Form Letter J |
| Gordon, Lynn | 11/18/21 | California resident and public health educator | 128.216 | Docket | Yes | Form Letter J Parts 1, 2, 3, 5, 6 |
| Gorelick, Dara | 11/17/21 | California resident | 128.125 | Docket | Yes | Form Letter J |
| Gould, Robert M., MD, President | 11/29/21 | Physicians for Social Responsibility – San Francisco Bay | 519 | Docket | No | |
| Graef, Aaron | 11/16/21 | Small business owner | 726 | Email | Yes | Form Letter G |
| Graf, Brett | 11/11/21 | Habitat Gardens | 59 | Docket | No | |
| Granholm, Ben | 11/29/21 | Western Propane Gas Association (WPGA) | 539 | Docket | No | |
| Grant, Alman | 11/1/21, 11/4/21 | [none provided] | 580 | Email | No | |
| Gray, David | 11/17/21 | Lompoc, California resident | 128.096 | Docket | Yes | Form Letter J |
| Gray, Hod | 11/20/21 | Lompoc resident | 128.231 | Docket | Yes | Form Letter J |
| Gray, Roby | 11/23/21 | Small business owner | 936 | Email | Yes | Form Letter G |
| Greenshields, Michael | 11/15/21 | Small business owner | 705 | Email | Yes | Form Letter G |
| Gregg, Brandon | 11/17/21 | [none provided] | 223 | Docket | No | |
| Greif, Jeffrey | 11/17/21 | California resident | 128.066 | Docket | Yes | Form Letter J |
| Griffith, David | 11/17/21 | Resident of Southern California | 295 | Docket | Yes | Form Letter J Parts 1, 2, 4, 6^ |
| Griffith, Lin | 11/17/21 | California resident | 128.074 | Docket | Yes | Form Letter J |
| Guerra, Joseph | 11/16/21 | Small business owner | 764 | Email | Yes | Form Letter H |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Guerrero, Gabriela | 11/3/21 | Nilfisk A/S | 582 | Email | No | |
| Guma, Karen | 11/17/21 | California resident | 340 | Docket | Yes | Form Letter J |
| Gurdin, J. Barry | 11/17/21 | Self | 351 | Docket | No | |
| Guthrie, Chelley | 11/22/21 | Small business owner | 862 | Email | Yes | Form Letter G |
| Guthrie, Eric | 11/22/21 | Small business owner | 872 | Email | Yes | Form Letter G |
| Gutierrez, Alma Pilar | 11/17/21 | California resident | 128.09 | Docket | Yes | Form Letter J |
| Gutierrez, Daniel | 10/17/21 | Small business owner | 614 | Email | Yes | Form Letter B |
| Gutierrez, Patrick | 11/15/21 | Small business owner | 707 | Email | Yes | Form Letter G |
| Gutierrez, Salvador | 11/24/21 | Small business owner | 946 | Email | Yes | Form Letter G |
| Guzman, Mario | 11/17/21 | California resident | 128.006 | Docket | Yes | Form Letter J |
| Habeger, James | 11/23/21 | Landscape Professional | 125.107 | Docket | Yes | Form Letter I |
| Habeger, James | 11/23/21 | Small business owner | 928 | Email | Yes | Form Letter G |
| Haemmerle, Judith | 11/17/21 | [none provided] | 126 | Docket | No | |
| Hageman, Warren | 11/17/21 | California resident | 128.094 | Docket | Yes | Form Letter J |
| Hagemann, Ben | 11/5/21 | Pressure washer industry | 13 | Docket | No | |
| Hagemeier, Mike | 11/23/21 | Landscape Professional | 125.108 | Docket | Yes | Form Letter I |
| Hagerman, Dean | 11/15/21 | Small business owner | 675 | Email | Yes | Form Letter G |
| Hagstrom, Sean | 11/17/21 | California resident | 128.044 | Docket | Yes | Form Letter J |
| Hague, Jim | 11/16/21 | Small business owner | 800 | Email | Yes | Form Letter G |
| Hague, John | 11/16/21 | Small business owner | 770 | Email | Yes | Form Letter G |
| Halderman, Tom | 11/17/21 | [none provided] | 153 | Docket | No | |
| Hall, Judith | 11/17/21 | California resident | 128.133 | Docket | Yes | Form Letter J |
| Hall, Leigh | 11/18/21 | [none provided] | 392 | Docket | No | |
| Halligan, Michele | 11/19/21 | California resident | 128.225 | Docket | Yes | Form Letter J |
| Hamilton, Kevin, RRT, Executive Director | 11/29/21 | Central California Asthma Collaborative | 519 | Docket | No | |
| Hamm, Dustin | 11/29/21 | ECI Fuel Systems | 544 | Docket | No | |
| Hammermeister, Lisa | 11/17/21 | [none provided] | 230 | Docket | No | |
| Hammond, Tara | 11/17/21 | Hammond Climate Solutions | 258 | Docket | No | |
| Hanson, Bryan | 11/11/21 | [none provided] | 60 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Hanson, James | 11/17/21 | Physician | 242 | Docket | No | |
| Hanson, Jerry | 11/12/21 | ACLA TNLA Nevada landscape assoc. | 96 | Docket | No | |
| Hanz, Patricia | 11/29/21 | Truck and Engine Manufacturers Association (EMA) | 521 | Docket | No | |
| Harabe, Tsutae | 11/22/21 | Small business owner | 876 | Email | Yes | Form Letter G |
| Harding, Joseph | 11/29/21 | Portable Generator Manufacturers Association (PGMA) | 515 | Docket | No | |
| Harmon, Linda | 11/19/21 | [none provided] | 419 | Docket | No | |
| Harper, Gretchen & Pat | 11/17/21 | California resident | 256 | Docket | No | |
| Harpster, Elaine | 11/17/21 | California resident | 128.127 | Docket | Yes | Form Letter J^ |
| Harpster, David | 11/17/21 | California resident | 128.172 | Docket | Yes | Form Letter J |
| Harrach, Jon | 10/29/21 | Company that currently sells small horse power engines for log splitters | 578 | Email | No | |
| Harris, Amy | 11/4/21 | Small business owner | 637 | Email | Yes | Form Letter B |
| Harris, John | 11/24/21 | [none provided] | 486 | Docket | No | |
| Harris, Shirley | 11/17/21 | [none provided] | 300 | Docket | No | |
| Hart, Ted | 11/15/21 | Small business owner | 720 | Email | Yes | Form Letter G |
| Hartung, James | 11/17/21 | California resident | 128.018 | Docket | Yes | Form Letter J |
| Havan, Artineh | 11/17/21 | California resident | 128.171 | Docket | Yes | Form Letter J |
| Havassy, Nancy | 11/17/21 | California resident | 128.046 | Docket | Yes | Form Letter J |
| Hazemoto, Jerry | 10/15/21 | Small business owner | 605 | Email | Yes | Form Letter B |
| Hearon, Sarah | 11/17/21 | [none provided] | 257 | Docket | No | |
| Heaviland, Thomas | 11/17/21 | Landscape Professional | 125.024 | Docket | Yes | Form Letter I |
| Heaviland, Tom | 11/18/21 | BrightView Landscape | 387 | Docket | No | |
| Hebert, Joan | 11/17/21 | California resident | 128.143 | Docket | Yes | Form Letter J^ |
| Heiden, Jessica | 11/28/21 | California resident | 128.248 | Docket | Yes | Form Letter J |
| Heinold, Christian | 11/17/21 | California resident | 128.159 | Docket | Yes | Form Letter J |
| Heitz, Barbara | 11/17/21 | [none provided] | 243 | Docket | No | |
| Helman, Elliot | 11/17/21 | California resident | 128.144 | Docket | Yes | Form Letter J |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Henderson, Kristine | 11/19/21 | Maintenance Department Manager for a licensed landscape contractor | 420 | Docket | No | |
| Hendricks, Kathlyn | 11/17/21 | Resident of Ojai & The Hendricks Institute, Inc. | 217 | Docket | No | |
| Henneberger, Dan | 11/18/21 | [none provided] | 411 | Docket | No | |
| Henry, Joan | 11/17/21 | California resident | 128.063 | Docket | Yes | Form Letter J |
| Henry, Kevin | 11/17/21 | California resident | 128.076 | Docket | Yes | Form Letter J |
| Henton, Trevor | 11/29/21 | [none provided] | 540 | Docket | No | |
| Hermes, Pol | 11/17/21 | [none provided] | 214 | Docket | No | |
| Hernandez, Fidencio | 11/22/21 | Landscape Professional | 125.097 | Docket | Yes | Form Letter I |
| Herold, Jeff | 11/12/21 | [none provided] | 70 | Docket | No | |
| Herrera, Bill | 11/17/21 | [none provided] | 294 | Docket | No | |
| Herrera, Susan | 11/15/21 | Small business owner | 719 | Email | Yes | Form Letter G |
| Herrick, Genevieve | 11/17/21 | California resident | 128.198 | Docket | Yes | Form Letter J |
| Hickman, Bill | 11/22/21 | [none provided] | 457 | Docket | No | |
| Higgins, Jason | 11/17/21 | Landscape Professional | 125.056 | Docket | Yes | Form Letter I |
| Higgins, Ka | 11/17/21 | [none provided] | 216 | Docket | No | |
| Hildebrand, William | 11/12/21 | Landscape contractor | 90 | Docket | No | |
| Hill, Alison | 11/17/21 | [none provided] | 353 | Docket | No | |
| Hill, Eugene | 11/22/21 | Small business owner | 875 | Email | Yes | Form Letter G |
| Hillman, Linda | 11/20/21 | [none provided] | 442 | Docket | No | |
| Hirth, Carol | 11/17/21 | [none provided] | 189 | Docket | No | |
| Hisler, Roy | 11/12/21 | Tree care industry | 79 | Docket | No | |
| Hoffmann, Juergen | 11/29/21 | Andreas Stihl AG & Co. KG (STIHL) | 509 | Docket | No | |
| Hofmann, Juli | 11/15/21 | Monterey Peninsula College HORT Dept. | 117 | Docket | No | |
| Holcomb, Deborah | 11/17/21 | California resident | 128.136 | Docket | Yes | Form Letter J |
| Holden, Cathy | 11/17/21 | [none provided] | 272 | Docket | No | |
| Holzberg, Steven | 11/19/21 | California resident | 128.226 | Docket | Yes | Form Letter J |
| Hoover, Bill | 11/10/21 | Sierra Curtis Neighborhood Assn. | 33 | Docket | No | |
| Hoover, Gary | 11/19/21 | [none provided] | 415 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Hopkins, Winifred | 11/17/21 | California resident | 128.197 | Docket | Yes | Form Letter J |
| Hopkinson, Natasha | 11/17/21 | [none provided] | 205 | Docket | No | |
| Horner, Christopher | 11/17/21 | [none provided] | 227 | Docket | No | |
| Hostetter, John | 11/16/21 | Small business owner | 769 | Email | Yes | Form Letter G |
| Howard, John | 11/17/21 | California resident | 128.13 | Docket | Yes | Form Letter J |
| Hubacek, Richard | 11/17/21 | California resident | 271 | Docket | Yes | Form Letter J Parts 1, 4, 5^ |
| Hubbs-Chang, Nancy | 11/18/21 | California resident in Los Angeles County | 128.219 | Docket | Yes | Form Letter J Parts 4, 5, and 6, and unique comments^ |
| Huckabay, Mary Ann | 11/17/21 | [none provided] | 215 | Docket | No | |
| Hume, Suzanne | 11/18/21 | CleanEarth4Kids.org | 410 | Docket | No | |
| Humphrey, Robert C. | 11/7/21 | [none provided] | 583 | Email | No | |
| Humphrey, Sam | 11/29/21 | MITM | 518 | Docket | No | |
| I, Robert | 11/22/21 | Small business owner | 900 | Email | Yes | Form Letter G |
| Ibarra, Mauricio | 11/17/21 | Small business owner | 811 | Email | Yes | Form Letter G |
| Illick, Joseph | 11/17/21 | [none provided] | 208 | Docket | No | |
| Infanti, Gay | 11/17/21 | [none provided] | 303 | Docket | No | |
| Innes, Charlotte | 11/17/21 | Resident of Los Angeles | 269 | Docket | No | |
| Irvin, Katja | 11/17/21 | [none provided] | 266 | Docket | Yes | Form Letter J Parts 3, 4, 5, 6 |
| Irvin, Ricky | 11/16/21 | Small business owner | 788 | Email | Yes | Form Letter H |
| Isaacs, Angela | 11/17/21 | California resident | 128.175 | Docket | Yes | Form Letter J |
| Isaacson, Holly | 11/17/21 | California resident | 128.049 | Docket | Yes | Form Letter J |
| Isbell, William | 11/22/21 | Small business owner | 912 | Email | Yes | Form Letter G |
| Ishimaru-Gachina, Harumi | 11/22/21 | Landscape Professional | 125.09 | Docket | Yes | Form Letter I |
| Jackman, Jean | 11/17/21 | [none provided] | 213 | Docket | No | |
| Jackson, Blaise | 11/16/21 | Small business owner | 780 | Email | Yes | Form Letter G |
| Jackson, Gregory | 11/9/21 | Small business owner | 652 | Email | Yes | Form Letter B |
| Jacobi, Veronica | 11/18/21 | [none provided] | 370 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Jacobson, Laura | 11/23/21 | [none provided] | 469 | Docket | No | |
| James, Joshua | 11/16/21 | Small business owner | 766 | Email | Yes | Form Letter H |
| Janakiraman, Anna | 11/20/21 | California resident | 440 | Docket | Yes | Form Letter J |
| Jaramillo, Nathan | 11/17/21 | Landscape Professional | 125.033 | Docket | Yes | Form Letter I |
| Jauch, Tris | 11/17/21 | Landscape Professional | 125.019 | Docket | Yes | Form Letter I |
| Jauch, William | 11/29/21 | California Landscape Contractors Association (CLCA) | 510 | Docket | No | |
| Jauregui, Caro | 11/29/21 | California Walks | 545 | Docket | No | |
| Jenks, Alden | 11/17/21 | [none provided] | 247 | Docket | No | |
| Jensen, Adam | 11/11/21 | Tree care industry | 61 | Docket | No | |
| Jensen, Jeff | 11/22/21 | California Alliance for Golf (CAG) | 459 | Docket | No | |
| Jensen, Jeff | 11/12/21 | Golf Course Superintendents Association of America | 585 | Email | No | |
| Jessler, Darynne | 11/17/21 | California resident | 128.158 | Docket | Yes | Form Letter J |
| Jewell, Julie | 11/3/21 | Small business owner | 630 | Email | Yes | Form Letter B |
| Jimenez, Enrique | 11/21/21 | Small business owner | 851 | Email | Yes | Form Letter G |
| Johnson, Alice | 11/17/21 | California resident | 128.137, 128.138* | Docket | Yes | Form Letter J |
| Johnson, David | 11/29/21 | Steam Cleaners, Inc. (SCI) | 538 | Docket | No | |
| Johnson, Helen | 11/20/21 | California resident | 128.229 | Docket | No | |
| Johnson, Richie | 11/19/21 | Small business owner, maintenance | 431 | Docket | No | |
| Johnson, Robert | 11/17/21 | Landscape Professional | 125.005 | Docket | Yes | Form Letter I |
| Johnson, Ryan | 11/15/21 | [none provided] | 118 | Docket | No | |
| Johnson, Susan | 11/4/21 | Sierra Motor Sports, northern CA power equipment (small engine) dealer | 12 | Docket | No | |
| Johnson, Tom | 11/17/21 | Fortunet Inc. | 128.013 | Docket | Yes | Form Letter J |
| Johnson, Victoria | 11/17/21 | California resident | 128.165 | Docket | Yes | Form Letter J^ |
| Jones, Jan | 11/17/21 | [none provided] | 278 | Docket | No | |
| Jones, Jay | 11/17/21 | [none provided] | 283 | Docket | No | |
| Juarez, Anthony | 11/16/21 | Hotsy of Southern California | 123.001 | Docket | Yes | Form Letter C |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Juskalian, Lee | 11/19/21 | [none provided] | 429 | Docket | No | |
| K., Saran | 11/17/21 | California resident | 331 | Docket | Yes | Form Letter J Parts 1, 2 |
| Kamendrowsky, Victor | 11/20/21 | [none provided] | 437 | Docket | No | |
| Kammerich, Leigh | 11/29/21 | Rural County Representatives of CA | 548 | Docket | No | |
| Kapler, Daniel | 11/22/21 | Landscape Professional | 125.091 | Docket | Yes | Form Letter I |
| Karabetyan, Tavit | 11/15/21<br>11/18/21 | Small business owner | 375 | Docket & Email | Yes | Form Letter G |
| Kardos, Dale | 10/18/21 | Kardos & Associates LLC (supporting RVIA) | 566 | Email | No | |
| Karmatz, Bernard | 11/12/21 | Evergreen Landscape Maintenance | 91 | Docket | No | |
| Kasbo, Richard | 11/20/21 | California resident | 128.23 | Docket | Yes | Form Letter J |
| Katz, Tim | 11/20/21 | California resident | 128.228 | Docket | Yes | Form Letter J |
| Kaufman, Jayne | 11/24/21 | [none provided] | 489 | Docket | No | |
| Keenan, Marjory | 11/17/21 | California resident | 128.134 | Docket | Yes | Form Letter J |
| Keenan, Michael | 11/17/21 | [none provided] | 222 | Docket | No | |
| Kein, Belinda | 11/17/21 | [none provided] | 139 | Docket | No | |
| Keleher, Nancy | 11/17/21 | [none provided] | 316 | Docket | No | |
| Kelley, Rachel | 11/18/21 | Air Breather | 128.212 | Docket | Yes | Form Letter J^ |
| Kellman, Lisa | 11/17/21 | [none provided] | 206 | Docket | No | |
| Kennedy, Deborah | 11/17/21 | [none provided] | 162 | Docket | No | |
| Kerr, Peter | 11/17/21 | [none provided] | 324 | Docket | No | |
| Kerrebijn, Paula | 11/17/21 | [none provided] | 250.001 | Docket | Yes | Form Letter K |
| Kersey, Lynn, MA, MPH, CLE, Executive Director | 11/29/21 | Maternal and Child Health Access (Los Angeles) | 519 | Docket | No | |
| Kessler, Kristen | 11/24/21 | Hueneme School District | 492 | Docket | No | |
| Ketzback, Thor | 11/1/21 | Bryan Cave Leighton Paisner LLP | 579 | Email | No | |
| Khan, Ameen | 11/29/21 | California Environmental Voters | 545 | Docket | No | |
| Kim, Shawn | 11/15/21 | Small business owner | 717 | Email | Yes | Form Letter G |
| Kim, Tammy | 11/16/21 | Small business owner | 794 | Email | Yes | Form Letter G |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Kimmel, John | 11/8/21 | Splash Window Cleaning & Powerwashing | 16 | Docket | No | |
| King, Bill | 11/17/21 | Landscape Professional | 125.022, 125.023* | Docket | Yes | Form Letter I |
| King, Christopher | 11/22/21 | Small business owner | 863 | Email | Yes | Form Letter G |
| Kinstler, Laura | 11/15/21 | Small business owner | 677 | Email | Yes | Form Letter G |
| Kinzel, Brandon | 11/16/21 | Small business owner | 733 | Email | Yes | Form Letter G |
| Kirby, Wayne | 11/22/21 | Small business owner | 917 | Email | Yes | Form Letter G |
| Kisst, David | 11/17/21 | Landscape Professional | 125.021 | Docket | Yes | Form Letter I |
| Kitayama, Eduardo | 11/22/21 | Small business owner | 871 | Email | Yes | Form Letter G |
| Kittredge, Dan And Lilly | 11/17/21 | California resident | 128.042 | Docket | Yes | Form Letter J |
| Klune, Richard | 11/17/21 | California resident | 128.075 | Docket | Yes | Form Letter J |
| Knecht, Thomas, MD, PhD | 11/22/21 | El Dorado Community Health Centers | 128.237 | Docket | Yes | Form Letter J |
| Knott, Greg | 11/29/21 | Outdoor Power Equipment Institute (OPEI) | 524 | Docket | No | |
| Knott, Greg | 11/29/21 | Outdoor Power Equipment Institute (OPEI) | 560 | Docket | No | |
| Knox, John | 11/29/21 | [none provided] | 534 | Docket | No | |
| Knox, Kim | 11/17/21 | California resident | 128.156 | Docket | Yes | Form Letter J |
| Knox, Mayumi | 11/17/21 | [none provided] | 137 | Docket | No | |
| Kobseff, Michael | 11/17/21 | Small business owner | 812 | Email | Yes | Form Letter G |
| Koeck, Diana | 11/22/21 | [none provided] | 468 | Docket | No | |
| Kopcho, Adam | 10/25/21 | Urban Restoration Group U.S. Inc. | 576 | Email | No | |
| Koslowsky, Rob | 10/25/21 | Author | 573 | Email | No | |
| Krahmer, Gary | 11/15/21 | Small business owner | 698 | Email | Yes | Form Letter G |
| Krakow, Jessica | 11/21/21 | [none provided] | 453 | Docket | Yes | Form Letter K |
| Krause, Mary | 11/21/21 | [none provided] | 454 | Docket | No | |
| Kreider, Joel | 11/16/21 | Small business owner | 763 | Email | Yes | Form Letter G |
| Krick, Jessica | 11/17/21 | California resident | 128.053 | Docket | Yes | Form Letter J |
| Kriss, Evan Jane | 11/17/21 | [none provided] | 160 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Krokosky, Dan | 11/15/21 | Small business owner | 674 | Email | Yes | Form Letter G |
| Krysl, Petr | 11/17/21 | [none provided] | 250 | Docket | Yes | Form Letter K |
| Kunert, Michelle | 11/17/21 | Landscape Professional | 125.061 | Docket | Yes | Form Letter I |
| Kunhardt, Tom | 11/17/21 | [none provided] | 277 | Docket | No | |
| Kunstman, Suzanne | 11/17/21 | [none provided] | 332 | Docket | No | |
| Kupke, Mark | 11/17/21 | California resident | 128.116 | Docket | Yes | Form Letter J |
| Kupper, Ketti | 11/18/21 | APLO | 388 | Docket | No | |
| Lacin, Kent | 11/12/21 | [none provided] | 73 | Docket | No | |
| Lacock, Gregory | 11/17/21 | Landscape Professional | 125.04 | Docket | Yes | Form Letter I |
| Lafferty, Byron | 11/29/21 | Steam Cleaners, Inc. (SCI) | 530 | Docket | No | |
| Lamb, John | 11/17/21 | [none provided] | 148 | Docket | No | |
| Lambert, Barry | 11/9/21 | All County Power Wash & Steam Cleaning, Inc. | 20 | Docket | No | |
| Lander, Beth | 11/17/21 | [none provided] | 290 | Docket | No | |
| Landsgaard, Eric | 11/18/21 | Small business owner | 828 | Email | Yes | Form Letter G |
| Landsgaard, Patrick | 11/21/21 | Small business owner | 850 | Email | Yes | Form Letter G |
| Landsgaard, Samuel | 11/18/21 | Small business owner | 835 | Email | Yes | Form Letter G |
| Lane, Magda | 11/15/21 | Landscaping company | 115 | Docket | No | |
| Langan, Caitlin | 11/17/21 | California resident | 128.153 | Docket | Yes | Form Letter J |
| Langenfeld, Mike | 11/15/21 | Small business owner | 706 | Email | Yes | Form Letter G |
| Lapic, Jeffrey | 11/17/21 | Resident of Novato | 259 | Docket | No | |
| Laponis, Mike | 11/21/21 | California resident | 128.234 | Docket | Yes | Form Letter J |
| Lara, Daniel | 11/23/21 | Small business owner | 920 | Email | Yes | Form Letter G |
| Larsen, Don | 11/16/21 | Small business owner | 772 | Email | Yes | Form Letter G |
| Larsen, Susan | 11/16/21 | Small business owner | 793 | Email | Yes | Form Letter G |
| Larson, Elaine | 11/17/21 | California resident | 128.011 | Docket | Yes | Form Letter J^ |
| LaRusso, Thomas | 11/17/21 | [none provided] | 194 | Docket | No | |
| Lasiter, Paul | 11/23/21 | Small business owner | 935 | Email | Yes | Form Letter G |
| Laurent, LJ | 10/19/21 | Independent | 5 | Docket | No | |
| Laverty, Bob | 11/11/21 | Glenn B. Dorning, Inc. | 38 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Lavictoire, Tony | 11/24/21 | California resident | 128.242 | Docket | Yes | Form Letter J |
| LeBlanc, Joe | 11/17/21 | California resident | 128.17 | Docket | Yes | Form Letter J |
| Lee, Ho | 11/17/21 | Small business owner | 808 | Email | Yes | Form Letter G |
| Lee, Kevin | 11/29/21 | Small business owner | 947 | Email | Yes | Form Letter G |
| Lee, Myung | 11/29/21 | Small business owner | 532.004 | Docket & Email | Yes | Form Letter G |
| Lee, Peter | 11/18/21 | [none provided] | 369 | Docket | No | |
| Lee, Sara | 11/22/21 | Small business owner | 903 | Email | Yes | Form Letter G |
| Lee, Saung | 11/22/21 | Small business owner | 873 | Email | Yes | Form Letter G |
| Legler, Kera | 11/18/21 | Small business owner | 829 | Email | Yes | Form Letter G |
| Leitman, Mark | 11/23/21 | Small business owner | 933 | Email | Yes | Form Letter F |
| Lembright, Bill | 11/18/21 | Small business owner | 823 | Email | Yes | Form Letter G |
| Lenhardt, Kate | 11/17/21 | [none provided] | 136 | Docket | No | |
| Lentz, Robert | 11/17/21 | [none provided] | 366 | Docket | No | |
| Leon, Adan | 11/22/21 | Landscape Professional | 125.096 | Docket | Yes | Form Letter I |
| LePard, Brian | 11/16/21 | Small business owner | 735 | Email | Yes | Form Letter H |
| Les, Kathy | 11/23/21 | [none provided] | 471 | Docket | No | |
| Lesaca, Francisco | 11/29/21 | Lesaca Landscape Company | 526 | Docket | No | |
| Leus, Vince, Program Coordinator | 11/29/21 | Prevention Institute | 519 | Docket | No | |
| Levine, Laurie | 11/12/21 | [none provided] | 76 | Docket | No | |
| Lichtenstein, Gregg | 11/17/21 | Physician | 325 | Docket | No | |
| Liddle, Lee | 11/17/21 | [none provided] | 236 | Docket | No | |
| Lind, Laura | 11/17/21 | [none provided] | 307 | Docket | No | |
| Linstead, Keith | 11/17/21 | [none provided] | 195 | Docket | No | |
| Lippman, Alicia | 11/27/21 | [none provided] | 498 | Docket | No | |
| Lirones, Margaret | 11/18/21 | [none provided] | 373 | Docket | No | |
| Lish, Christopher | 11/29/21 | California resident | 506 | Docket | Yes | Form Letter J^ |
| Livingston, John | 11/17/21 | Sierra Club Shasta Group | 262 | Docket | No | |
| Llamas, Efrain | 11/23/21 | Small business owner | 923 | Email | Yes | Form Letter F |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Lloyd, Michael | 10/21/21 | Retired | 6 | Docket | No | |
| Locher, Lynn | 11/17/21 | [none provided] | 313 | Docket | No | |
| Looby, Judith | 11/17/21 | California resident | 128.107 | Docket | Yes | Form Letter J |
| Lopez, Cruz | 11/4/21 | Small business owner | 635 | Email | Yes | Form Letter B |
| Lopez, Julio | 11/17/21 | Landscape Professional | 125.025 | Docket | Yes | Form Letter I |
| Lopez, Julio | 11/16/21 | Small business owner | 765 | Email | Yes | Form Letter H |
| Lopez, Mauricio | 11/15/21 | Small business owner | 709 | Email | Yes | Form Letter G |
| Lopez, Raquel | 11/12/21 | Queens Lawnmower Shop, Inc. | 93 | Docket | No | |
| Lopez, Raquel | 11/16/21 | Small business owner | 785 | Email | Yes | Form Letter G |
| Lormant Sebag, Marine | 11/17/21 | California resident | 128.118 | Docket | Yes | Form Letter J |
| Lorraine, Janet | 11/17/21 | [none provided] | 255 | Docket | No | |
| Louis, Jon | 11/17/21 | Landscape Professional | 125.065 | Docket | Yes | Form Letter I |
| Love, Rodney | 11/17/21 | California resident | 346 | Docket | Yes | Form Letter J Part 1 |
| Lowery, Justin | 11/17/21 | California resident | 128.089 | Docket | Yes | Form Letter J |
| Lubin, Thalia | 11/17/21 | California resident | 321 | Docket | Yes | Form Letter J Parts 1, 6 |
| Ludwig, Stephen | 11/18/21 | California resident | 128.215 | Docket | Yes | Form Letter J |
| Lugo, Chris | 11/15/21 | Small business owner | 699 | Email | Yes | Form Letter G |
| Luna, Karina | 10/19/21 | Small business owner | 621 | Email | Yes | Form Letter B |
| Lupenko, Andy | 11/18/21 | California resident | 128.204 | Docket | Yes | Form Letter J |
| Lustgarden, Steve | 11/17/21 | California resident | 296 | Docket | No | |
| Lykins, Joshua | 11/15/21 | Small business owner | 692 | Email | Yes | Form Letter G |
| M, Mitch | 11/17/21 | California resident | 128.029 | Docket | Yes | Form Letter J |
| Maassen, L | 11/24/21 | California Sea Urchin Divers Network (CSUDN) | 493 | Docket | No | |
| Mabon, Noah | 11/25/21 | California resident | 128.245 | Docket | Yes | Form Letter J |
| Macarai, Gloria | 11/4/21 | Chris's Lawnmower Shop Inc | 9 | Docket | No | |
| Macarai, Gloria | 10/15/21 | Small business owner | 603 | Email | Yes | Form Letter A |
| MacDonald, Gregory | 11/15/21 | City of Carson, Tree Maint. Supervisor | 113 | Docket | No | |
| Macias, Ernesto | 11/23/21 | VP Risk Management, West Coast Arborists | 477 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| MacMillan, Tawny | 11/18/21 | California resident | 128.224 | Docket | Yes | Form Letter J |
| MacRaith, Bonnie | 11/17/21 | [none provided] | 159 | Docket | No | |
| Magallon, Leonel | 11/16/21 | Small business owner | 791 | Email | Yes | Form Letter G |
| Magavern, Bill | 11/29/21 | Coalition for Clean Air | 545 | Docket | No | |
| Magnuson, Shan | 11/18/21 | [none provided] | 379 | Docket | No | |
| Maher, Karina | 11/17/21 | Physician | 231 | Docket | No | |
| Mai, Peter | 11/22/21 | Small business owner | 888 | Email | Yes | Form Letter G |
| Malan, Justin, Executive Director | 11/29/21 | California Conference of Directors of Environmental Health | 519 | Docket | No | |
| Malcarne, Deb | 11/17/21 | Resident of San Diego | 174 | Docket | Yes | Form Letter J^ |
| Malley, Karen | 11/17/21 | [none provided] | 190 | Docket | No | |
| Mandrussow, Olga | 11/17/21 | California resident | 128.032 | Docket | Yes | Form Letter J |
| Mangia, Jim, MPH, President & CEO | 11/29/21 | St. John's Well Child and Family Center (Los Angeles) | 519 | Docket | No | |
| Manies, Kristen | 11/17/21 | California resident | 128.142 | Docket | No | |
| Marcus, Jason | 11/12/21 | Small business landscape owner | 82 | Docket | No | |
| Marcus, Mark | 11/19/21 | CentreScapes Inc | 428 | Docket | No | |
| Marick, Brian | 11/16/21 | Small business owner | 732 | Email | Yes | Form Letter G |
| Marin, Brittany | 10/25/21 | Small business owner | 626 | Email | Yes | Form Letter B |
| Marin, Santiago | 10/18/21 | Small business owner | 672 | Email | Yes | Form Letter B |
| Marks, Thomas | 11/22/21 | Small business owner | 909 | Email | Yes | Form Letter G |
| Marshall, Val and Kirk | 11/17/21 | California resident | 128.178 | Docket | Yes | Form Letter J |
| Marshburn, Robert | 11/16/21 | Small business owner | 727 | Email | Yes | Form Letter H |
| Martin, Nick | 11/16/21 | Small business owner | 781 | Email | Yes | Form Letter H |
| Martin, Tyson | 11/17/21 | California resident | 128.002 | Docket | Yes | Form Letter J |
| Martinez, Ana | 11/29/21 | Small business owner | 522 | Docket & Email | Yes | Form Letter G |
| Martinez, C. | 11/19/21 | [none provided] | 412 | Docket | No | |
| Martinez, Jennin | 11/29/21 | JVM Landscape Construction, Inc. | 561 | Docket | No | |
| Martinez, Maria | 11/24/21 | Small business owner | 942 | Email | Yes | Form Letter F |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Marvin, Grace | 11/17/21 | [none provided] | 358 | Docket | No | |
| Marvin, Grace | 11/20/21 | Sierra Club & Butte Environmental Council | 441 | Docket | No | |
| Mastiere, Bonnie | 11/17/21 | [none provided] | 260 | Docket | No | |
| Mathews, Tim | 11/22/21 | Small business owner | 911 | Email | Yes | Form Letter G |
| Mathis, Janet | 11/19/21 | Small business owner | 846 | Email | Yes | Form Letter G |
| Mathis, Mark | 11/13/21 | [none provided] | 109 | Docket | No | |
| Mathis, Mark | 11/18/21 | Small business owner | 837 | Email | Yes | Form Letter G |
| Matsuno, Jeff | 11/17/21 | California resident | 128.154 | Docket | Yes | Form Letter J^ |
| Maxson, Victoria | 11/17/21 | California resident | 128.073 | Docket | Yes | Form Letter J |
| May, Philip | 11/22/21 | Small business owner | 896 | Email | Yes | Form Letter G |
| Maya Heinert, MD | 11/29/21 | Health Professionals for Clean Air and Climate Action | 519 | Docket | No | |
| McCabe, John | 11/12/21 | McCabe's Landscape Construction | 81 | Docket | No | |
| McCabe, Michael | 11/19/21 | Small business owner | 843 | Email | Yes | Form Letter F |
| McCann, Ellen | 11/18/21 | California resident | 128.211 | Docket | Yes | Form Letter J |
| McClelland, John | 11/29/21 | American Rental Association (ARA) | 513 | Docket | No | |
| McClenahan, John | 11/11/21 | Tree care industry | 51 | Docket | No | |
| McClintock, Hanck | 11/17/21 | [none provided] | 320 | Docket | No | |
| McClung, Marty | 11/12/21 | Western Mower & Engine | 102 | Docket | No | |
| McCormick, Brett | 11/17/21 | Landscape Professional | 125.063 | Docket | Yes | Form Letter I |
| McCormick, Kelly | 11/17/21 | [none provided] | 348 | Docket | No | |
| McCulligh, Bud | 11/10/21 | Small business owner | 653 | Email | Yes | Form Letter F |
| McEntee, Shannon | 11/17/21 | California resident | 128.185 | Docket | Yes | Form Letter J |
| McGoldrick, Kerri | 11/17/21 | California resident | 128.061 | Docket | Yes | Form Letter J |
| McIlroy, Steve | 11/11/21 | [none provided] | 40 | Docket | No | |
| McKeever, Nancy | 11/23/21 | [none provided] | 597 | Email | No | |
| McKirnan, Dan | 11/17/21 | California resident | 128.025 | Docket | Yes | Form Letter J^ |
| McKnight, John | 11/29/21 | National Marine Manufacturers Association (NMMA) | 507 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| McLaughlin, Joe | 11/17/21 | [none provided] | 319 | Docket | No | |
| McLaughlin, Wendy | 11/17/21 | California resident | 128.082 | Docket | Yes | Form Letter J |
| McMichael, Amber | 11/9/21 | [none provided] | 24 | Docket | No | |
| McMullen, Jay | 11/18/21 | Landscape Professional | 125.078 | Docket | Yes | Form Letter I^ |
| McNeil, Ross | 11/19/21 | Small business owner | 844 | Email | Yes | Form Letter G |
| Medeiros, George | 11/22/21 | Small business owner | 857 | Email | Yes | Form Letter G |
| Medina, Angel | 10/23/21 | Small business owner | 625 | Email | Yes | Form Letter B |
| Medina, Eric | 10/17/21 | Small business owner | 608 | Email | Yes | Form Letter B |
| Medrano, Daniel | 11/17/21 | California resident | 128.195 | Docket | Yes | Form Letter J |
| Medved, Paul | 11/17/21 | California resident | 238 | Docket | Yes | Form Letter J Parts 1, 6 |
| Meelker, Casey | 11/29/21 | Hydro Tek Systems Inc. | 553 | Docket | No | |
| Meislin, Barbara | 11/17/21 | [none provided] | 233 | Docket | No | |
| Mendes, Manny | 11/11/21 | Liberty Landscaping Inc. | 45 | Docket | No | |
| Mercado, Erasmo | 10/19/21 | Small business owner | 620 | Email | Yes | Form Letter B |
| Mercado, Francisco | 10/21/21 | Small business owner | 623 | Email | Yes | Form Letter B |
| Mercado, Luis | 10/18/21 | Small business owner | 616 | Email | Yes | Form Letter B |
| Mercado, Luis | 10/19/21 | Small business owner | 622 | Email | Yes | Form Letter B |
| Messmer, Kim | 11/17/21 | California resident | 128.145 | Docket | Yes | Form Letter J |
| Meyer, George, MD | 11/29/21 | Health Professionals for Clean Air and Climate Action | 519 | Docket | No | |
| Meyer, Mike | 11/16/21 | Small business owner | 779 | Email | Yes | Form Letter G |
| Meyers, Cindy | 11/17/21 | [none provided] | 268 | Docket | No | |
| Meyers, Hildy | 11/20/21 | [none provided] | 445 | Docket | No | |
| Meyers, Matthew | 11/17/21 | Landscape Professional | 125.001 | Docket | Yes | Form Letter I |
| Meza, Manuel | 11/12/21 | Meza Landscape Management | 106 | Docket | No | |
| Migliorini, Patrick | 11/17/21 | Landscape Professional | 125.016 | Docket | Yes | Form Letter I |
| Miller, Anita | 11/16/21 | Small business owner | 753 | Email | Yes | Form Letter G |
| Miller, Carol | 11/23/21 | [none provided] | 476 | Docket | No | |
| Miller, James | 11/16/21 | Small business owner | 778 | Email | Yes | Form Letter H |
| Miller, Kimberly | 11/22/21 | Small business owner | 884 | Email | Yes | Form Letter G |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Miller, Matt | 11/16/21 | Small business owner | 784 | Email | Yes | Form Letter G |
| Miller, Murray | 11/22/21 | Small business owner | 853 | Email | Yes | Form Letter G |
| Milton, Jack | 11/17/21 | California resident | 128.128 | Docket | Yes | Form Letter J |
| Milton, Marc | 11/17/21 | [none provided] | 281 | Docket | No | |
| Mingus, Darrin | 11/17/21 | Landscape Professional | 125.039 | Docket | Yes | Form Letter I |
| Mitchell, Greg | 11/29/21 | ECI Fuel Systems | 558 | Docket | No | |
| Mitchell, Justin | 11/15/21 | Small business owner | 694 | Email | Yes | Form Letter G |
| Mitchell, Ruth | 11/18/21 | Small business owner | 833 | Email | Yes | Form Letter G |
| Mogensen, Erik | 11/15/21 | Landscaping company | 120 | Docket | No | |
| Molho, Arthur | 11/18/21 | [none provided] | 383 | Docket | No | |
| Mone, Carolyn | 11/17/21 | [none provided] | 274, 276* | Docket | No | |
| Monico, Chuck | 11/20/21 | Landscape Professional | 125.087 | Docket | Yes | Form Letter I |
| Monroe, Richard | 11/17/21 | [none provided] | 246 | Docket | No | |
| Monteleone, Kathleen | 11/19/21 | [none provided] | 414 | Docket | No | |
| Monter, Nicholas | 11/12/21 | Stotz Equipment | 104 | Docket | No | |
| Moore, Hugh | 11/17/21 | [none provided] | 209 | Docket | No | |
| Moorhead, Laurel | 11/24/21 | Transfer Flow, Inc. | 487 | Docket | No | |
| Morales, Raul | 11/17/21 | Landscape Professional | 125.067 | Docket | Yes | Form Letter I |
| Moran, Dave | 11/4/21 | Small business owner | 641 | Email | Yes | Form Letter B |
| Moreno, Lisa | 11/22/21 | [none provided] | 467 | Docket | No | |
| Morgan, Dan | 11/17/21 | California resident | 342 | Docket | No | |
| Morgan-Hickey, Diana | 11/17/21 | [none provided] | 364 | Docket | No | |
| Morgen, Henry | 11/18/21 | [none provided] | 407 | Docket | No | |
| Morrison, Fred | 11/24/21 | [none provided] | 490 | Docket | No | |
| Moulton, Samantha | 11/17/21 | California resident | 128.151 | Docket | Yes | Form Letter J |
| Mueckenberger, Andrew | 11/17/21 | California resident | 128.121 | Docket | Yes | Form Letter J |
| Mueller, Karsten | 11/17/21 | California resident | 128.095 | Docket | Yes | Form Letter J |
| Mullen, Mike (CPM) | 10/19/21 | [none provided] | 568 | Email | No | |
| Munguia, Cesar | 11/24/21 | Landscape Professional | 125.109 | Docket | Yes | Form Letter I |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Murray, Joan | 11/17/21 | [none provided] | 334 | Docket | No | |
| Nachazel-Ruck, Jane | 11/17/21 | California resident | 128.169 | Docket | Yes | Form Letter J |
| Nagaran, Sharon | 11/17/21 | [none provided] | 141 | Docket | No | |
| Nahigian, Kenneth | 11/17/21 | [none provided] | 241 | Docket | No | |
| Nakamura, Shinji | 10/20/21 | Kyoeisha Co., Ltd | 571 | Email | No | |
| Nast, Robert | 11/19/21 | [none provided] | 433 | Docket | No | |
| Nath, Utkarsh | 11/23/21 | California resident | 128.241 | Docket | Yes | Form Letter J |
| Navarrette, Arthur | 11/16/21 | Small business owner | 730 | Email | Yes | Form Letter H |
| Navarro, Daylena | 11/16/21 | Small business owner | 743 | Email | Yes | Form Letter G |
| Near, David | 11/10/21 | Small business owner | 656 | Email | Yes | Form Letter F |
| Near, David | 11/17/21 | Small business owner | 815 | Email | Yes | Form Letter G |
| Neel, E Ann | 11/17/21 | [none provided] | 150 | Docket | No | |
| Neft, Darrell | 11/17/21 | California resident | 128.122 | Docket | Yes | Form Letter J |
| Nelson, Chris | 11/20/21 | [none provided] | 438 | Docket | No | |
| Nelson, Eric | 11/20/21 | Small business owner | 847 | Email | Yes | Form Letter F |
| Nepomnyashchy, Victor | 11/17/21 | California resident | 128.174 | Docket | Yes | Form Letter J |
| Nesmith, Henry | 11/16/21 | Small business owner | 754 | Email | Yes | Form Letter G |
| Neuhauser, Alice | 11/17/21 | California resident | 128.08 | Docket | Yes | Form Letter J^ |
| Nevin, David | 11/19/21 | Small business owner | 839 | Email | Yes | Form Letter F |
| Nguyen, Diep | 11/16/21 | Small business owner | 745 | Email | Yes | Form Letter G |
| Nichols, Randy | 11/17/21 | [none provided] | 147 | Docket | No | |
| Nikodym, Gary | 11/23/21 | Small business owner | 925 | Email | Yes | Form Letter G |
| Noah, Mark, MD, FACP, President | 11/29/21 | American College of Physicians California Services Chapter | 519 | Docket | No | |
| Nooyen, Fleur | 11/12/21 | [none provided] | 89 | Docket | No | |
| Nora, Lawrence | 11/23/21 | Small business owner | 930 | Email | Yes | Form Letter F |
| Norimoto, Masayasu | 11/15/21 | Small business owner | 701 | Email | Yes | Form Letter G |
| Norris, Anthony | 11/22/21 | Small business owner | 892 | Email | Yes | Form Letter G |
| Novotny, Erin | 11/16/21 | Small business owner | 751 | Email | Yes | Form Letter H |
| OBrien, Aiden | 11/29/21 | Tree Care Industry Association (TCIA) | 520 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Ochoa, Melissa | 10/17/21 | Small business owner | 611 | Email | Yes | Form Letter B |
| Ochs, Michael | 11/29/21 | RV Industry Association (RVIA) | 531 | Docket | No | |
| OConnell, Jim | 11/8/21 | Pressure washer industry | 14 | Docket | No | |
| O'Connell, Kayla | 11/4/21 | Small business owner | 639 | Email | Yes | Form Letter B |
| Oda, John | 11/17/21 | California resident | 128.192 | Docket | Yes | Form Letter J |
| O'Gorman, Dan | 11/16/21 | Small business owner | 742 | Email | Yes | Form Letter G |
| Ohlenkamp, Kris | 11/19/21 | [none provided] | 417 | Docket | No | |
| Oliver, Mark | 11/12/21 | Small business landscape owner | 83 | Docket | No | |
| Olsen, Robert | 11/16/21 | Goldenstate Landscapes, Inc. | 122 | Docket | No | |
| Ordaz, Ralph | 10/17/21 | Small business owner | 613 | Email | Yes | Form Letter B |
| Oropeza, Rick | 11/24/21 | [none provided] | 491 | Docket | No | |
| Orozco, Luis | 11/19/21 | Small business owner | 841 | Email | Yes | Form Letter F |
| Orsa, Gary | 11/16/21 | Small business owner | 755 | Email | Yes | Form Letter H |
| Ortega, Jesse | 11/16/21 | Small business owner | 762 | Email | Yes | Form Letter G |
| Osborne, Annie | 11/17/21 | California resident | 128.092 | Docket | Yes | Form Letter J |
| Osorio, Aaron | 11/17/21 | landscape and garden professional | 186 | Docket | Yes | Form Letter I |
| Osorio, Andrea | 11/17/21 | Landscape Professional | 125.015 | Docket | Yes | Form Letter I |
| Ostrander, Thorsten | 11/17/21 | California resident | 128.161 | Docket | Yes | Form Letter J |
| Overmann, Laura | 11/18/21 | California resident | 128.202 | Docket | Yes | Form Letter J |
| Overmyer-Velazquez, Rebecca | 11/17/21 | Clean Air Coalition of North Whittier an | 128.009 | Docket | Yes | Form Letter J |
| Owen, Craig | 11/17/21 | Venco Western | 284 | Docket | No | |
| Owen, Craig | 11/16/21 | Small business owner | 740 | Email | Yes | Form Letter H |
| Owner, John | 11/29/21 | Small business owner | 532.001 | Docket & Email | Yes | Form Letter G |
| Palacios, Alfredo | 10/18/21 | Small business owner | 615 | Email | Yes | Form Letter B |
| Palmrose, Wayne | 11/16/21 | Small business owner | 802 | Email | Yes | Form Letter H |
| Palomino, Edwin | 11/22/21 | Landscape Professional | 125.101 | Docket | Yes | Form Letter I |
| Panaqua, Trina | 10/18/21 | Garvey Equipment Company | 567 | Email | No | |
| Panjabi, Deepali | 11/20/21 | California resident | 128.232 | Docket | Yes | Form Letter J |
| Paquette, Bob | 11/17/21 | [none provided] | 220 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Parasiliti, Peter | 11/17/21 | California resident | 211 | Docket | Yes | Form Letter J Parts 1, 3, 4, 5, 6^ |
| Pardini, Jason | 11/22/21 | Small business owner | 877 | Email | Yes | Form Letter G |
| Pardini, Jeff | 11/22/21 | Small business owner | 879 | Email | Yes | Form Letter G |
| Pardoe, Janice | 11/20/21 | California resident | 444 | Docket | No | |
| Park, Benjamin | 11/17/21 | California resident | 128.084 | Docket | Yes | Form Letter J |
| Park, Daniel | 11/22/21 | Small business owner | 868 | Email | Yes | Form Letter G |
| Parkins, Cheryl | 11/17/21 | California resident | 128.026 | Docket | Yes | Form Letter J |
| Parsons, Ron | 11/17/21 | [none provided] | 184 | Docket | No | |
| Partl, Uwe-Markus (Max) | 11/17/21 | [none provided] | 164 | Docket | No | |
| Pasterski, Robin | 11/16/21 | [none provided] | 124 | Docket | No | |
| Pate, Deanna | 11/10/21 | [none provided] | 32 | Docket | Yes | Form Letter E |
| Patin, Nastassia | 11/18/21 | California resident | 128.207 | Docket | Yes | Form Letter J |
| Patterson, Kevin | 11/17/21 | California resident | 128.079 | Docket | Yes | Form Letter J |
| Pawlik, Jasmine | 11/17/21 | Landscape Professional | 125.013 | Docket | Yes | Form Letter I |
| Payne, Darren | 11/18/21 | Landscape Professional | 125.075 | Docket | Yes | Form Letter I |
| Peer, Scott | 11/17/21 | [none provided] | 355 | Docket | No | |
| Pelose, Meg | 11/29/21 | [none provided] | 551 | Docket | No | |
| Pepper, David, MD | 11/29/21 | Health Professionals for Clean Air and Climate Action | 519 | Docket | No | |
| Perez, Daniel | 10/18/21 | Small business owner | 618 | Email | Yes | Form Letter B |
| Performance, King's | 11/22/21 | Small business owner | 865 | Email | Yes | Form Letter G |
| Perry, Susan | 11/17/21 | [none provided] | 365 | Docket | No | |
| Peterich, John | 11/22/21 | Small business owner | 893 | Email | Yes | Form Letter G |
| Petty, Phil | 11/29/21 | Williams Cleaning Systems | 546 | Docket | No | |
| Pham, Trung | 11/15/21 | Small business owner | 685 | Email | Yes | Form Letter G |
| Phares, Glenn | 11/15/21 | Small business owner | 682 | Email | Yes | Form Letter G |
| Piaget, Clare | 11/17/21 | California resident | 128.008 | Docket | Yes | Form Letter J^ |
| Piccinino, Mike | 11/16/21 | Small business owner | 741 | Email | Yes | Form Letter G |
| Pidoli, John | 11/16/21 | Small business owner | 768 | Email | Yes | Form Letter G |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Pinkerton, Ann | 11/17/21 | California resident | 128.115 | Docket | Yes | Form Letter J^ |
| Plancarte, Juvenal | 11/18/21 | Landscape Professional | 125.081 | Docket | Yes | Form Letter I |
| Poland, Barbara | 11/17/21 | [none provided] | 311 | Docket | No | |
| Polesky, Alice | 11/17/21 | California resident | 128.168 | Docket | Yes | Form Letter J |
| Postel, Rus | 11/17/21 | California resident | 128.11 | Docket | Yes | Form Letter J |
| Potter, Elizabeth | 11/17/21 | [none provided] | 317 | Docket | No | |
| Priaulx, Dale | 11/15/21 | Small business owner | 673 | Email | Yes | Form Letter G |
| Priddy, Justin | 11/12/21 | Small business owner | 657 | Email | Yes | Form Letter B |
| Priddy, Karri | 11/12/21 | Small business owner | 660 | Email | Yes | Form Letter B |
| Prine, Thomas | 11/16/21 | Small business owner | 798 | Email | Yes | Form Letter G |
| Priven, Louis | 11/17/21 | California resident | 128 | Docket | Yes | Form Letter J |
| Procyk, Taylor | 11/22/21 | Aether Catalyst Solutions, Inc. | 461 | Docket | No | |
| Putt, John | 11/17/21 | Michigan resident | 275 | Docket | No | |
| Quayle, MaryLou | 11/17/21 | Landscape Professional | 125.044 | Docket | Yes | Form Letter I |
| Quiroz, Rebecca | 11/17/21 | Landscape Professional | 125.059 | Docket | Yes | Form Letter I |
| Rader, Ralph | 11/15/21 | Small business owner | 712 | Email | Yes | Form Letter G |
| Rago, Francesca | 11/17/21 | California resident | 128.05 | Docket | Yes | Form Letter J |
| Rago, Francesca | 11/17/21 | [none provided] | 183 | Docket | No | |
| Rainwater, Steve | 11/16/21 | Small business owner | 729 | Email | Yes | Form Letter G |
| Rakich, Cathryn | 11/18/21 | [none provided] | 400 | Docket | No | |
| Ramirez, Alicia | 11/17/21 | Landscape Professional | 125.017 | Docket | Yes | Form Letter I |
| Ramirez, John | 11/17/21 | Landscape Professional | 125.018 | Docket | Yes | Form Letter I |
| Ramirez, Scott | 11/17/21 | Small business owner | 816 | Email | Yes | Form Letter G |
| Ramos, Dylan | 11/16/21 | Small business owner | 747 | Email | Yes | Form Letter G |
| Ramos, Ivan | 11/22/21 | Landscape Professional | 125.092 | Docket | Yes | Form Letter I |
| Raphael, Joan | 11/17/21 | [none provided] | 318 | Docket | No | |
| Rasmussen, R. Calvin | 11/29/21 | Royce Industries L.C. | 516 | Docket | No | |
| Raynes, Jonathan | 11/17/21 | Small business owner | 807 | Email | Yes | Form Letter F |
| Reed, Christie | 11/18/21 | Landscaper | 401 | Docket | No | |

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|---|---|---|---|---|---|---|
| Reed, Robert | 11/17/21 | Retired | 133 | Docket | No | |
| Reid, Alan | 11/17/21 | [none provided] | 359 | Docket | No | |
| Reporter, Roshan | 11/17/21 | California resident | 128.16 | Docket | Yes | Form Letter J |
| Resnick, Adam | 11/18/21 | [none provided] | 250.002 | Docket | Yes | Form Letter K |
| Reutimann, Wes | 11/29/21 | ActiveSGV | 545 | Docket | No | |
| Reutimann, Wesley | 11/23/21 | California resident | 128.24 | Docket | Yes | Form Letter J |
| Rezos, Janet | 11/17/21 | [none provided] | 323 | Docket | No | |
| Rhinehart, Keith | 11/18/21 | California resident | 128.222 | Docket | Yes | Form Letter J |
| Rhomberg, Mark | 11/18/21 | [none provided] | 409 | Docket | No | |
| Rice, Christine | 11/17/21 | Landscape Professional | 125.07 | Docket | Yes | Form Letter I |
| Ricewasser, Robert | 11/17/21 | [none provided] | 315 | Docket | No | |
| Richardson, Dell | 11/18/21 | California resident | 128.205 | Docket | Yes | Form Letter J |
| Richardson, Mike | 11/29/21 | O'Connell Jetting Systems | 535 | Docket | No | |
| Ricketts, Kyle | 11/18/21 | Hotsy of Southern California | 123.004 | Docket | Yes | Form Letter D |
| Ricketts, Michael | 11/16/21 | Hotsy of Southern California | 123 | Docket | Yes | Form Letter C |
| Ricketts, Michael | 11/29/21 | Hotsy of Southern California | 552 | Docket | No | |
| Ricketts, Robin | 11/16/21 | Hotsy of Southern California | 123.002 | Docket | Yes | Form Letter D |
| Rieser, Ronit | 11/17/21 | California resident | 200, 202* | Docket | No | |
| Rifkind, Michael | 11/18/21 | [none provided] | 384 | Docket | No | |
| Riggins, Ty | 11/8/21 | [none provided] | 15 | Docket | No | |
| Ring, Sean | 11/5/21 | Small business owner | 646 | Email | Yes | Form Letter B |
| Rios, Jaime | 11/18/21 | Rios Design | 404 | Docket | No | |
| Rios, Megan | 11/29/21 | California Landscape Contractors Association (CLCA) | 529 | Docket | No | |
| Rippetoe, Robert | 11/17/21 | [none provided] | 146 | Docket | No | |
| Ritter, Keith | 11/18/21 | Landscape Professional | 125.079 | Docket | Yes | Form Letter I |
| Rivers, Matthew | 11/17/21 | California resident | 128.109 | Docket | Yes | Form Letter J |
| Rizzo, Lisa | 11/17/21 | California resident | 128.085 | Docket | Yes | Form Letter J |
| Roadifer, Robert | 11/10/21 | [none provided] | 35 | Docket | No | |
| Robbins, Megan | 11/17/21 | [none provided] | 196 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Roberts, James | 11/17/21 | [none provided] | 132 | Docket | No | |
| Roberts, Louann | 11/18/21 | Small business owner | 821 | Email | Yes | Form Letter G |
| Roberts, Michael | 11/18/21 | [none provided] | 371 | Docket | No | |
| Robinson, Brian | 11/17/21 | Robinson Landscaping | 127 | Docket | No | |
| Robinson, Charles | 11/17/21 | California resident | 128.056 | Docket | Yes | Form Letter J |
| Robinson, Mary | 11/27/21 | [none provided] | 499 | Docket | Yes | Form Letter J Part 3^ |
| Robles, Roger | 11/17/21 | [none provided] | 140 | Docket | No | |
| Roche, Adrienne | 11/18/21 | Small business owner | 825 | Email | Yes | Form Letter G |
| Roddick, Dan | 11/17/21 | [none provided] | 168 | Docket | No | |
| Rodriguez, Alejandro | 11/15/21 | Small business owner | 715 | Email | Yes | Form Letter G |
| Rodriguez, Erin | 11/29/21 | Union of Concerned Scientists | 545 | Docket | No | |
| Rodriguez, Joe | 11/16/21 | Small business owner | 767 | Email | Yes | Form Letter H |
| Rodriguez, Moises | 11/24/21 | Small business owner | 943 | Email | Yes | Form Letter G |
| Roeder, Erin | 11/18/21 | [none provided] | 399 | Docket | No | |
| Rogers, Ashley | 11/17/21 | California resident | 128.045 | Docket | Yes | Form Letter J |
| Rogers, Connie | 11/17/21 | Gilroy Growing Smarter | 310 | Docket | No | |
| Rogers, Don | 11/22/21 | Small business owner | 870 | Email | Yes | Form Letter G |
| Rogers, Tyler | 11/17/21 | Landscape Professional | 125.009 | Docket | Yes | Form Letter I |
| Rogers, Tyler | 11/16/21 | Small business owner | 796 | Email | Yes | Form Letter H |
| Rollin, Linda | 11/17/21 | [none provided] | 192 | Docket | No | |
| Rollins, Richard | 11/17/21 | California resident | 128.099 | Docket | Yes | Form Letter J |
| Roodhuyzen, Peter | 11/17/21 | [none provided] | 130 | Docket | No | |
| Roop, Jeffrey | 11/17/21 | California resident | 128.035 | Docket | Yes | Form Letter J |
| Rosales, Eric | 11/12/21 | Small business owner | 664 | Email | Yes | Form Letter B |
| Rose, John | 11/17/21 | [none provided] | 234 | Docket | No | |
| Rosenfield, Jon | 11/17/21 | [none provided] | 178 | Docket | No | |
| Ross, Darlene | 11/17/21 | [none provided] | 179 | Docket | No | |
| Rossi, Glenn | 11/15/21 | Small business owner | 683 | Email | Yes | Form Letter G |
| Rothman, Robyn, JD, Associate Director, State Policy Programs | 11/29/21 | Health Care Without Harm | 519 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Rowe, Greg | 11/17/21 | [none provided] | 156 | Docket | No | |
| Rozenberg, Paul | 11/23/21 | Suburban Propane | 475 | Docket | No | |
| Ruacho, Mariela, Manager, Clean Air Advocacy | 11/29/21 | American Lung Association | 519 | Docket | No | |
| Ruby, Dennis | 11/17/21 | [none provided] | 187 | Docket | No | |
| Rudolph, Linda, MD, MPH, Director | 11/29/21 | Center for Climate Change and Health, Public Health Institute | 519 | Docket | No | |
| Rufener, Paula | 11/17/21 | California resident | 201 | Docket | Yes | Form Letter J |
| Rush, Jack | 11/29/21 | Landscape Professional | 125.11 | Docket | Yes | Form Letter I |
| Russell, Jennifer | 11/18/21 | [none provided] | 391 | Docket | No | |
| Ruth, Carol | 11/22/21 | [none provided] | 128.236 | Docket | No | |
| Ryan, Kimberly | 11/18/21 | [none provided] | 386 | Docket | No | |
| Rynearson, Levi | 11/11/21 | [none provided] | 37 | Docket | No | |
| S, C | 11/17/21 | [none provided] | 333 | Docket | No | |
| S., E. | 11/17/21 | [none provided] | 343 | Docket | No | |
| Sabatini, Kathy | 11/17/21 | [none provided] | 181 | Docket | No | |
| Sabin-Casamalhauapa, Maileahsa | 11/16/21 | Small business owner | 775 | Email | Yes | Form Letter G |
| Saelee, Matthew | 10/18/21 | Small business owner | 617 | Email | Yes | Form Letter B |
| Saffren, G. | 11/17/21 | California resident | 128.18 | Docket | Yes | Form Letter J |
| Salas, Caleb | 11/22/21 | Small business owner | 860 | Email | Yes | Form Letter G |
| Salazar, Alex | 11/24/21 | business owner | 481 | Docket | No | |
| Salazar, Francisco | 11/22/21 | Small landscaping business | 456 | Docket | No | |
| Salazar, Joe | 11/17/21 | California resident | 128.184 | Docket | Yes | Form Letter J |
| Salgado, Dalia | 11/17/21 | California resident | 128.055 | Docket | Yes | Form Letter J |
| Salgado, Ramon | 11/23/21 | Landscape Professional | 125.103 | Docket | Yes | Form Letter I |
| Sanborn, Heidi | 11/20/21 | [none provided] | 434 | Docket | No | |
| Sanchez, Jorge | 11/14/21 | California Landscape Contractors Association (CLCA) | 111 | Docket | No | |
| Sanchez, Jorge | 11/17/21 | Landscape Professional | 125.066 | Docket | Yes | Form Letter I |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Sandoval, Eduardo | 10/17/21 | Small business owner | 607 | Email | Yes | Form Letter B |
| Sandow, B | 11/17/21 | [none provided] | 299 | Docket | No | |
| Sartor, Linda | 11/17/21 | California resident | 128.031 | Docket | Yes | Form Letter J |
| Sarver, Michael | 11/17/21 | Small business owner | 814 | Email | Yes | Form Letter F |
| Saunders, John | 11/29/21 | Small business owner | 525 | Docket & Email | Yes | Form Letter G |
| Saxton, Chris | 11/13/21 | business owner | 110 | Docket | No | |
| Scarborough, Morgan | 11/22/21 | Small business owner | 891 | Email | Yes | Form Letter G |
| Schad-Siebert, Simone | 11/19/21 | [none provided] | 432 | Docket | No | |
| Schaefer, Maija | 11/18/21 | California resident | 128.213 | Docket | Yes | Form Letter J |
| Schaefer, Martin | 11/12/21 | California Landscape Contractors Association (CLCA) | 84 | Docket | No | |
| Schatz, Steve | 11/17/21 | [none provided] | 326 | Docket | No | |
| Schenck, Alan | 11/17/21 | California resident | 128.141 | Docket | Yes | Form Letter J |
| Schlinger, Henry, Dr. | 11/17/21 | California resident | 128.003 | Docket | Yes | Form Letter J |
| Schloredt, Evan | 11/15/21 | Small business owner | 678 | Email | Yes | Form Letter G |
| Schmidt, Cheryl | 11/17/21 | California resident | 128.166 | Docket | Yes | Form Letter J |
| Schmidt, Cheryl | 11/17/21 | [none provided] | 330 | Docket | No | |
| Schmidt, Jamie | 11/29/21 | Professional Worldwide Mobile Cleaning Association | 547 | Docket | No | |
| Schneider, Ann | 11/20/21 | Mayor, City of Millbrae | 449 | Docket | No | |
| Schoeder, Claude | 11/19/21 | [none provided] | 424 | Docket | No | |
| Schoeder, Leeanna | 11/19/21 | California Landscape Contractors Association (CLCA) | 422 | Docket | No | |
| Schoenhoeft, Joyce | 11/17/21 | Landscape Professional | 125.047 | Docket | Yes | Form Letter I |
| Schramm, Mike | 11/16/21 | Small business owner | 790 | Email | Yes | Form Letter G |
| Schroeder, Ken | 11/17/21 | Resident of Modesto | 253 | Docket | No | |
| Schultz, Judy | 11/18/21 | Nurse | 128.214 | Docket | No | |
| Schwager, Michael | 11/17/21 | [none provided] | 154 | Docket | No | |
| Schweitzer, Michael | 11/17/21 | Small business owner | 813 | Email | Yes | Form Letter G |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Scinto, David | 11/23/21 | Small business owner | 919 | Email | Yes | Form Letter G |
| Scott, June | 11/11/21 | [none provided] | 55 | Docket | No | |
| Scurto, Tony | 11/22/21 | Small business owner | 901 | Email | Yes | Form Letter G |
| Seaton, Alisha | 11/17/21 | California resident | 134 | Docket | No | |
| Segura, Blanca | 11/29/21 | United Pressure Systems | 541 | Docket | No | |
| Segura, Pedro | 11/22/21 | Small business owner | 894 | Email | Yes | Form Letter G |
| Serles, Charles | 11/16/21 | Small business owner | 739 | Email | Yes | Form Letter H |
| Shamblin, Trevor | 11/8/21 | Small business owner | 650 | Email | Yes | Form Letter B |
| Sharp, Patricia | 11/17/21 | [none provided] | 151 | Docket | No | |
| Sheldon, Stuart | 11/28/21 | [none provided] | 503 | Docket | No | |
| Sherman, Bruce | 10/15/21 | Small business owner | 602 | Email | Yes | Form Letter B |
| Sherman, Scott | 11/18/21 | AvidGreen Landscaping | 390 | Docket | No | |
| Shinen, Edward | 11/23/21 | Landscape Professional | 125.106 | Docket | Yes | Form Letter I |
| Siemons, Daniel | 11/17/21 | [none provided] | 588 | Email | No | |
| Sigala, Patrick A. | 11/17/21 | [none provided] | 314 | Docket | No | |
| Sikora, Kevin | 11/15/21 | Small business owner | 697 | Email | Yes | Form Letter G |
| Silva, Melinda | 11/22/21 | Small business owner | 890 | Email | Yes | Form Letter G |
| Silver, Dan | 11/17/21 | [none provided] | 210 | Docket | Yes | Form Letter J Part 1 |
| Silverstein, Bella | 11/17/21 | [none provided] | 336 | Docket | No | |
| Simmons, Katharine | 11/21/21 | [none provided] | 455 | Docket | No | |
| Simon, David | 11/17/21 | California resident | 347 | Docket | Yes | Form Letter J Parts 4, 5, 6^ |
| Simon, James J. | 11/15/21 | Solano County Grounds Supervisor | 587 | Email | No | |
| Simonian, Carmen | 11/12/21 | Small business owner | 658 | Email | Yes | Form Letter B |
| Simons, Anita | 11/17/21 | California resident | 128.163 | Docket | Yes | Form Letter J |
| Simpson, Andrew | 11/17/21 | [none provided] | 350 | Docket | No | |
| Sims, Juliet, MPH, Associate Program Director | 11/29/21 | Prevention Institute | 519 | Docket | No | |
| Sitton, Jason | 11/16/21 | Small business owner | 757 | Email | Yes | Form Letter G |
| Skibba, Peter | 11/23/21 | Small business owner | 940 | Email | Yes | Form Letter G |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Slade, Tyler | 11/12/21 | VP, Slade Industrial Landscape | 85 | Docket | No | |
| Slone, Tom | 11/18/21 | California resident | 128.223 | Docket | Yes | Form Letter J |
| Smith, Brittaney | 11/22/21 | Small business owner | 859 | Email | Yes | Form Letter G |
| Smith, Gary | 11/18/21 | Smith Pipe & Supply | 396 | Docket | No | |
| Smith, Joan | 11/21/21 | [none provided] | 452 | Docket | No | |
| Smith, Joe | 11/17/21 | California resident | 128.167 | Docket | Yes | Form Letter J |
| Smith, Joyce | 11/17/21 | California resident | 128.152 | Docket | Yes | Form Letter J |
| Smith, Keith | 11/23/21 | Small business owner | 926 | Email | Yes | Form Letter G |
| Smith, Leslie | 11/17/21 | California resident | 128.014 | Docket | Yes | Form Letter J |
| Smith, Scott | 11/17/21 | Landscape and garden professional | 306 | Docket | No | |
| Smith, Steve | 11/22/21 | [none provided] | 460 | Docket | No | |
| Snow, Joel | 11/22/21 | Small business owner | 898 | Email | Yes | Form Letter G |
| Snow, Rhonda | 11/22/21 | Small business owner | 897 | Email | Yes | Form Letter G |
| Snyder, Robert | 11/17/21 | California resident | 128.179 | Docket | Yes | Form Letter J |
| Sokolsky, Joel | 11/17/21 | California resident | 128.147 | Docket | Yes | Form Letter J |
| Solano, Oscar | 11/18/21 | Small business owner | 832 | Email | Yes | Form Letter G |
| Sorrells, Kevin | 11/11/21 | Small commercial landscape business | 49 | Docket | No | |
| Sousa, Paul | 11/29/21 | Western United Dairies (WUD) | 512 | Docket | No | |
| Sousa, Paul | 10/25/21 | Western United Dairies (WUD) | 574 | Email | No | |
| Southard, James | 11/23/21 | Small business owner | 934 | Email | Yes | Form Letter F |
| Spillmann, Daniel | 11/23/21 | Scripps Health | 472 | Docket | No | |
| Sponhaltz, Jeff | 11/16/21 | Small business owner | 761 | Email | Yes | Form Letter G |
| Spooner, Jim | 11/27/21 | [none provided] | 497 | Docket | No | |
| Spooner, Muriel | 11/18/21 | California resident | 128.21 | Docket | Yes | Form Letter J^ |
| Spradlin, Steve | 11/22/21 | Small business owner | 906 | Email | Yes | Form Letter G |
| Spraggins, Charles | 11/19/21 | [none provided] | 426 | Docket | No | |
| Spring, Bruce | 11/17/21 | Univ of Southern California | 360 | Docket | No | |
| Sprunk, Greg | 11/29/21 | Business Owner in SD | 543 | Docket | No | |
| St Martin, Dan | 11/29/21 | Briggs & Stratton, LLC | 528 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Star, Garry | 11/17/21 | Resident of Earth | 128.059 | Docket | Yes | Form Letter J |
| Stark, Jo Ann | 11/19/21 | [none provided] | 430 | Docket | No | |
| Stark, Nolan | 11/16/21 | Small business owner | 783 | Email | Yes | Form Letter H |
| Starner, Constance | 11/17/21 | California resident | 128.112 | Docket | Yes | Form Letter J |
| Stern, Leah | 11/17/21 | California resident | 128.129 | Docket | Yes | Form Letter J |
| Sternberg, Laura | 11/17/21 | [none provided] | 352 | Docket | No | |
| Stewart, Shane | 11/23/21 | Small business owner | 938 | Email | Yes | Form Letter G |
| Stiles, Sarah | 11/24/21 | California resident | 128.243 | Docket | Yes | Form Letter J |
| Stine, Michael | 11/22/21 | Small business owner | 854 | Email | Yes | Form Letter G |
| Stocking, Tyler | 11/17/21 | Landscape Professional | 125.004 | Docket | Yes | Form Letter I |
| Stone, James | 11/17/21 | [none provided] | 144 | Docket | No | |
| Strand, Muriel | 11/27/21 | [none provided] | 500 | Docket | No | |
| Strong, Brian | 11/16/21 | Small business owner | 734 | Email | Yes | Form Letter G |
| Stroup, Jason | 11/15/21 | Small business owner | 687 | Email | Yes | Form Letter G |
| Sukyas, Philippe | 11/15/21<br>11/18/21 | Small business owner | 376 | Docket & Email | Yes | Form Letter G |
| Sullivan, Efia | 11/17/21 | Landscape Professional | 125.027 | Docket | Yes | Form Letter I |
| Sullivan, Richard | 11/12/21 | [none provided] | 69 | Docket | No | |
| Sully, Nicholas | 11/17/21 | California resident | 128.139 | Docket | Yes | Form Letter J |
| Sumner, Dan | 11/11/21 | Landscaper | 52 | Docket | No | |
| Superior Center | 11/17/21 | Superior Center | 806 | Email | Yes | Form Letter G |
| Swartz, Michael | 11/15/21 | Small business owner | 680 | Email | Yes | Form Letter G |
| Sweeney, Tom | 11/22/21 | [none provided] | 464 | Docket | No | |
| Sweet, David | 11/22/21 | Small business owner | 869 | Email | Yes | Form Letter G |
| Sybrant, Jeffrey | 11/29/21 | Small business owner | 532.002 | Docket & Email | Yes | Form Letter G |
| Sykes, Hannah | 11/17/21 | Small business owner | 809 | Email | Yes | Form Letter G |
| Szeto, Michael | 11/17/21 | [none provided] | 239 | Docket | Yes | Form Letter J^ |
| Tabat, Gregory | 11/17/21 | California resident | 128.015 | Docket | Yes | Form Letter J |
| Tarverdians, Andre | 11/17/21 | California resident | 128.041 | Docket | Yes | Form Letter J |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Taschereau, Eileen | 11/17/21 | California resident | 128.2 | Docket | Yes | Form Letter J |
| Taylor, Craig | 11/16/21 | Small business owner | 738 | Email | Yes | Form Letter H |
| Taylor, Donald | 11/17/21 | [none provided] | 244 | Docket | No | |
| Tenret, Jerry | 11/17/21 | Landscape Professional | 125.037 | Docket | Yes | Form Letter I |
| Teraoka, Isabelle | 11/20/21 | Teacher at Santa Fe High School | 435 | Docket | Yes | Form Letter J Parts 3, 4, 6^ |
| Ter-Barsegyan, Armen, MPH, CHES | 11/29/21 | Health Professionals for Clean Air and Climate Action | 519 | Docket | No | |
| Terfort, Leonie | 11/17/21 | California resident | 128.012 | Docket | Yes | Form Letter J |
| Terhune, Jen | 11/23/21 | [none provided] | 473 | Docket | No | |
| Thayer, Jeff | 11/17/21 | [none provided] | 309 | Docket | No | |
| Theiss-Aird, Caroline | 11/17/21 | California resident | 128.111 | Docket | Yes | Form Letter J |
| Thom, Dee | 11/17/21 | Landscape Professional | 125.02 | Docket | Yes | Form Letter I |
| Thomas, David | 11/18/21 | Small business owner | 826 | Email | Yes | Form Letter G |
| Thomas, Harold | 11/18/21 | [none provided] | 394 | Docket | No | |
| Thompson, Erik | 11/17/21 | Small business owner | 817 | Email | Yes | Form Letter G |
| Thompson, Jessica | 11/18/21 | Green goddess gardens, Inc | 405 | Docket | No | |
| Thompson, Joshua | 11/16/21 | Small business owner | 771 | Email | Yes | Form Letter H |
| Timmons, Joanne | 11/22/21 | Small business owner | 881 | Email | Yes | Form Letter G |
| Tomassi, Jennifer | 11/18/21 | California resident | 128.209 | Docket | Yes | Form Letter J |
| Tomola, Vicki | 11/20/21 | [none provided] | 439 | Docket | No | |
| Tornabene, John | 11/22/21 | Power Washers of North America | 458 | Docket | No | |
| Toro, Laura | 11/17/21 | Small business owner | 810 | Email | Yes | Form Letter G |
| Torres, Alison | 10/14/21 | Eastern Municipal Water District, Air Quality-Environmental Services Division | 565 | Email | No | |
| Tovar, Humberto | 11/17/21 | Small business owner | 818 | Email | Yes | Form Letter F |
| Tower, Eric | 11/9/21 | Pressure washing contractor | 26 | Docket | No | |
| Tower, Eric | 11/9/21 | Small business owner | 651 | Email | Yes | Form Letter B |
| Toyofuku, Cesar | 11/22/21 | Small business owner | 852 | Email | Yes | Form Letter G |
| Tpsyrnoski, John | 11/17/21 | Landscape Professional | 125.054 | Docket | Yes | Form Letter I |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Tran, Hannah | 11/18/21 | Hotsy of Southern California | 123.005 | Docket | Yes | Form Letter D |
| Treichel, Mary | 11/22/21 | Small business owner | 855 | Email | Yes | Form Letter G |
| Tripathi, Jay | 11/18/21 | Landscape Professional | 125.076 | Docket | Yes | Form Letter I |
| Trudeau, William | 11/11/21 | [none provided] | 53 | Docket | No | |
| Tulleners, Nicholas | 11/16/21 | Small business owner | 782 | Email | Yes | Form Letter H |
| Turk, Kyle | 11/04/21 | Small business owner | 948 | Email | Yes | Form Letter B |
| Turk, Kyle | 11/10/21 | Small business owner | 34 | Docket | No | |
| Turner, Cole | 11/24/21 | [none provided] | 484 | Docket | No | |
| Turner, Virginia | 11/17/21 | [none provided] | 249 | Docket | No | |
| Utterback, Michael | 11/11/21 | Landscaper | 54 | Docket | No | |
| Valadez, Alfonso | 11/18/21 | Assistant Director Maintenance, Kern High School District | 398 | Docket | No | |
| Valdez, Rodolfo | 11/17/21 | Landscape Professional | 125.035 | Docket | Yes | Form Letter I |
| Valencia, Anjelica | 11/7/21 | Small business owner | 647 | Email | Yes | Form Letter B |
| Vallelunga, David | 11/18/21 | Small business owner | 836 | Email | Yes | Form Letter G |
| Van Atta, Susan | 11/11/21 | Landscape Architect | 48 | Docket | No | |
| Van Craeynest, Arlene C. | 11/17/21 | [none provided] | 180 | Docket | No | |
| Van de Riet, Paul | 11/17/21 | California resident | 128.124 | Docket | Yes | Form Letter J |
| Van de Woestijne, Johanna | 11/17/21 | California resident | 128.034 | Docket | Yes | Form Letter J |
| Van Denend, Thomas | 11/12/21 | ShelterWorks Ltd. | 86 | Docket | No | |
| Van Groningen, Jeremy | 10/25/21 | [none provided] | 7 | Docket | No | |
| Van Groningen, Jeremy | 11/15/21 | [none provided] | 116 | Docket | No | |
| Van Tassell, Robin | 11/17/21 | [none provided] | 197 | Docket | No | |
| Vangilder, Rebecca | 11/22/21 | Small business owner | 899 | Email | Yes | Form Letter G |
| Vasilieff, Marie | 11/23/21 | [none provided] | 478 | Docket | No | |
| Vaughan, Ellen | 10/18/21 | Santa Cruz Resident | 3 | Docket | No | |
| Velu, Meera | 11/18/21 | California resident | 128.203 | Docket | Yes | Form Letter J |
| Ventre-Hutton, Valerie | 11/22/21 | California resident | 128.239 | Docket | Yes | Form Letter J^ |
| Veren, Nataliya | 11/17/21 | [none provided] | 265 | Docket | No | |
| Vergara, Delane | 11/23/21 | Landscape Professional | 125.102 | Docket | Yes | Form Letter I |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Vermillion, Lydia | 11/16/21 | Small business owner | 774 | Email | Yes | Form Letter G |
| Vesper, Paul | 11/17/21 | California resident | 128.105 | Docket | Yes | Form Letter J |
| Vienneau, Jim | 11/17/21 | Landscape Professional | 125.062 | Docket | Yes | Form Letter I |
| Vignocchi, Carmela | 11/17/21 | California resident | 128.193 | Docket | Yes | Form Letter J^ |
| Villalpando, Marin | 11/18/21 | [none provided] | 382 | Docket | No | |
| Villarosa, John | 11/12/21 | Small business owner | 662 | Email | Yes | Form Letter B |
| Villarosa, Meredith | 11/12/21 | Small business owner | 661 | Email | Yes | Form Letter B |
| Vincent, Glen | 11/15/21 | Small business owner | 669 | Email | Yes | Form Letter G |
| Wager, Leon | 11/16/21 | Small business owner | 799 | Email | Yes | Form Letter H |
| Wagner, John | 11/17/21 | [none provided] | 312 | Docket | No | |
| Wakefield, Alan | 10/20/21 | Ojai resident | 569 | Email | No | |
| Walker, Pegasus Paleolight | 11/17/21 | [none provided] | 285 | Docket | No | |
| Walle, Jocelyn | 11/4/21 | Small business owner | 638 | Email | Yes | Form Letter B |
| Wallof, Hunter | 11/17/21 | [none provided] | 203 | Docket | No | |
| Walp, Susan P. | 11/17/21 | California resident | 128.119 | Docket | Yes | Form Letter J^ |
| Walters, Joy | 11/26/21 | Clean Healthy Air - Clean Healthy Altadena (CHA CHA) | 600 | Email | No | |
| Waltz, Jeff | 11/16/21 | Small business owner | 760 | Email | Yes | Form Letter H |
| Wandler, Sharon | 11/17/21 | Capitol Quarter Midget Association | 287 | Docket | No | |
| Wang, Harry, MD, President | 11/29/21 | Physicians for Social Responsibility – Sacramento | 519 | Docket | No | |
| Wappler, David | 11/17/21 | California resident | 161 | Docket | No | |
| Ware, Christopher | 11/17/21 | California resident | 128.058 | Docket | Yes | Form Letter J |
| Warner, Chris | 11/17/21 | [none provided] | 297 | Docket | No | |
| Washington, Kevin | 11/18/21 | Miller Electric Mfg. LLC | 378 | Docket | No | |
| Washington, Kevin | 11/28/21 | ITW Construction | 502 | Docket | No | |
| Waters, Heather | 11/17/21 | [none provided] | 263 | Docket | No | |
| Watje, Mark | 11/20/21 | Small business owner | 848 | Email | Yes | Form Letter G |
| Watkins, Christopher | 11/22/21 | Small business owner | 915 | Email | Yes | Form Letter G |
| Watson, James | 11/19/21 | Small business owner | 845 | Email | Yes | Form Letter G |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Webster, Roderick | 11/17/21 | Resident of Merced | 228 | Docket | Yes | Form Letter J^ |
| Weeden, Noreen | 11/18/21 | [none provided] | 380 | Docket | No | |
| Weiland, Bob | 11/11/21 | Weiland & Associates, Inc. | 46 | Docket | No | |
| Weinrich, William | 11/15/21 | Small business owner | 724 | Email | Yes | Form Letter G |
| Weirich, Robin | 11/17/21 | California resident | 128.078 | Docket | Yes | Form Letter J |
| Weissburg, Robert | 11/17/21 | California resident | 128.072 | Docket | Yes | Form Letter J |
| Weisz, Russell | 11/17/21 | California resident | 128.181 | Docket | Yes | Form Letter J |
| Welch, Dennis | 11/17/21 | Small business owner | 819 | Email | Yes | Form Letter G |
| Welch, Jimmy | 11/24/21 | Cleaning Equipment Trade Association (CETA) | 483 | Docket | No | |
| Welch, Michael J., MD | 11/29/21 | Health Professionals for Clean Air and Climate Action | 519 | Docket | No | |
| Wellin, Paul | 11/17/21 | California resident | 142 | Docket | Yes | Form Letter J^ |
| Wenger, Rachelle, System Vice President, Public Policy & Advocacy | 11/29/21 | Dignity Health | 519 | Docket | No | |
| Westlund, Pamela | 11/17/21 | California resident | 128.194 | Docket | Yes | Form Letter J |
| Wheat, Alan | 11/12/21 | Alan Wheat Consulting | 100 | Docket | No | |
| Whitaker, Howard | 11/17/21 | [none provided] | 218 | Docket | No | |
| White, Douglas | 11/15/21 | Small business owner | 676 | Email | Yes | Form Letter G |
| White, Dustin | 11/18/21 | Landscape Professional | 125.072 | Docket | Yes | Form Letter I |
| White, Shane | 11/11/21 | K and D Landscaping, Inc. | 66 | Docket | No | |
| Whiting, Mark | 11/17/21 | Landscape Professional | 125.03 | Docket | Yes | Form Letter I |
| Whitney, Brandon | 11/23/21 | Pressure Washer Dealer | 474, 537* | Docket | No | |
| Whitson, Andrea | 11/17/21 | California resident | 128.068 | Docket | Yes | Form Letter J |
| Wickham, Kristel | 11/17/21 | California human, homeowner in Sunnyvale | 158 | Docket | Yes | Form Letter J^ |
| Wicks, Margaret | 11/15/21 | Small business owner | 704 | Email | Yes | Form Letter G |
| Wilcox, Kenneth | 11/17/21 | California resident | 251 | Docket | No | |
| Wilcox, Tyler | 11/15/21 | Small business owner | 723 | Email | Yes | Form Letter G |
| Wilcoxen, Beth | 11/17/21 | [none provided] | 188 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Wilder, Jenny | 11/17/21 | California resident | 128.15 | Docket | Yes | Form Letter J |
| Wilkie, Steve | 11/4/21 | Small business owner | 642 | Email | Yes | Form Letter B |
| Willi, David | 11/17/21 | Landscape Professional | 125.058 | Docket | Yes | Form Letter I |
| Williams, Donald | 11/16/21 | Small business owner | 746 | Email | Yes | Form Letter H |
| Williams, Gerry | 11/18/21 | [none provided] | 406 | Docket | No | |
| Williams, Lisa | 11/17/21 | [none provided] | 590 | Email | No | |
| Williams, Mark | 11/4/21 | Small business owner | 640 | Email | Yes | Form Letter B |
| Williams, Matt | 11/17/21 | [none provided] | 172 | Docket | No | |
| Williams, Tim | 11/15/21 | Small business owner | 666 | Email | Yes | Form Letter B |
| Willis, Douglas | 11/23/21 | Small business owner | 922 | Email | Yes | Form Letter G |
| Wilmot, Erik | 11/17/21 | [none provided] | 235 | Docket | No | |
| Winkler, Michael | 11/17/21 | Redwood Energy | 193 | Docket | No | |
| Winningham, Tanesha | 11/17/21 | Landscape Professional | 125.045 | Docket | Yes | Form Letter I |
| Winter, Matt | 11/19/21 | Landscape Professional | 125.084 | Docket | Yes | Form Letter I |
| Wintter, Will | 11/17/21 | Small business owner | 820 | Email | Yes | Form Letter G |
| Woehl, Jane | 11/17/21 | Resident of Sacramento | 221 | Docket | Yes | Form Letter J Parts 1, 2, 4, 5, 6 |
| Wolf, Carol | 11/17/21 | California resident | 128.131 | Docket | Yes | Form Letter J |
| Wolf, Kristina | 11/17/21 | [none provided] | 232 | Docket | No | |
| Wolfe, Nanlouise | 11/17/21 | California resident | 128.135 | Docket | Yes | Form Letter J |
| Wolfe, Steve | 11/18/21 | [none provided] | 385 | Docket | No | |
| Wolfson, Steven | 11/20/21 | [none provided] | 436 | Docket | No | |
| Wolter, Brent | 11/5/21 | Small business owner | 645 | Email | Yes | Form Letter B |
| Wong, Steve | 11/11/21 | Landscape Architect | 68 | Docket | No | |
| Woo, Kyong | 11/23/21 | Small business owner | 939 | Email | Yes | Form Letter G |
| Woodard, David | 11/18/21 | Small business owner | 824 | Email | Yes | Form Letter G |
| Woodruff, Eric | 11/29/21 | Generac Power Systems | 527 | Docket | No | |
| Woods, Richard | 11/16/21 | Small business owner | 787 | Email | Yes | Form Letter G |
| Worley, John | 11/23/21 | [none provided] | 596 | Email | No | |
| Wornum, Claudia | 11/17/21 | [none provided] | 254 | Docket | No | |

| Commenter | Date | Affiliation | Commenter Code | Submission Method | Form Letter? | Form Letter Category |
|---|---|---|---|---|---|---|
| Wrenn, Greg | 11/22/21 | Past the Gate/California Landscape Contractors Association (CLCA) | 462 | Docket | No | |
| Wright, Susan | 11/17/21 | California resident | 128.157 | Docket | Yes | Form Letter J |
| Wyett, David | 11/29/21 | Always Under Pressure | 555 | Docket | No | |
| Wyrick, Kristopher | 11/18/21 | Small business owner | 822 | Email | Yes | Form Letter G |
| Yamamoto, Jiro | 11/17/21 | Resident of San Francisco | 270 | Docket | No | |
| Yamayoshi, Mamoru | 11/15/21 | Small business owner | 708 | Email | Yes | Form Letter G |
| Yanowitz, David | 11/17/21 | [none provided] | 298 | Docket | No | |
| Yanowitz, Steviann | 11/17/21 | [none provided] | 225 | Docket | Yes | Form Letter J Part 2 |
| Yates, Bridget | 11/16/21 | Small business owner | 736 | Email | Yes | Form Letter H |
| Yellin, Steven | 11/17/21 | California resident | 128.062 | Docket | Yes | Form Letter J |
| Yllanes, Michael | 11/23/21 | Small business owner | 932 | Email | Yes | Form Letter G |
| Yokoyama, Kazuaki | 11/22/21 | Small business owner | 885 | Email | Yes | Form Letter G |
| Yoon, James | 11/13/21 | Diamond Vantage Inc. | 564 | Email | No | |
| Young, Kevin | 11/22/21 | Small business owner | 886 | Email | Yes | Form Letter G |
| Young, Ted | 11/17/21 | [none provided] | 293 | Docket | No | |
| Youngelson, Noah | 11/17/21 | California resident | 128.132 | Docket | Yes | Form Letter J |
| Yovanopoulos, Anastasia | 11/17/21 | California resident | 128.097 | Docket | Yes | Form Letter J |
| Yturralde, Deborah | 11/12/21 | [none provided] | 98 | Docket | No | |
| Yudell, J | 11/17/21 | [none provided] | 288 | Docket | No | |
| Yundt, James | 11/22/21 | Small business owner | 878 | Email | Yes | Form Letter F |
| Zak, Deb | 11/18/21 | [none provided] | 397 | Docket | No | |
| Zakar, Barry | 11/17/21 | [none provided] | 322 | Docket | No | |
| Zang-Rosetti, Leana | 11/17/21 | California resident | 128.102 | Docket | Yes | Form Letter J |
| Zechar, Corwin | 11/18/21 | [none provided] | 393 | Docket | No | |
| Zelman, Stephen | 11/17/21 | California resident | 128.183 | Docket | Yes | Form Letter J |
| Zermeno, Gail | 11/17/21 | [none provided] | 175 | Docket | No | |
| Zierikzee, R. | 11/17/21 | California resident | 128.019 | Docket | Yes | Form Letter J |
| Zilka, Evann | 11/17/21 | Landscape Professional | 125.032 | Docket | Yes | Form Letter I |
| Zlotoff, Mara | 11/17/21 | Person with asthma | 261 | Docket | No | |

**Table 2. Written Comments Received During the Board Hearing**

| Commenter | Date | Affiliation | Commenter Code | Submission Method |
|---|---|---|---|---|
| Aguilar, Edgar, Chair | 12/9/21 | Asthma Coalition of Kern County | 2002 | Docket |
| Barrett, William | 12/9/21 | American Lung Association | 2002 | Docket |
| Bello, Carlos, MPH, CHES, Treasurer | 12/9/21 | Asthma Coalition of Kern County | 2002 | Docket |
| Bolsins, Scott | 12/9/21 | [none provided] | 2007 | Docket |
| Buddiga, Praveen, MD, FAAAI | 12/9/21 | Family Allergy Asthma Clinic (Fresno) | 2002 | Docket |
| Carrel, Marc, President & CEO | 12/9/21 | BREATHE Southern California | 2002 | Docket |
| Chandy, Asha, Communications Coordinator | 12/9/21 | Asthma Coalition of Kern County | 2002 | Docket |
| Choong, Yvonne, Vice President, Center for Health Policy | 12/9/21 | California Medical Association | 2002 | Docket |
| Dodd, Catherine, PhD, RN, Advisor | 12/9/21 | Families Advocating for Chemical and Toxics Safety (FACTS) | 2002 | Docket |
| Ervice, Joel, Associate Director | 12/9/21 | Regional Asthma Management and Prevention (RAMP) | 2002 | Docket |
| Ferguson, Karmi, Executive Director | 12/9/21 | American Academy of Pediatrics, California | 2002 | Docket |
| Forest, Catherine S., MD, MPH, FAAFP | 12/9/21 | Health Professionals for Clean Air and Climate Action | 2002 | Docket |
| Futernick, Marc, MD | 12/9/21 | Health Professionals for Clean Air and Climate Action | 2002 | Docket |
| Giarde, Sandra | 12/9/21 | California Landscape Contractors Association (CLCA) | 2005 | Docket |
| Gould, Robert M., MD, President | 12/9/21 | Physicians for Social Responsibility – San Francisco Bay | 2002 | Docket |
| Grant, Greg | 12/9/21 | Former City of Ojai Public Work Director (recently retired) | 2012 | Docket |
| Hamilton, Kevin, RRT, Executive Director | 12/9/21 | Central California Asthma Collaborative | 2002 | Docket |
| Hanz, Patricia | 12/9/21 | Truck and Engine Manufacturers Association (EMA) | 2011 | Docket |
| Heinert, Maya, MD | 12/9/21 | Health Professionals for Clean Air and Climate Action | 2002 | Docket |
| Jain, Vipul V., MD, MS, President | 12/9/21 | California Thoracic Society | 2002 | Docket |
| Johnston, Dave | 12/9/21 | El Dorado County Air Quality Management District (El Dorado AQMD) | 2014 | Email |
| Kersey, Lynn, MA, MPH, CLE, Executive Director | 12/9/21 | Maternal and Child Health Access (Los Angeles) | 2002 | Docket |
| Leus, Vince, Program Coordinator | 12/9/21 | Prevention Institute | 2002 | Docket |
| Malan, Justin, Executive Director | 12/9/21 | California Conference of Directors of Environmental Health | 2002 | Docket |
| Mangia, Jim, MPH, President & CEO | 12/9/21 | St. John's Well Child and Family Center (Los Angeles) | 2002 | Docket |
| Martin, Zach | 12/9/21 | Forney Industries | 2015 | Email |

| Commenter | Date | Affiliation | Commenter Code | Submission Method |
|---|---|---|---|---|
| Metzger, Alan | 12/9/21 | Walker Distributing Company | 2013 | Docket |
| Meyer, George, MD | 12/9/21 | Health Professionals for Clean Air and Climate Action | 2002 | Docket |
| Miller, Kevin | 12/9/21 | Legend Brands | 2016 | Email |
| Molly, Munz | 12/9/21 | [none provided] | 2010 | Docket |
| Noah, Mark, MD, FACP, President | 12/9/21 | American College of Physicians California Services Chapter | 2002 | Docket |
| Ochs, Michael | 12/9/21 | RV Industry Association (RVIA) | 2004 | Docket |
| Pearson, Dan | 12/9/21 | Karcher North America Inc. | 2009 | Docket |
| Pepper, David, MD | 12/9/21 | Health Professionals for Clean Air and Climate Action | 2002 | Docket |
| Rasmussen, R. Calvin | 12/9/21 | Royce Industries L.C. | 2008 | Docket |
| Rothman, Robyn, JD, Associate Director, State Policy Programs | 12/9/21 | Health Care Without Harm | 2002 | Docket |
| Ruacho, Mariela, Manager, Clean Air Advocacy | 12/9/21 | American Lung Association | 2002 | Docket |
| Rudolph, Linda, MD, MPH, Director | 12/9/21 | Center for Climate Change and Health, Public Health Institute | 2002 | Docket |
| Sims, Juliet, MPH, Associate Program Director | 12/9/21 | Prevention Institute | 2002 | Docket |
| Strand, Muriel | 12/9/21 | [none provided] | 2006 | Docket |
| Taylor, Roger and Marian | 12/9/21 | RV owners | 2003 | Docket |
| Ter-Barsegyan, Armen, MPH, CHES | 12/9/21 | Health Professionals for Clean Air and Climate Action | 2002 | Docket |
| Wang, Harry, MD, President | 12/9/21 | Physicians for Social Responsibility – Sacramento | 2002 | Docket |
| Welch, Michael J., MD | 12/9/21 | Health Professionals for Clean Air and Climate Action | 2002 | Docket |
| Wenger, Rachelle, System Vice President, Public Policy & Advocacy | 12/9/21 | Dignity Health | 2002 | Docket |
| Woelfel, Joani | 12/9/21 | Far West Equipment Dealers Association (FWEDA) | 2001 | Docket |

**Table 3. Oral Comment Presented at the Board Hearing**

| Commenter | Date | Affiliation | Commenter Code |
|---|---|---|---|
| Abbs, Alan | 12/9/21 | Bay Area Air Quality Management District (BAAQMD) | 3026 |
| Akins, Leo | 12/9/21 | Forest River, Inc. | 3005 |
| Alexander, Kim | 12/9/21 | Mow Better | 3009 |
| Amber, Glenn | 12/9/21 | Westerbeke Corporation | 3017 |
| Askeland, Ron, Dr. | 12/9/21 | San Diegans for Sustainable, Equitable, and Quiet Equipment in Landscaping (SD-SEQUEL) | 3020 |
| Baer, Andrew | 12/9/21 | Tiffin Motorhomes | 3013 |
| Barad, Daniel | 12/9/21 | Sierra Club California | 3007 |
| Barrett, William | 12/9/21 | American Lung Association | 3059 |
| Berman, Marc | 12/9/21 | California Assemblymember, District 24 | 3000 |
| Blaine, Matthew | 12/9/21 | California Mountain Biking Coalition | 3065 |
| Bliss, Casey | 12/9/21 | Bliss Power Lawn Equipment | 3052 |
| Bonifas, Alan | 12/9/21 | All Spray | 3036 |
| Bray, Andrew | 12/9/21 | National Assoc. of Landscape Professionals | 3034 |
| Brodsky, Gregg | 12/9/21 | Cleaning Equipment Trade Association (CETA) | 3056 |
| Brown, Jeff | 12/9/21 | Amador County Supervisor | 3047 |
| Burdette, Linda | 12/9/21 | Family Motor Coach Association (FMCA) | 3010 |
| Burian, Jeff | 12/9/21 | Forest River RV | 3022 |
| Burns, Elizabeth | 12/9/21 | Zone 24 Landscaping | 3035 |
| Carroll, Michael | 12/9/21 | Portable Generator Manufacturers Association (PGMA) | 3058 |
| Coad, Jeff | 12/9/21 | Briggs & Stratton | 3003 |
| Cochran, Donald | 12/9/21 | Northwood Manufacturing and Outdoors RV | 3055 |
| Colome, Steven | 12/9/21 | Public representative | 3060 |
| Davis, Ted | 12/9/21 | South Bay Airstream Adventures | 3021 |
| Donohue, Mickey | 12/9/21 | Foothills homeowner | 3033 |
| Enyart, Garry | 12/9/21 | Cummins | 3049 |
| Ervice, Joel, Associate Director | 12/9/21 | Regional Asthma Management and Prevention (RAMP) | 3053 |
| Foo, Gabe | 12/9/21 | Gardenland Power Equipment | 3048 |
| Friesen, Darrel | 12/9/21 | Seller of RVs | 3018 |
| Geller, Michael | 12/9/21 | Manufacturers of Emission Controls Association (MECA) | 3042 |
| Giarde, Sandra | 12/9/21 | California Landscape Contractors Association (CLCA) | 3037 |
| Gilbert, Erin | 12/9/21 | Pacific Crest Trail Association (PCTA) | 3041 |
| Granholm, Ben | 12/9/21 | Western Propane Gas Association (WPGA) | 3044 |
| Hanz, Patricia | 12/9/21 | Truck and Engine Manufacturers Association (EMA) | 3016 |
| Harper, Davis | 12/9/21 | The Climate Center | 3043 |
| Ingrassia, Phil | 12/9/21 | National RV Dealers Association (RVDA) & California Recreation Vehicle Dealers Association (CalRVDA) | 3063 |
| Johnston, Dave | 12/9/21 | El Dorado Air Quality Management District (El Dorado AQMD) | 3028 |

| Commenter | Date | Affiliation | Commenter Code |
|---|---|---|---|
| Jordan, Tom | 12/9/21 | San Joaquin Valley Air Pollution Control District | 3046 |
| Knott, Greg | 12/9/21 | Outdoor Power Equipment Institute (OPEI) | 3039 |
| Mabe, Daniel | 12/9/21 | American Green Zone Alliance (AGZA) | 3050 |
| Magavern, Bill | 12/9/21 | Coalition for Clean Air | 3001 |
| McGrath, Casey | 12/9/21 | Pacific Stihl | 3032 |
| McKnight, John | 12/9/21 | National Marine Manufacturers Association (NMMA) | 3011 |
| Meelker, Casey | 12/9/21 | Hydro Tek | 3029 |
| Mitchell, Greg | 12/9/21 | ECI Fuel Systems | 3015 |
| O'Connell, Jim | 12/9/21 | Hotsy Pacific / Cleaning Equipment Trade Association (CETA) | 3025 |
| Ochs, Michael | 12/9/21 | RV Industry Association (RVIA) | 3024 |
| Olma, Robert | 12/9/21 | Andreas Stihl AG & Co. KG (STIHL) | 3038 |
| Raddigan, Ronnie | 12/9/21 | California Recreation Vehicle Dealers Association (CalRVDA) Board | 3023 |
| Rasmussen, R. Calvin | 12/9/21 | Royce Industries | 3004 |
| Reece, Chad | 12/9/21 | Industry veteran & RV enthusiast | 3030 |
| Rees, Sarah | 12/9/21 | South Coast Air Quality Management District (SCAQMD) | 3040 |
| Ricketts, Michael | 12/9/21 | Hotsy of Southern California | 3019 |
| Rodriguez, Erin | 12/9/21 | Union of Concerned Scientists | 3064 |
| Rodriguez, Shari | 12/9/21 | Outdoor power equipment dealer | 3012 |
| Rosenbaum, Mark | 12/9/21 | Mike Thompson's RV Superstores | 3027 |
| Ruacho, Mariela, Manager, Clean Air Advocacy | 12/9/21 | American Lung Association | 3006 |
| Salazar, Alex | 12/9/21 | Ground Care Landscape Company | 3062 |
| Sherman, Randy | 12/9/21 | Zama Group | 3031 |
| Spendlove, Matthew | 12/9/21 | NextGen Power Systems | 3051 |
| Stafford, Tammy | 12/9/21 | Harbor Freight Tools | 3057 |
| Tenney, David | 12/9/21 | Manteca Trailer & Motorhome, LLC | 3002 |
| Tower, Eric | 12/9/21 | Power washing contractor | 3054 |
| Welch, Jimmy | 12/9/21 | Cleaning Equipment Trade Association (CETA) | 3008 |
| Woelfel, Joani | 12/9/21 | Far West Equipment Dealers Association (FWEDA) | 3045 |
| Woelfer, Todd | 12/9/21 | Thor Industries | 3014 |
| Woodruff, Eric | 12/9/21 | Generac Power Systems | 3061 |

**Table 4. Written Comments Received During the March 2022 15-Day Notice Comment Period**

| Commenter | Date | Affiliation | Commenter Code | Submission Method |
|---|---|---|---|---|
| Baker, Todd | 04/14/22 | [none provided] | 4014 | Docket |
| Darlington, Tom | 04/12/22 | Air Improvement Resource, Inc. (AIR) | 4022 | Email |
| Dennis Hendrix | 04/14/22 | [none provided] | 4009 | Docket |
| Domingos, Mitch | 04/14/22 | [none provided] | 4007 | Docket |
| Gamboa, Marvin | 04/13/22 | [none provided] | 4005 | Docket |
| Gilstrap, Ray | 03/31/22 | Allpro Engine & Mower Supply | 4002 | Docket |
| Hanz, Patricia | 04/14/22 | Truck and Engine Manufacturers Association (EMA) | 4013 | Docket |
| Johnson, Matthew | 04/14/22 | American Honda Motor Co., Inc. (Honda) | 4021 | Email |
| Knott, Greg | 04/14/22 | Outdoor Power Equipment Institute (OPEI) | 4010 | Docket |
| Kunhardt, Tom | 03/30/22 | [none provided] | 4001 | Docket |
| McCall, Garrett | 04/14/22 | Landscaper | 4017 | Docket |
| McKnight, John and Amber, Glenn | 03/30/22 | National Marine Manufacturers Association (NMMA) and Westerbeke Corporation | 4020 | Email |
| Nelson, Mike | 04/14/22 | Ace Hardware | 4008 | Docket |
| Nielsen, Niki | 04/14/22 | [none provided] | 4018 | Docket |
| Olma, Robert | 04/14/22 | Andreas Stihl AG & Co. KG (STIHL) | 4011 | Docket |
| Pham, Trung | 04/01/22 | Single Cylinder Repair, Inc. | 4003 | Docket |
| Rodrigues, Shari | 04/13/22 | Furber Saw, Inc. | 4006 | Docket |
| Rodriguez, Roger | 04/14/22 | [none provided] | 4012 | Docket |
| Stafford, Tammy | 04/14/22 | Harbor Freight Tools | 4015 | Docket |
| Vailancourt, Erik | 04/14/22 | [none provided] | 4019 | Docket |
| Welch, Jimmy | 04/14/22 | Cleaning Equipment Trade Association (CETA) | 4016 | Docket |
| Yusuf, Mostafa | 04/04/22 | Landscape Product Distributor | 4004 | Docket |

**Table 5. Written Comments Received During the May 2022 15-Day Notice Comment Period**

| Commenter | Date | Affiliation | Commenter Code | Submission Method |
|---|---|---|---|---|
| Analla, Molly | 06/08/22 | [none provided] | 5004 | Docket |
| Hagan, Melissa | 06/10/22 | Law Office of Melissa B. Hagan, PLLC | 5007 | Email |
| Hanz, Patricia | 06/13/22 | Truck and Engine Manufacturers Association (EMA) | 5006 | Docket |
| Knott, Greg | 06/13/22 | Outdoor Power Equipment Institute (OPEI) | 5005 | Docket |
| McKnight, John and Amber, Glenn | 05/31/22 | National Marine Manufacturers Association (NMMA) and Westerbeke Corporation | 5009 | Email |
| Van Groningen, Jeremy | 06/03/22 | [none provided] | 5003 | Docket |
| Vaughan, Ellen | 05/31/22 | [none provided] | 5002 | Docket |
| Waldburger, Mateo | 06/07/22 | San Diego Exterior Pro's | 5008 | Email |
| Wyrick, Kristopher | 05/27/22 | [none provided] | 5001 | Docket |

# A. Comments Received during the 45-day and Hearing Comment Periods

This section of the FSOR provides the text or a summary of each comment submitted regarding the original proposed amendments during the 45-day comment period and during the Board hearing on December 9, 2021. Comment letters and emails were submitted by more than 1,300 individuals or organizations during the 45-day comment period. An additional 66 oral statements and 46 comment letters and emails were provided during the December Board Hearing. This subsection IV.A includes responses to all comments submitted in writing and oral comments from the meeting transcript. To facilitate the use of this document, comments are categorized into topic-specific sections and are grouped by responses wherever possible. Tables 1, 2, and 3 above list the commenters that provided written and oral comments on the Proposed Amendments during the 45-day comment period and during the Board hearing. The tables include the commenter codes assigned to each to help identify commenters in the comments/responses which follow. Note, two stakeholders provided 45-day comments tabulated in Microsoft Excel spreadsheets. These comment spreadsheets, together with agency responses, are presented as tables in the following attachments to this FSOR:

- Attachment A: Outdoor Power Equipment Institute (OPEI) "Annex A" comments, which accompanied OPEI's first November 29, 2021, letter submitted by Greg Knott during the 45-day comment period
- Attachment B: Truck and Engine Manufacturers Association (EMA) "Exhibit F" comments, which accompanied EMA's November 29, 2021, letter submitted by Patricia Hanz during the 45-day comment period

## A.1. Support for Proposed Amendments

### *A.1.1. Support from landscapers and other ZEE users*

Comment: The Curtis Park neighborhood is a politically active and vibrant 2,500 household community located in South Sacramento. The Sierra Curtis Neighborhood Association (SCNA) holds monthly board meetings to address neighborhood issues, manages the Sierra2 Center for the Arts & Community, hosts many annual events, and publishes monthly the Viewpoint newspaper. SCNA strongly supports the proposed amendment to small off-road engines (SORE) which would set emission standards for smog-forming pollutants to zero for all new SORE beginning with the 2024 model year. SCNA has been actively involved in zero emission equipment (ZEE) for yard care. The Sierra 2 Center contracts with FRESH AIR Yard Care which uses only electric and hand powered equipment to maintain the landscape. SCNA has a Clean & Quiet Yard Care Ad Hoc Committee that promotes and educates the neighborhood about greener alternatives to yard care at community events and through their website https://sierra2.org/neighbors-seek-cleaner-quieter-yard-care-tools/ (33-Docket)

Comment: I feel as we are the "green" industry we need to be embracing this change and thus changing our image. If our goal is to appeal to a younger generation of new members we will only do so if we care what they care about. Over the last several years members of our industry have benefited financially like never before, while it is a cost to change it's one we all must be willing to pay. I understand the hesitation with change, but this will be a good one. (39-Docket)

Comment: Already using many electric machines and they are better than gas. Our Mean Green 60" Ride mower and 48" stand on mower have improved profitability significantly over gas and reduced

maintenance time and expense. Our electric chain saws and hedgers are an improvement over their gas counterparts also. Reduced operator stress and PPE requirements are also beneficial. (54-Docket)

Comment: As a licensed landscape architect and contractor I support a ban on sale and use of gas powered landscape equipment by 2024. This ban would not only help reduce carbon emissions but would also reduce noise pollution. (68-Docket)

Comment: I have been a licensed landscape contractor for more than three decades. I whole-heartedly support transitioning from gas power to electrical for small equipment, such as blowers, mowers, hedge trimmers, etc. Not only are the current machines bad for the environment, they are bad for people operating them. The noise and emissions are awful. Opponents of this measure insist it is between battery and gas powered machines. Battery life is a legitimate concern. When practical, a corded machine is a viable alternative, as is charging an extra battery or two at every stop. Increased demand for the technology should result in innovation, increased efficiency and price competition, much as it has with electric cars. Over time, I doubt many will miss paying for gas, oil and other maintenance not required by electric motors. (90-Docket)

Comment: Another fact to mention is clients, just about all clients, cannot stand gas leaf blowers and other loud equipment. You can sell the transition to your clients as something not only good for the environment but good for their peace of mind. Smart landscape professionals will turn this to their advantage. (90-Docket)

Comment: I dream of the day Landscaping is truly greening including all electric fleet and equipment! This is the future....and we should be seizing this moment to lead our industry and gain the accolades our industry's stewardship is undervalued for. Let's do this! (94-Docket)

Comment: Yes. Gas powered landscape equipment should be banned immediately. For 10 years, my small but profitable maintenance company used hand held battery powered equipment. We carried extra fully charged batteries with us. The equipment did not harm our ears, irritate clients/neighbors, cause lung damage due to the fumes, endanger our environment, and the air just smelled better. The equipment was light and powerful enough to do everything we needed except to blow off heavy wet mowed grass or heavy wet soil. We used rakes, brooms, and shovels for those tasks if necessary. Our environment and our careers are in jeopardy because if it gets too hot and dry for plants to survive, we will not have a landscape industry. Currently, there are even desert plants that are dying due to excessive heat and lack of minimal water. Unless all of us are inconvenienced to slow the climate crisis, even if it is expensive, we will have a planet on which we don't want to live or on which we can not live. Currently, not one major country on earth wants to spend the money or be inconvenienced by changes that will enable the continued existence of our children, grandchildren, and all of the children on earth to live in the world as we know and love it. (95-Docket)

Comment: Absolutely gas should be 95% banned. I've been fully battery operated on myself and crew for 2 years now. It's been amazing. (100-Docket)

- I no longer have to buy gas and oil, and have leaky cans in trucks and vans.
- Nobody can ruin a tool by mixing gas wrong saving me thousands in lost equipment. Not only bad mixing kills tools, but creates more smoke when done wrong.
- Once you have battery and chargers. Additional tools cost less money.
- You can use customer supplied power, which is often solar.
- I've added solar to one vehicle and we never have lack of battery charge.

- Less sound and noise pollution for my customers
- Less sound for my crews ears, no exhaust in they're lungs. Healthier for them and the planet. (100-Docket)

The only reason gas should be used is huge weed eating and fire clearance work. The batteries just don't have the capacity for acres of mowing. (100-Docket)

Comment: I have been using battery-powered blowers for the last 10 years when the City of Santa Monica introduced their ordinance. These blowers are quieter and you don't smell the gasoline fumes in the air, particularly when multiple companies are servicing clients on the same days throughout the weeks. There is also less fire danger using battery-operated blowers when red zone ordinances are in effect. (115-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. For over two decades, we have used electric-powered and human-powered equipment. These alternatives are affordable and readily available. (128.080-Docket)

Comment: It is time for the phase out of these small polluting and noisy devices. I have replaced my yard blower and chain saw with battery tools which work fine. I live rural so I use these tools a lot. I purchased extra batteries and told my gardener NOT to use his gas powered tools. He loves the yard blower. We have to stop kicking the cans (issues) down the road for future generations to deal with. It is OUR responsibility and the time to address those responsibilities. (187-Docket)

Comment: I have had personal experience with an electrically powered lawn mower and can attest to the fact that such mowers are as good or better than gasoline powered ones. They should be used instead of gasoline powered mowers. The same holds true for leaf blowers. (212-Docket)

Comment: I have been using a battery powered mower, edger, and blower for over 5 years. They are efficient and quiet. No trips to the gas station is another benefit. I support a quick transition to zero emission equipment. (236-Docket)

Comment: These tools should be electric. Gas machines pollute too much. My husband has been using an electric mower and blower for years. They work quite well. Fossil fuels are killing the planet. They should be left in the ground. (278-Docket)

Comment: I have used gas-powered leaf blowers professionally for many years. They are horrible to operate, create greenhouse gas emissions, cause noise pollution, remove beneficial biomass from soil and consume fossil fuel. Electric alternatives work very well. It is time for a change. (281-Docket)

Comment: These is an easy fix. Electric blowers work great. (292-Docket)

Comment: I am writing to you today as a landscape and garden professional. No more time is necessary. This requirement should have been met years ago. Enforce the law now. (306-Docket)

Comment: Everyday I hear the loud chainsaws, mowers, blowers and weed whackers going in my neighborhood almost every day. And I smell their exhaust, too. I own and use an electric chainsaw, mower, blower and hedge trimmer, and they work well. (328-Docket)

Comment: Please transition to clean leaf blowers and lawn equipment. Gas powered leaf blowers and lawn mowers are huge polluters. Electric ones work well, I've been using an electric leaf blower for a

decade now, and I would never go back. Please ban the gas ones and help improve our health. (355-Docket)

Comment: I am now using Snapper and /Greenworks 80 volt Lawnmowers. My Greenworks edger/weedwacker is better than gas. The 80 volt electric chainsaw is comparable to gas without fumes to get in the way. In short, I think it would be smart to drop all gas lawn equipment. I have done away with all my gas lawn equipment and it is for the better. Gasoline storage is volatile and dangerous. Why continue this practice? (362-Docket)

Comment: I realize the technology is evolving, but today there are many gas driven units that could easily be replaced by electric power. Leaf Blowers are an example. I own one and they work quite well as does my electric lawnmower and my electric hedge trimer; and the list goes on. As such, please consider phasing out small gas engines in our State. We would all benefit from it. (385-Docket)

Comment: Our town has banned gas powered small engines and the availability of electric substitutions has been good. We are using half gas and half electric now. The transition has been uncomfortable, but now the boys like the cleanliness of the electric machines. The power is not as strong and a combustion engine, but at least it is better than hand tools! We use mainly hand tools but on larger lawns and hedges a machine is great. The client just has to know that work will take a bit longer with hand tools, but most feel good not listening to loud 2 cycle engines outside their windows. Better, stronger machines are on the table now, our beloved machines will always be with us! (405-Docket)

Comment: Living in the Ojai Valley, we have seen the benefits of electric leaf blowers big time. Many folks were dubious, but the data showed promising results, and the city workers liked the new equipment. Note that leaf blowers impact Latinos the most since they often provide this service to cities. (443-Docket)

Comment: I have been using all electric for yard equipment for years and have found no reason that gas powered are required. I use mixture or corded vs battery equipment. The cords took a little to get used to but no real issues certainly for vast majority of residential and a good number of commercial locations. Being home most of the time I now experience the smell as well as the noise pollution caused by the gas powered equipment used by homeowners and landscaping businesses. Very few locations have a large enough area that would require even non-corded equipment. Please give us all peace and quiet along with better air quality. (497-Docket)

Comment: We support regulations promoting clean air and a sustainable environment. We installed solar panels and storage batteries in our home and on both of our RVs and try to be energy efficient. For 14 years, we traveled with a 28 ft Airstream trailer and tow vehicle until early 2021 when we converted to a 19.5 ft fully outfitted Class B Mercedes Sprinter camper van. We carried a portable Honda generator for our Airstream trailer, and have the latest model, quiet, built-in Onan generator in our Sprinter camper van. We've traveled with our RVs around the United States and into Canada to visit family, for pleasure, and occasionally for Roger's consulting work. We love the quiet, clean feeling that comes from camping in nature. The combination of solar panels, plugging into the campground's shore power, and recharging batteries while driving generally gives our RV's dual lithium house batteries enough power to support our needs. (2003-Docket)

Comment: My family purchased a battery electric leaf blower and lawnmower over 10 years ago. We prefer ZEE to SORE for many reasons; they are quieter, cleaner, safer and more convenient. The smell and toxic fumes we are forced to breathe when SORE is operated in and around my family is unavoidable and unfair. My family (including my autistic son) does not obtain any financial benefit

from the operation of SORE--only harm. My neighbors pay only $25 a month for a "mow and blow" crew. This seems way too cheap; I think they could pay more. Additionally, I can't imagine how landscape crew members must feel after breathing SORE toxic fumes day-in and day-out. This is a serious environmental justice issue! We are sincerely hoping this transition happens faster than designed. You have my support!!! (2010-Docket)

Comment: I support the adoption of new regulations that will phase out the sale of gas-powered lawn equipment in California beginning in 2024. As Public Works Director for the City of Ojai, I implemented a program replacing the use of City staff using gas-powered landscape equipment with clean battery-powered equipment. This included a 60-inch deck lawnmower, push mowers, string trimmers, blowers, hedge trimmers, and chainsaws used in maintenance of the City of Ojai's parks, street, and facility landscaping. The larger facilities maintained included the 10-acre Sarzotti Park with soccer and ball fields, the 7-acre Libbey Park, and the 9-acre City Hall campus. The battery-electric chainsaws were used to prune the thousands of trees under the City's care on street sides and in parks as well as emergency removals of fallen trees. Every spring, a crew of 4 to 6 ran battery-electric string trimmers for full days for several weeks to remove weed growth in undeveloped areas as a fire reduction effort. In total, the City's entire 52 acres of landscaping across 19 municipal properties, including all parks and sports fields and city hall is being done with battery-electric powered equipment. The equipment has been extremely reliable, in operation since early 2018. The primary benefits include:

- Lowering emissions for the region
- Lowering the crew and neighborhoods/public's exposure to exhaust/HAP fumes
- Lowering the crew and neighborhoods/public's exposure to noise
- Simplifying equipment maintenance – no gasoline & oil in sheds and trucks, no carburetor problems or tune ups required, etc. (2012-Docket)

Some of the crew doubted the equipment would be tough enough for large mowing jobs, for weeks of full day spring weed control efforts, and chain-sawing larger trees. After a year of using the battery-electric equipment they were convinced. I support approval and amending the SORE regulations per the staff recommendation. (2012-Docket)

Comment: This is Steve Colome and I'm speaking as a public representative today supporting adoption of the amendments before the Board. While CARB and SORE manufacturers have endeavored to reduce emissions, it is a chimera to reduce emissions much further as we're up against the laws of physics. Small IC engines are inherently polluting. The reason I chose to speak today, listening to the testimony, is that this discussion of ZEEs is reminiscent of the conversion from incandescent to LED lighting. Change can be challenging and there are often hiccups along the way, but the final result is a win-win, and the technology forcing is beneficial to all. In 2018, the City of Ojai Public Works Department converted all of its municipal equipment to battery electric. And despite initial doubts, the Public Works crew today would not return to the SORE equipment. Instrumental in all of this was workforce training, which for Ojai was provided by AGZA, allowing the transition to be trouble free. So I applaud the public outreach and training efforts that are embedded in the proposal today. I therefore encourage the Board to avoid any further delays or carve-outs and pass these amendments today as proposed by staff. (3060-Oral Testimony)

**Agency Response:**

These comments express support for the Proposed Amendments by landscapers, community organizations, and others who have been using zero-emission landscaping equipment and

other ZEE alternatives to SORE equipment. The commenters describe several benefits, including but not limited to: healthier for workers, neighbors, and the planet; improved profitability compared to gas counterparts due to reduced fuel, maintenance time, and other expenses; reduced operator stress and PPE requirements; client/neighbor preferences for quieter equipment; reduced worker exposure to noise, exhaust and other fumes and smells; improved safety from no longer storing and transporting gasoline cans; no longer having smoke and equipment losses due to workers mixing gasoline and oil incorrectly; less fire danger using battery-operated blowers; and overall positive performance of ZEE and RV batteries. CARB made no changes based on these comments. CARB appreciates the support and agrees that it is necessary and important to adopt ZEE. The following response provides clarification and context for several points within the above comments.

In response to the comments about noise reduction, to clarify, regulating noise pollution is beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice. Nonetheless, although ZEE create noise while in operation, ZEE generally create less noise than SORE equipment (ISOR pages 82-83), which reduces noise at worksites as well as in the community where the equipment is operating. Therefore, noise reduction is one of the benefits of the Proposed Amendments. Similarly, while the Proposed Amendments would reduce carbon emissions, they are specifically designed to achieve the expected $NO_x$ and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20.

In response to the comments specific to banning the use of SORE equipment, to clarify, the Proposed Amendments would not prohibit the use of CARB-certified SORE equipment nor would they prohibit the use of ZEE such as leaf blowers or other equipment that create noise or might disturb or remove beneficial biomass in soil. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. The SORE regulations require new engines to be certified and labeled to meet emission standards and other requirements. CARB regulates the engines, but does not regulate the use of SORE equipment. Gardeners and other people can continue to use and repair their current SORE equipment until the end of its life.

In response to the comment, "The power is not as strong and [*sic*] a combustion engine, but at least it is better than hand tools," to clarify, CARB is not requiring the use of hand tools and, for the most common types of SORE equipment, ZEE equivalents to SORE equipment are available in the market today with similar or better performance characteristics and lifetime. Please refer to ISOR section I.E for a review of currently available ZEE, and to the Agency Responses in section IV.A.35 for additional discussion.

In response to comments about requiring electric or battery powered equipment, to clarify, the Proposed Amendments do not require that equipment be powered by electricity. The Proposed Amendments are inherently technology neutral because they specify emission standards of zero and do not specify a particular energy source or technology. For example, as noted on ISOR page 24, hydrogen fuel cell powered equipment are considered ZEE under the Proposed Amendments. In addition, manufacturers may use emission reduction credits to offset emissions from engines that use low-emission technologies. Please refer to the Agency Response in section IV.A.2.6.3 for additional discussion about alternative fuels and technologies and use of credits by manufacturers that participate in CARB's averaging, banking, and trading (ABT) emission reduction credit program.

For discussion of the comment, "Absolutely gas should be 95% banned. ... The only reason gas should be used is huge weed eating and fire clearance work. The batteries just don't have the capacity for acres of mowing," please refer to the Agency Responses in sections IV.A.2.5.5 and IV.A.35.

Regarding the comment, "...public outreach and training efforts that are embedded in the proposal today," to clarify, while there has been workforce outreach and training by air district and CARB programs, contractors, and partners, requirements and funding for outreach and training are beyond the scope of the rulemaking as described in the October 2021 45-Day Notice. CARB agrees that outreach and workforce development training for dealers, mechanics, and landscapers would be beneficial. CARB made no change based on these comments.

### *A.1.2. General support and support for health benefits and other goals*

Comment: I'd like to support your efforts to strongly regulate gasoline lawn equipment. CA can move the industry in the right direction. Electric options are available. Go for it! (3-Docket)

Comment: I support a transition to Zero Emissions for small off-road vehicles. Air pollution is a serious problem and our children deserve our energetic shift toward zero emissions. The technology is here. Let's be forward thinking and transition toward a safe future. (17-Docket)

Comment: There are some advantages to electric equipment. I understand a few companies are working on hybrid equipment. (46-Docket)

Comment: Please transition to zero emissions for small off road engines. It is time to take air pollution seriously. (47-Docket)

Comment: Gas blowers and other gas-operated landscape maintenance equipment should be banned as soon as possible. They create noise as well as air impacts that affect the equipment handlers as well. These machines do not clean, they only move dirt and leaves to neighboring areas. (48-Docket)

Comment: As with all aspects of humanity.
Everyone and everything must change.
If we are to continue as an species living on this planet.
Anything that operates on fossil fuels must stop ASAP (now)
And convert to a sustainable energy source. (64-Docket)

Comment: In my opinion it is time our industry stop using gas powered equipment asap. The image of landscape companies can only benefit for embracing a more environmentally friendly way to conduct our work. If we plan now on switching to electric tools, it will be done by 2024 without much financial pain. How many years does a mower or blower last when used daily? What about the less maintenance needed to operate electric tools? When factored in the equation it makes even more sense to switch. In California we have had to adapt to a lack of water and learn about efficient irrigation systems and installing less thirsty landscapes or find another way to make a living. Working for cleaner air and a better environment is no less important and well worth the initial investment. After all we are in the GREEN industry! (65-Docket)

Comment: Sacramento is a city of trees. Also it is a city of leaves. But all year long, you can hear the drone of leaf blowers everywhere, any hour of the day, and sometimes, night. They are polluting. I

can smell the gas exhaust as I ride my bike past them. They create very dirty air, especially in the dry summer, when dust mixes with exhaust fumes. Apparently an hour of gas-powered leaf blowing puts as much pollution in the air as a car trip from here to Denver. They are loud. Their drone keeps people from opening their windows. Their drone drives away birds and other small creatures. They create a dead zone as everything moves away to avoid their obnoxious effect. Leaf blowers and other small gas-powered tools are obnoxious, unhealthful and dangerous for the environment. Many can be replaced easily with their electric-powered counterparts. For the sake of common sense, peace and quiet, and the survival of the planet, please take this small step, and regulate the use of gas-powered engines! Thanks so much. (73-Docket)

Comment: I believe that the proposed ban on the sale of gas-powered small off-road engines, beginning in 2024, is a wise and necessary measure. The regulations do not, and should not, prohibit the use of existing gas powered small engines. If it did that would represent a significant hardship to many landscape maintenance companies as well as residential homeowners. Creating a hard deadline and getting the word out NOW will ensure the preparedness of the users and the manufacturers. (74-Docket)

Comment: Waiting for technology to arrive delays this necessary step, both incidentally as well as purposefully. Drawing a hard line in the sand with a reasonable cut off date of 2024 ensures continued diligence to perfecting the technology. Don't let up. I support the proposed ban on the sale of gas-powered small off-road engines, beginning in 2024. (74-Docket)

Comment: It's bound to happen some time, let's just get it over with. (75-Docket)

Comment: I am in favor of the regulation for transition to zero emissions for small off-road engines. The air and noise pollution of these in the landscape industry must be mitigated by finding alternative resources for equipment. (76-Docket)

Comment: I am super happy about this new law and I wish it would have happened years ago already. I am willing to pay more for electric power equipment - the gas powered equipment is making the earth and all the inhabitants choke. (89-Docket)

Comment: Yes. Please make this transmission to zero emissions at soon as you can. It is urgent. Our children and grandchildren need a pretty and friendly climate to live in. (101-Docket)

Comment: As much as I believe the requirement to replace gas powered equipment to battery powered may be a burden for some by outlay of additional cost, I feel it's necessary to move in this direction. We are at a forefront of making change and the landscape industries is no different. (114-Docket)

Comment: Three years seem fair enough to give companies time to make change and transition over this period. Our environment is so important, and the green Industries can be a leader in doing something that will affect the world. (114-Docket)

Comment: It is LONG past the time to end the use of these highly polluting devices - many of which are used in landscaping. Alternatives exist and the state is offering incentives such as funding for electric blowers. Change is never easy but economies will adapt to meet the need for the greater good. Postponing or delayment does not solve the larger air quality problems - only kicks the can up the road. I support the ban and look forward to a greener future. (117-Docket)

Comment: Please. Let's work to get rid of these polluting noise making machines. (124-Docket)

Comment: Please pass this ban. The argument that it will make it impossible for landscapers to do their jobs is nonsense. People maintained gardens and lawns for many decades before we were subjected to this noise and air pollution. Please pass this ban. (126-Docket)

Comment: Also, living in a community that has over 120 golf courses, the daily amount of air pollution from mowers, trimmers, etc is truly revolting. (128.008-Docket)

Comment: In addition, the noise pollution caused by leaf blowers and lawn mowers exacerbates my migraine disease which makes me very sensitive to noise. (128.023-Docket)

Comment: Additionally, the noise levels are a hazard to operators and a clear nuisance to nearby residents. (128.025-Docket)

Comment: I am a life-long California resident and I had childhood asthma and continue to be affected by incomplete combustion of gas, especially from gas-powered leaf blowers and lawn mowers. I urge you to support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. (128.067-Docket)

Comment: I am a California resident and I live on the Central Coast where we often have the worst levels of air pollution in the U.S. (128.070-Docket)

Comment: I am a California resident, and I support the adoption of new regulations that will phase out the sale of highly-polluting (and extremely noisy) gas-powered leaf blowers and lawn equipment in California beginning in 2024. (128.115-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers causes numerous health problems, and greatly contributes to California's notoriously poor air quality and noise pollution. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. (128.119-Docket)

Comment: In my own neighborhood, I am assaulted daily by the noise and exhaust fumes of gasoline powered leaf blowers and lawn mowers used by homeowners and gardeners. These things are a public nuisance! (128.126-Docket)

Comment: It will also hopefully decrease noise pollution. (128.127-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. The use of these machines causes numerous health problems, and greatly contributes to California's notoriously poor air quality such that California continues to fail to meet national air quality standards. These new regulations will result in fewer premature deaths, emergency room visits, and hospitalizations. The reasons and the fact that the California Legislature appropriated $30 million for your agency to distribute to small proprietor landscapers to help them begin to acquire and transition to new, zero emission electric and manual equipment means that there is no reason not to act now. Please approve and amend the SORE regulations per the staff recommendation. (128.142-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, greatly contributes to California's notoriously poor air quality, and creates a noise

nuisance. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. (128.154-Docket)

Comment: With this amendment, air pollution with lessen at a local level and save many from asthma. It's a move in the correct direction for a healthier life and environment. (128.165-Docket)

Comment: I am a California resident, grew up in Upland CA in the 60s & 70's and I have difficulty breathing because of the smog, smudge pots burning oil to keep the citrus trees from frost damage. It doesn't have to be this way for children only if we STOP polluting the air with gas-powered landscape equipment!! Lawn mowers, leaf blowers, and the trucks that haul this equipment from neighborhood to neighborhood. (128.193-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gasoline-powered small off-road engines (SORE) in California beginning in 2024. The use of gasoline-powered lawn mowers, leaf blowers, and weed trimmers in particular, causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. (128.196-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. Across the street from my home, every week, one crew works 3 yards which results in 8 hours of non-stop noise and nauseous fumes. And there are 2 other crews who service homes on my street. These crews have up to 6 people using various pieces of highly-polluting equipment all at once. The use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. This regulation will improve air quality, help to slow the climate crisis, improve human health, and save lives. Please approve and amend the SORE regulations per the staff recommendation. (128.206-Docket)

Comment: Additionally, this regulation is a quick and relatively inexpensive way to improve air quality and should be implemented as soon as possible. (128.210-Docket)

Comment: I am a California resident in Los Angeles County and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. Hopefully, this will NOT be prohibitively expensive for landscaping companies; it should not be construed by manufacturers as an excuse to increase prices to the point where landscaping companies would need egregious amounts of financial assistance to comply, above and beyond what is currently available. But the use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday, and I have asthma (and sensitivity to the noise pollution produced as well by gas-powered SOREs, but that's a different focus). CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

$8.8 billion in health insurance benefits through 2043

892 premature deaths avoided

438 fewer emergency room visits for asthma (I personally haven't had to go yet, but it's been a near thing more than once)

311 fewer hospitalizations for respiratory and cardiovascular issues (128.219-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards. This means that millions of Californians like myself, my grandchildren and my entire community breathe unhealthy air everyday. (128.239-Docket)

Comment: We need zero emissions leaf blowers ASAP. Please make it happen. (129-Docket)

Comment: Please phase out the use of 2 stroke engines in CA
We must phase out of gas powered engines and the lawn industry can make a great contribution to that end. They are horrible and cause a great amount of air and sound pollution. Alternatives are a great alternative. (130-Docket)

Comment: It blows my mind that any of us have to even ask for this at this point. These small engine nightmares have been destroying the air and peace everywhere they are used. Despite being illegal in LA. I'm so disgusted with our cities and states. I hope this will have ANY impact. (131-Docket)

Comment: We eventually have to stop using fossil fuels before they run out... Why not change the simple things to electric while we can. (132-Docket)

Comment: just do it (133-Docket)

Comment: My son is asthmatic and the rising levels of children who have asthma in LA is growing. The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. (134-Docket)

Comment: We need to eliminate all emissions that destroy our ability to breath clean air. Please act accordingly in all you do. (135-Docket)

Comment: I live in a community that includes landscape maintenance. Unfortunately, this includes constant noise and pollution from equipment, including lawn mowers and leaf blowers. I would very much appreciate regulation that requires quieter and zero emission equipment. It's a quality of life and environmental issue. (136-Docket)

Comment: I support the zero emission garden blower to be implemented. Every bit of reduction in emissions counts to reduce the impact of global warming. (137-Docket)

Comment: Please do all you can to end the use of noise-polluting lawn and garden equipment. We need to protect our communities and wildlife from the noise. (138-Docket)

Comment: The emissions from hand held leaf blowers is noxious and contributes to pollution and carbon in our atmosphere. There is no reason to allow this kind of needless toxicity to continue. WE as a nation must eliminate these noisy toxic blowers and, as need be, replace them with zero-emissions blowers. The same goes for all vehicles and the like that use single-stroke engines. The time is now! (139-Docket)

Comment: I support California's transition to clean lawn care equipment. (140-Docket)

Comment: The odor of gasoline and the disgusting fumes from leaf blowers are not just a nuisance they sicken us. Impossible to leave windows open many days if you don't want the fumes entering your home! I'm sensitive to pollution and my doctor advised me to move out of LA if I want to stay well. Sad! (143-Docket)

Comment: Californians consistently breathe dirty air, despite the states partial shift away from fossil fuels for electricity. Consequently, it is important for public health that the California Air Resources Board adopt a zero emissions standard for Small Off-Road Engines such as those that power lawnmowers and leaf blowers. Please support better air quality and health for all Californians by voting to support the adoption of this policy. Thank you! (144-Docket)

Comment: Please pass the proposed Small Off-Road Engine Regulation to end the sale of polluting lawn and garden equipment. (145-Docket) (218-Docket) (299-Docket) (352-Docket) (412-Docket)

Comment: Small engines cause LOTS of pollution, more than cars! It's time to do away with them! (146-Docket)

Comment: Gas powered leaf blowers are a scourge in my neighborhood! They are completely ruining any quality of life here. Everyday there is some property next to me operating a leaf blower. The noise is deafening and the stench of burning and unburnt fuel is sickening. It is not healthy or safe to be within a hundred feet of these machines. God knows what it is doing to the poor workers who use them. We need to completely get rid of fossil fuel leaf blowers and generators and require property owners to provide exterior power outlets for electric alternatives. There should be noise limitation standards also required for all new leaf blowers. Eventually blowers of any kind should be abolished since they kick up a cloud of toxic dust that drifts across the entire neighborhood. LA has a history of air pollution -- we need to continue to combat it at every level. Work on leaf vacuums (instead of blowers) and other alternatives must be promoted and supported. (147-Docket)

Comment: In a time when Climate Change has been proved to be a REAL THREAT to all of us on this planet, it makes sense to do WHAT NEEDS TO BE DONE to fight this threat! Zero Emissions of all leaf blowers is the step that NEEDS TO BE IMPLEMENTED IMMEDIATELY! (148-Docket)

Comment: These massive pollutants must be eliminated. Alternatives must be used. It's absurd to continue to subject the air we breathe to a tool with no limits to the exposure. (149-Docket)

Comment: Keep our neighborhoods CLEAN and unpolluted!! (150-Docket)

Comment: The dirty air and noise these gas-powered leaf blowers and lawn mowers can be improved upon. My lungs and eardrums can't be. (151-Docket)

Comment: Small off road Engine Regulations are highly inefficient and spew toxic fumes and particles at a disproportionately high rate. It is a easy- low apple- to reduce carbon and it will be better for the health of those near them constantly. Please develop regulations for these items (152-Docket)

Comment: I live in a large apartment complex in Irvine, where we are daily exposed to unhealthy leaf blowers and other gas-powered equipment, as are other California residents. Please act to replace these polluting devices per your staff recommendations. (154-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. If not now, when? (155-Docket)

Comment: Please quickly enact and begin enforcing rules to ban the sale of gas-powered gardening equipment such as lawnmowers and leaf blowers. In reality, the latter should more properly be called "dust blowers," because they are used year-round in our neighborhood and mainly blow particulates rather than leaves. Our home on a cul-de-sac is surrounded by 7 other homes, almost all of which employ gardeners who use dust blowers every week. We hear them 6 days a week, and must constantly run to close our windows to keep out the gasoline exhaust fumes and dust. I began my career as a health educator for an affiliate for the American Lung Association and later worked as an environmental planner (much of it in air quality). As such, I implore ARB to reduce the incidence of COPD in California by banning dust blowers. (156-Docket)

Comment: As you know we are in a climate crisis. There is no room left in our carbon budget for polluting tools that have clean electric options in the market. (158-Docket)

Comment: Please pass the proposed Small Off-Road Engine Regulation to end the sale of polluting lawn and garden equipment! I for one experience this pollution when my gardener uses the leaf blower and other gas driven equipment! (159-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. The use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. In addition, the new battery powered equipment will be QUIETER!!! I despise when the grounds maintenance crew works around the large apartment complex I live at in Ventura CA (Sofi Ventura), due to the significant air and noise pollution they produce. Please approve and amend the SORE regulations per the staff recommendation. (161-Docket)

Comment: Please help us reduce emissions from leaf blowers now. We must act today to stop the decline of our climate. We are all vulnerable now, waiting is not acceptable. (162-Docket)

Comment: I urge you to pass the proposed Small Off-Road Engine Regulation to end the sale of polluting lawn and garden equipment. It will be a step in the right direction for our state. (163-Docket)

Comment: Thanks for working to reduce the CA carbon footprint by ending these annoying and polluting small engines in all of our neighborhoods. (164-Docket)

Comment: Gas powered leaf blowers and other appliances: They are noisy & smokey & polluting. Two-stroke engines especially are bad on the environment. Battery & cord devices exist. Let's switch to those. Let's not make this complicated. Rebates can be provided for those who need to purchase the new replacement equipment and have difficulty affording it. (165-Docket)

Comment: Go electric (166-Docket)

Comment: I live in Long Beach, California, in the crowded coastal neighborhood of Belmont Shore. Gas-powered leaf blowers and lawn equipment are used almost daily by hired gardeners (known colloquially as 'blow and mow' yard care workers)- and spread dangerous fumes, dust, and noise onto our home and property and throughout the neighborhood - causing health problems of many types. I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. This is an urgent need for the health of Californians. (167-Docket)

Comment: Please- if leave blowers are really necessary-then at least make them zero emissions!!! Our planet is dying and we're blowing leaves around??? (169-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. My family and I are routinely put off by the foul odors and smells produced by these devices. Holding our noses and shutting our windows can't be the answer. Please provide the protections that my family and all California families deserve. (170-Docket)

Comment: In order to keep emissions down, the use of gas powered leaf blowers and lawn mowers should be eliminated. (171-Docket)

Comment: Please go to zero emission for these small devices. Thank you. (172-Docket)

Comment: I am in favor of prohibiting small off-road engines as quickly as possible. These engines are responsible for a disproportionate and unsustainable amount of emissions which are contributing to global warming. They also cause excessive noise which is a nuisance and can cause hearing loss. (173-Docket)

Comment: No gas leaf blowers etc. Clean air. (175-Docket)

Comment: My neighbors have gardeners who use gas-powered equipment, and it is unbelievably noisy and a real nuisance in this era of Zoom events. A few of them are trying to help their gardeners buy electric equipment--they are good people and well-intentioned. However, a law would be very advantageous to aid in the transition for the many who have no idea how harmful gas-powered equipment is to the environment and to our health. I was shocked when I learned how much pollution they cause. Please support the Amendment to the Small Off-Road Engine Regulations. (176-Docket)

Comment: "Small Off-Road Engines" can be a source of pollution and MUST be included as you limit emissions. As a nation, we must strive to go beyond "net zero" to ensure that we are not just eliminating greenhouse gases but also improving the quality of our clean energy supply. Small appliances and engines MUST be part of the solution, not continue to exacerbate the problem. I urge CARB to enact stringent regulations to phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. I was glad to see that the California Legislature also appropriated $30 million for your agency to distribute to small proprietor landscapers to help them begin to acquire and transition to new, zero emission electric and manual equipment. These sort of supports for small businesses are important as part of the efforts to clean up our air and environment. We in SoCal and around the world appreciate the efforts to make our planet a healthier place and ensure a safe future for our grandkids. (177-Docket)

Comment: Please ban fossil-fuel powered lawnmowers, leaf blowers, and similar equipment. We cannot continue to tolerate air & noise pollution, and associated health and social impacts, that come from use of this equipment. Fossil Fuel powered lawncare appliances produce inordinate amounts of pollution that can send users and their neighbors to the hospital, or worse. They also generate noise and dust that impact everyone and really impact neighborhoods. We don't need fossil fuel powered lawn maintenance equipment. I grew up on the east coast in the 1970's and 1980's, with a yard that was large by northern California standards. We mowed our lawn with an electric mower and managed the leaves with rakes or electric leaf blowers. Electric mowers and blowers are more advanced and powerful now than they were decades ago -- and yards are smaller. There's really no need for fossil

fuel engines for residential, corporate, or municipal yard maintenance. Please ban fossil fuel powered yard maintenance equipment completely and quickly as possible. (178-Docket)

Comment: We need to control pollution from off-road vehicles and lawn management equipment. Please get onboard with doing something about this problem. (180-Docket)

Comment: Please quickly pass the Small Off-road Engine Regulation proposal! The amount of emissions is staggering and we have alternatives for replacement now. (181-Docket)

Comment: As you draft amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions AND Public Availability of Additional Documents and Information, make sure you use the science-based evidence of the health benefits from zero emissions SORE:

$8.8 billion in health insurance benefits through 2043

892 premature deaths avoided

438 fewer emergency room visits for asthma

311 fewer hospitalizations for respiratory and cardiovascular issues.

These are large and important health benefits that make it imperative to have strong rules for SORE. (182-Docket)

Comment: Please require that all SORES sold in California be zero emission. (183-Docket)

Comment: I am writing to urge you to pass the proposed Small Off-Road Engine Regulation. Transitioning gas powered lawn mowers, leaf blowers and similar products to electric power will not only reduce CO2 emissions, it will improve air quality and benefit the health of all Californians. I'm sure I don't need to tell you this! (185-Docket)

Comment: The time has come to finally quickly phase out gas-powered blowers. We can no longer justify the huge amount of air pollution from them over the new battery-powered blowers. The pollution affects the health, immediate and long-term of all of us and should no longer be tolerated. A secondary benefit of this change will be a huge improvement in noise pollution which will also improve our health and quality of life. (188-Docket)

Comment: Thank you for requiring that all lawn mowers and leaf blowers be emission free! Gas powered blowers and mowers are dirty, destructive and dangerous to the environment and to people, neighbors, children, those with compromising health issues. (189-Docket)

Comment: I have personal experience of the polluting effects of old, poorly maintained gas-powered gardening equipment. On a daily basis in my neighborhood of Westchester, garden service providers come into the neighborhood and create a triple whammy of pollution from excessive noise, toxic air pollution caused by the equipment itself, and toxic air pollution caused by blowers that launch street level dirt into the air (including the heavy metals present on our hardscape surfaces). I'm sick of it in every sense and want this stopped. (191-Docket)

Comment: This is the time to get gas powered small engines out of our communities. This is a daily emission in my block of 11 homes alone. Please pass the Small Off-Road Engine Regulation. It's a seemingly small move, but I can tell you it would make a huge difference for every single one of us in California. My heart flutters in anticipation! Go for it! It's one step at a time. A little late, but necessary, nonetheless. (192-Docket)

Comment: I strongly support banning gasoline-powered leaf blowers and other landscaping equipment. These devices are highly polluting and noisy and can be replaced by battery or line-powered equipment. Many years ago the New York Times rightly described the gasoline-powered leaf blower and its noise, pollution and uselessness as the, "Gardening Machine From Hell". It is now time to consign these machines to Hell, where they belong. (193-Docket)

Comment: End domestic landscaping maintenance air and noise pollution now. (194-Docket)

Comment: Anything that can be done to make our air cleaner surely is a given .. two - stroke engines are filthy .. and noisy .. (195-Docket)

Comment: Please stop the sale of gas powered, and highly polluting leaf blowers, and all other polluting gas powered yard equipment, as soon as possible. If it cannot be done until 2024, that will have to do. I have been personally sickened (and therefore house-bound, at times) because of these terribly toxic, pollution spewing gas powered yard tools for decades now. It is long overtime for CARB to ensure that gas powered yard equipment making companies switch permanently to selling only electric powered tools, in order to help ensure healthy air quality in our neighborhoods. This critical change needs to be final, and it needs to happen fast~ Our children's health, and overall community's welfare, depends on your decision. (196-Docket)

Comment: Require electric blowers! (198-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. The use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. This regulation will improve air quality, help to slow the climate crisis, improve human health, and save lives. Please approve and amend the SORE regulations per the staff recommendation. (200-Docket)

Comment: We have to cut our pollution emissions in as many ways as we can and the noise and exhaust fumes from leaf blowers is one that can easily be replaced by electric ones. (203-Docket)

Comment: Please stop pollution. Keep our air clean! (205-Docket)

Comment: I am a California resident and I urge you to support regulations that would phase out the sale of gas powered leaf blowers and lawn equipment. They contribute to poor air quality and impact people's health with their noxious fumes. In this age of unprecedented climate change, everything must be done to lessen the use of fossil fuels and to also to create a clean and breathable environment for all the citizens of California. Please approve and amend the SORE regulations per the staff recommendation. (206-Docket)

Comment: Off-road engines to have zero pollution. (208-Docket)

Comment: Please for the love of god, regulate these engines. In Los Angeles alone there are hundreds of thousands, gas powered leaf blowers being used all day everyday. Not only do they contribute to poorer air quality for all, but the individuals using them are at greater risk of dynamic health problems as there is no protection/regulation in place on these tools. I can't stand smelling these blowers weekly at my apartment complex and don't understand why we haven't fixed this simple problem! (211-Docket)

Comment: Kindly do anything possible to get us to zero emissions. We are a family with healthy diet, exercise routines and highly educated. Yet 2 out of 3 grandchildren have had such horrible lung problems that they were intubated. Not only is our air bad but the noise from gas leaf blowers is so deafening that often I cannot enjoy our backyard because of it. We Americans have bad health compared to those of other countries. We are not living as long as we did previously and we do not live as long as people in other countries. We can do better. Please use your powers, in spite of all of the paid lobbyists urging otherwise, speak for the people and get us to zero emissions with new policies. (213-Docket)

Comment: It is time to make sure this proposed amendment passes so we cut down on dangerous emissions from small off-road engines. (214-Docket)

Comment: Please approve of the proposed small off-road engine regulation. Every day we are subjected to noisy, smelly, polluting lawn equipment. Please help us transition out of this outdated and highly polluting method of lawn care. (216-Docket)

Comment: I was surprised to find out what a source of pollution gas leaf blowers have become and completely support a total ban on gas-powered blowers, which have been illegal in my small town of Ojai for a few years. They are also a source of noise pollution and remove one of the sources of regenerative agriculture--leaves. (217-Docket)

Comment: Transition to Zero Emissions. Please act on the above! (219-Docket)

Comment: Global warming is the biggest threat to humanity. We need to reduce carbon emissions and pollution immediately. If you don't, you are putting the health of children in jeopardy, and worsening social injustice. No more delays. (220-Docket)

Comment: Do the right thing for our air quality. (222-Docket)

Comment: Gasoline leaf blowers are an environmental disaster due to the huge amount of pollutants they emit into the air. Electric blowers would be a much better solution. The fumes and high-pitched noise of gas leaf blowers regularly cause people to close windows, be awoken from sleep, startle babies, and frighten pets. and that doesn't count the thin layer of dirt and dust that they kick up into the air that then drifts into homes, onto cars, or gets inhaled. Please outlaw these highly polluting small gas engines. (223-Docket)

Comment: It is time for us to see the writing on the wall! It might be uncomfortable to change, But change we must do for the future of our lives on this Earth. (224-Docket)

Comment: Gas powered leaf blowers are a significant source of air pollution in the Los Angeles basin. One hour of operation from a commercial leaf blower emits the equivalent of driving a 2017 Camry 1100 miles. While walking in my neighborhood, I am assaulted by fumes from leaf blowers--like standing behind a dirty diesel gas bus. This pollution also impacts the health and safety of lower wage workers. Trade-in programs can be developed to mitigate the financial burden on landscape workers. Phasing out the use of SORE quickly can have a significant benefit in improved air quality and reduced carbon emissions. This is low-hanging fruit in the battle to save our state from irreversible climate change. Ban SORE's! (226-Docket)

Comment: It's vital that California SORES transition to zero emissions to reduce air and noise pollution and to make the state safer and healthier for all. Important too that for small businesses who

are dependent on such engines (i.e. gardeners/landscapers, etc). a system of financial assistance be created to help reduce the cost of transitioning to zero emissions equipment. (227-Docket)

Comment: I live in Merced in the Central Valley where asthma and other respiratory health problems are double what they are elsewhere in the state. Almost every family has one or more members who are impacted. Which is not to say other areas of California are not contesting with similar impacts of poor air quality as well. But you can see why my concern is so great. (228-Docket)

Comment: I fully support and urge your support of a rapid transition to zero emission equipment and the elimination of fossil fuel driven small off-road engines to help in the control of climate change. Thank-you for your consideration. (229-Docket)

Comment: I am writing in my role as a physician to urge you to do all you can to support AB 1346 and ban the sale of gas powered small engines as soon as possible. The pollutants and toxins emitted from gas powered small engines is significant and is damaging our health. This pollution increases our risk of heart attack, stroke, lung disease, cancer, and miscarriage. As a pediatrician, the increase in premature birth, low birthweight babies, and birth defects is especially heart breaking. The social cost of the problems these gas powered small engines cause is enormous. It includes medical costs due to increases in the above diseases, premature deaths, degradation of natural resources, decreased GDP, property damage from climate-induced floods, wildfires, and climate remediation. As a physician, I am asking you to do what is best for Californians' health. We have solutions for a safer, cleaner, healthier future. Now all we need is the political will to do the right thing and help translate AB 1346 into reality to clean up the air we all breathe. (231-Docket)

Comment: I and everyone I know are tired of disruptive, polluting, NOISY leaf blowers. This is a quality of life issue. Please make them stop. (232-Docket)

Comment: Stop sale of equipment that harms our environment and health. (233-Docket)

Comment: Zero emissions leaf blowers (234-Docket)

Comment: Please make small off-road engines zero-emission (and quieter too if you can). Thanks! (235-Docket)

Comment: Eliminate the use of gas-powered leaf blowers and lawn mowers! Gas-powered leaf blowers and lawn mowers cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. I hope CARB amends the regulations such that our air is healthier. These machines contribute enough emissions, so close to our homes, that urgent action is needed to eliminate their use. (239-Docket)

Comment: Happy Wednesday 11-17-21.... Please transition all off road smaller vehicles to green zero emissions!! Please... it is time to transition all off road vehicles from gasoline power to electric zero emissions!! Thank You, Now is the time. (240-Docket)

Comment: As a concerned citizen, I support a reasonably expedited transition to zero-emissions leaf blowers and other equipment to reduce carbon outputs. (241-Docket)

Comment: We must be aggressive in reducing greenhouse gas emissions. Now that there are many electric (not to mention manual) lawnmowers and leaf blowers, please make these go away through

whatever actions you can take to protect our local communities (these engines tend to generate high levels of local pollutants) and the world at large. (242-Docket)

Comment: Enough of the polluting mowers, leaf blowers and all outdoor gardening and recreational, for that matter, machinery. We've hopelessly ruined our environment, so stop, already, while we can still breathe! Humans are done and we've finished off many animal species, as well. (243-Docket)

Comment: Please consider immediately transitioning away from gas powered leaf blowers. They are a public nuisance and a disaster environmentally. (244-Docket)

Comment: Please ban power leaf blowers! Noisy and a major source of Greenhouse Gas. (245-Docket)

Comment: Please consider regulation and enforcement of pollution caused by small engines. Small engines lubricate by mixed oil and gasoline, which burns to high smoke, carbon emissions. (246-Docket)

Comment: clean air NOW (248-Docket)

Comment: Outlaw polluting gardening equipment (249-Docket)

Comment: I am a California resident and I strongly support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. Given that there are viable, nonpolluting alternatives to gasoline-powered small engines, it would be unreasonable and unethical to permit them to continue to poison our air. (251-Docket)

Comment: No more noisy smelly leaf blowers and lawn mowers! Oh, that would be a relief! I understand that the gardeners who have already made purchases could use that equipment until it no longer functions, but any new purchases would have to be quieter, e.g. robotic lawnmowers : )) Thursday in my neighborhood is a cacophony of machinery. It can't end soon enough. It would be better for the gardeners' respiratory systems and hearing as well! Please help eliminate the stink and noise from these machines and pass these new regulations! (252-Docket)

Comment: I live in Modesto, where the air quality is poor, and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. (253-Docket)

Comment: They are too loud, too polluting to operate, stir up too much to further pollute the air. Also stirs up anger, at the careless and lazy destruction. (255-Docket)

Comment: Of the easiest things that can be done to lower emissions and transition to zero emissions, one of the easier steps to be taken YOU can take for us, the citizens of California. You do not have to spend money to do this. You do not have to make money on this plan. YOU MUST PAY ATTENTION to the science involved in the CLIMATE CRISIS PROBLEM and offer the best options to the citizens of your state to make LIFE SURVIVABLE in the future and better now. It is my state and has been for the last 50 plus years. We have children, grandchildren and great grandchildren living in California and want for them the future of a NATURAL WORLD that does not threaten their lives and that will exist when they have children.

We take this problem seriously and ask you to take this proposal to make blowers of all sizes and descriptions that one can hold, push, carry or transport in some fashion ZERO EMISSIONS PRODUCTS. This is a small action on your part and a small action that will make a BIG DIFFERENCE and something that we can all participate in and know that we have made a difference in literally "saving the Earth". All the small actions will add up to hope in peoples' hearts and something that MANY can participate in to really help not only their own neighborhoods, but their cities, states and countries. Please take positive action toward the goal of ZERO EMISSIONS. (256-Docket)

Comment: If anyone asks me what my most hated thing is, I would say leaf blowers. I believe that at least 70% would say the same thing. The noise and pollution is unacceptable. Please do a favor for all of us who shudder when they hear and see leaf blowers everywhere, every day. Make them quieter and cleaner! (257-Docket)

Comment: For the sake of a just and livable future, please ban garden equipment that emits pollution! The equipment is terrible for the environment, poisons our air and is so harmful for workers! (258-Docket)

Comment: We REALLY need this--I've been waiting for a regulation such as this to come around. PLEASE lets do whatever it takes to pass this initiative for the sake of the planet, our environment, our health. Let's not wait another minute, please let's all do our part to provide a safer environment for all of us. (260-Docket)

Comment: We must stop polluting our air like it is a garbage dump. Lets get rid of all polluting engines of all sizes. People will change when they have alternatives and there are many non-fossil fuel machines out there. Thanks (262-Docket)

Comment: It is time to phase out the gardening tools that elevate particulate pollution. Please ban gas powered leaf blowers, etc. (263-Docket)

Comment: I am writing in support of new regulations to phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. These gas-powered forms of lawn equipment are horribly polluting and inefficient. Gas-powered leaf blowers and lawn mowers, in particular, have a huge effect on air quality, which in turn causes numerous health problems. We need to bring California air standards up to meet national air quality standards. Please approve and amend the SORE regulations per the staff recommendation. (264-Docket)

Comment: Use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality and noise! (265-Docket)

Comment: We must do everything we can as soon as possible. (267-Docket)

Comment: We need to pay attention and make EVERY CHANGE THAT WE POSSIBLY CAN to save our lives and the lives of our future generations! NOW!!! (268-Docket)

Comment: Please act now to keep our neighborhoods clean! (269-Docket)

Comment: I am a San Francisco resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. As a retired firefighter I can appreciate the increase in public safety and public health from the reduction in the storage of gasoline and other petroleum fuels from the garages and sheds of California. I can also appreciate the reduction in burns and other injuries from the use of gas powered

appliances. Beyond the personal injuries and deaths, on a public health scale, the elimination of SOREs will improve the air quality in California. Do your best to act now, and reduce the magnitude of changes that will have to be enacted next year, next decade, next score of years, to prevent climate chaos. (270-Docket)

Comment: Not only is this equipment noisy but they are hazardous to our health and contribute to climate warming. (271-Docket)

Comment: Gas powered leaf blowers are a curse! They cause terrible air and noise pollution. Please outlaw them. (272-Docket)

Comment: please make sure polluting yard tools are banned for sale in CA (274-Docket)

Comment: Although I am from a different state (Mich), I do believe that one way to decrease the amount of toxic substances in the air (in this case--CO2) is to outlaw gas powered equipment. (275-Docket)

Comment: Leaf blowers are noisy and pollute the air. Let's convert to battery powered leaf blowers for quieter neighborhoods and less air pollution! (277-Docket)

Comment: This is a simple solution to help clean-up our environment. PLEASE require that fossil fuel powered leaf blowers, lawn mowers, etc. are phased-out rapidly over the next few years. The electric/battery powered alternatives are plentiful and effective....let's take advantage!! Thank you (279-Docket)

Comment: Gas powered leaf blowers are GHG emitters, air quality polluting and noise polluting. Electric powered leaf blowers are MORE THAN ADEQUATE FOR NORMAL LANDSCAPING ACTIVITIES. (280-Docket)

Comment: I am writing to urge more stringent regulation of mowers, leaf blowers and other small off road engine emissions. I live on a busy street and with the exception of older vehicles and those modified with resonators and I assume bypassing the catalytic converters, the emissions are not as noticeable as those from nearby lawn mowers, leaf blowers and the like. It is clear that this is a health hazard in my already poor air quality home. I strongly urge you to be bold in your decision making. It is indeed a matter of life and well being. Two acquaintances, without a smoking history, have died of lung cancer in the last three years. Both were life long southern California residents. We have made progress but must continue on this trend. Lives depend on it and the decisions you make are a measure of personal integrity. (283-Docket)

Comment: Ending the sale of polluting lawn and garden equipment is exigent in light of the climate crisis. (285-Docket)

Comment: How many Leaf Blowers are there in California, and the Nation? I do not know, but the manufacturers know! That would tell you how much GHG is added to the atmosphere. What I do know is the amount is greater than it would be if they were banned. That alone would justify banning. But there is another reason as well. Think how much more quiet it would be if electric blowers were used? Rechargeable battery packs could be used instead of heavy gas blowers! (286-Docket)

Comment: Don't cave to money - clean air is priceless. (288-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. AND THEY'RE DAMN NOISY ADDING MORE POLLUTION! (291-Docket)

Comment: Please vote to reduce the amount of Carbon emissions from gas blowers and other engines that continue to add to our dirty air. We cannot wait any longer in regard to our air quality. (294-Docket)

Comment: It's quite clear this regulation will improve air quality, help to slow the climate crisis, improve human health, and save lives. (295-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. These machines are a menace to our neighborhoods and are highly polluting, endangering public health. Please act quickly and decisively to rid our state of these machines. (296-Docket)

Comment: Please pass the Small Off-Road Engine Regulation and help us have cleaner air. (297-Docket)

Comment: Although they exist, people continue to use gas powered leaf blowers which emit much more pollution than the average automobile. With global warming now apparent, it is insane for us NOT to end the use of gas-powered leaf blowers right now. No more delays. (298-Docket)

Comment: Leaf blower emissions are toxic and should be banned. (300-Docket)

Comment: I am a user of small off-road engine home machines but am also a strong supporter of making our environment as clean as possible. Clean air is critical both to our environment and for the health of our citizens. I would gladly replace the machines I have for use around my home if there were clean air options available. Setting that as an aim for CA I believe is an important step to take. (301-Docket)

Comment: In my neighborhood, gardeners daily use noxious smelling equipment that is harmful to everyone. The exhaust is so bad one can't keep windows open. I have asthma, which is greatly exacerbated by the gas exhaust. These also contribute substantially to climate change. Please outlaw the use of this equipment. (303-Docket)

Comment: I am a Pasadena, California resident and I strongly support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024, plus reduce the incessant noise of gas-powered equipment. (304-Docket)

Comment: It is time that we get rid of all gasoline powered small machines. Please take action (305-Docket)

Comment: Please require that leaf blowers and other small tools no longer use gasoline. We need to do everything we can to slow climate change. (307-Docket)

Comment: I strongly support the small off-road engine regulations. We must act now to save our planet from CO2. That includes getting rid of all internal combustion engines. (309-Docket)

Comment: Please vote to phase in Zero Emission small off road engines. We are eager to get rid of the horribly noisy and air polluting engines now used. (310-Docket)

Comment: Leaf blowers are dirty, loud and adding to the very pollution we are trying to eliminate that causes the every increasing danger from climate disruption. It's way past time to stop the potential destruction of life on our home. (311-Docket)

Comment: It's time to save the planet. Time to phase out carbon spewing small off-road engines. (312-Docket)

Comment: The current leaf blowers provide noise and air pollution. We need pollution free leaf blowers for all future leaf blowers and to phase out the gas leaf blowers that are currently being used to control climate change. (313-Docket)

Comment: Please work to stop polluting the Air. Thank you for your consideration. (314-Docket)

Comment: Leaf blowers, hedge trimmers, weed wackers, lawn mowers, edgers, vacuums, etc. should all transition to zero emissions. There should also be a decibel limit on the amount of noise produced by this equipment. (315-Docket)

Comment: Frankly, I think leaf blowers should be outlawed totally. They are loud and stupid. What happened to raking? But if you have to have them, they should not pollute. Thank you. (316-Docket)

Comment: I have asthma which is exacerbated by exhaust from leaf blowers and other machines that use fossil fuels. Also, noisy gas powered leaf blowers ruin the quality of life in our neighborhoods. We need zero emission leaf blowers. (317-Docket)

Comment: Electric Leaf Blowers are readily available. We should subsidize commercial gardener to purchase and use electric gardening equipment. (319-Docket)

Comment: Please ban these noisy, polluting devices. They can be replaced by battery operated leaf blowers. (322-Docket)

Comment: Please outlaw the use of these small engine machines. They pollute the air and endanger the people who use them and everyone within breathing distance. They are ubiquitous on my street and my neighborhood would be cleaner and quieter without them. (323-Docket)

Comment: Gas-powered leaf blowers and lawn mowers are notorious for their pollution and cause numerous health problems and contribute to poor air quality. They must be removed. I was at my daughter's elementary school at dropoff this morning and there was a maintenance worker blowing leaves as kids were coming into school. Man, was it stinky! The kids couldn't avoid it. I have the same experience coming into work on a regular basis. I feel sorry for the workers who have these pollution machines strapped to their backs for hours at a time, day after day. How can these still be in use in 2021? Much better alternatives exist and must be adopted asap. Your action on this will help us live better lives. (324-Docket)

Comment: As a California physician, I support the creation and implementation of new rules to eliminate the use of fossil-fuel driven leaf blowers and lawn equipment. Requiring batteries to power this equipment seems light would reduce harmful emissions into both the atmosphere and people's lungs. We need to grab all necessary means to reduce carbon pollution and this seems like low

hanging fruit. Help improve air quality, reduce noise (!) and help us meet Paris Accord targets. (325-Docket)

Comment: Small Off-Road Engines are extreme polluters which cause terrible respiratory health problems! (326-Docket)

Comment: Please pass the Small Off-Road Engines Regulation to end the sale of gasoline-powered lawn mowers and leaf blowers. Our health is threatened by smog, and gasoline-powered garden equipment should have been banned in this state decades ago. I was diagnosed with asthma this year, and I should have the right to breathe clean air. (327-Docket)

Comment: All hand held tools should be emission free. They are so widely used throughout the US and contribute heavily to our air pollution. We must take steps to stop pollution for clean air for ourselves and enhance the planet. Please make the right decision to help clean our air. (330-Docket)

Comment: Please help clean our neighborhood air and protect our children by passing the Small Off-Road Engine Regulations NOW!! (333-Docket)

Comment: Please stop the sale of gasoline-powered lawnmowers, leaf blowers, etc. They pollute the air and contribute to climate change. Also, I personally am sick of having to run and close all my windows when I hear gasoline-powered lawn and garden equipment nearby. I've been using an electric lawnmower for years. Other people can too. (334-Docket)

Comment: What I want to say is that it is ludicrous that I hear the sound of blowers at work, at play, nap time, ALL THE TIME. I smell their dust and breathe the polluted air that is filled with particulate lead from the gutters, human sputum....contaminated?...stuff we should not be breathing. But worst of all, in this horrendous drought, the mulch and leaf cover are being removed from our soil, drying it out and causing more water to be used. This has to stop! (335-Docket)

Comment: Please ban polluting leaf blowers. I have to race around the house, slamming shut all the windows on a beautiful day, upstairs and downstairs, whenever one of those CO2-emitting monstrosities is in action. And it happens weekly, courtesy of my HOA, since they are in charge of the landscaping. There's nothing I can do to get them to use zero-emissions leaf blowers. Even with my race-around-the-house routine, I still get those noxious gas fumes inside the house. It takes forever to dissipate -- I can't even open the windows for a LOOOOOONG time afterwards, because the gasoline odor lingers. Please help. We need a law. Clean leaf blowers exist. Let's use them exclusively. Ban these polluting machines. We must do everything we can to slow global warming and keep our air clean. (336-Docket)

Comment: PLEASE outlaw those hideous, loud, disgusting polluting gas leaf blowers! Everytime I'm outside those nasty things are spewing out FILTHY gas fumes that I have to breathe. This is NOT okay. They are also obscenely LOUD, adding to noise pollution, then they blow their dirt all over the neighborhood into OTHER people's yards, on other people's cars, etc. I SWEEP my driveway - it doesn't take that long with the proper broom. (338-Docket)

Comment: These things are toxic and loud. They must be regulated to get where we want to be as a State. We must lead the way for others to follow. (339-Docket)

Comment: I have lived in California for 40 years and it is quite amazing that after all this time with all the regulations that have been passed on air quality during that time, that leaf blowers are still polluting the air in this state and causing noise pollution as well. This state is suppose to be at the

forefront of clean energy and yet nothing has ever been done to curb leaf blowers and lawn mowers from their endless pollution in this state. I moved from the midwest in 1981 to Orange County and one of the first things that I noticed was the noise and pollution of leaf blowers used by the gardeners every week. I had never seen leaf blowers before and here it is 2021 and nothing has changed. It is certainly time to curb them and have them powered by electricity. (341-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. Please approve and amend the SORE regulations per the staff recommendation. (342-Docket)

Comment: We need to move away from dirty fossil fuels. It is time to stop selling these polluting motors. (344-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of polluting (and noisy) gas-powered leaf blowers and lawn equipment in California. This equipment contributes unnecessarily to California's air pollution. Your own health benefit analysis determined that these new regulations, if adopted, would be most helpful. (347-Docket)

Comment: *Every weekday* there's a gas-powered leaf blower blasting somewhere on my street. I'm so fed up with smelling the exhaust and hearing their drone out my window. Last August, even the week our skies turned black with ash and our AQI was over 400 with particulate pollution, the band of gardeners was out blasting a cloud of ash out of the gutter and back into the air. I felt so disgusted and defeated and I retreated to the room farthest from the street to try to hear my zoom lecture over the noise of the blower and my air purifier. Gas-powered leaf blowers are a scourge on the environment- the fumes they emit along with the particulate pollution they cause are a major concern for public health as well as environmental safety. Particulate pollution is correlated with a number of negative health impacts including a number of cognitive disorders. The noise pollution they cause is a nuisance to humans in the area (with more people than ever working and schooling from home) but also for animals who rely on acoustic signaling to communicate. The noise level is a stressor for many species. (348-Docket)

Comment: Simply put, to help lessen and help to reduce global warming as we have more heating of planet baking to frying situations, please end the use of gas powered leaf blowers and gas power lawn mowers. Your help, to help us and thus would set a good example that your agency cares. (349-Docket)

Comment: I think it is great to move toward battery powered equipment by 2024. It is all about the manufacturers coming up with the right stuff! Necessity is the Mother of Invention. I would suggest landscape maintenance companies get ahead of the curve as soon as possible and market themselves as going green, rather than continue being rather noisy polluters. (350-Docket)

Comment: It is time to ban the sale of polluting gasoline powered leaf blowers, lawn mowers and other yard machinery. There are pollution free alternatives, and this equipment is a major cause of pollution. (353-Docket)

Comment: We do need to just ban the sale of gas-powered leaf blowers asap, but we need a marketing campaign on behalf of a paradigm-breaking life cycle analysis of leaves. Add up the negative health impacts from the air pollution and noise, and the health benefits from pulling leaves with a rake or pushing them with a broom over to nearby trees or shrubs for mulch. We think CARB

doing marketing campaigns to counteract the ridiculous think-alike habits and values promulgated by the marketers of stuff we don't need COULD measurably reduce GHGs. It could be a challenge campaign with other states and nations to see who can decrease the gas-powered leaf-blower population fastest. (354-Docket)

Comment: We must do all that we can to eliminate sources of air pollution. (356-Docket)

Comment: Now is the time to make as many differences to change the course of climate change. Changing our fossil fuel tools to zero emission tools will make a great change if everyone makes an effort. (357-Docket)

Comment: This is an urgent issue: please pass the proposed Small Off-Road Engine Regulation to end the sale of polluting lawn and garden equipment. Our state should resume being a good example! (358-Docket)

Comment: We are at code red. We must reduce emissions. Thank you. (360-Docket)

Comment: No more fossil fuel powered gas blowers. They are noisy; they pollute; they contribute to climate change; and they don't do the job well. (361-Docket)

Comment: Air is what we have to breathe. Let's keep it clean for health. (363-Docket)

Comment: No More Fossil Fuels Destroying the Earth-- the Clock is Ticking (367-Docket)

Comment: Many municipalities already have long since banned these. Their sheer quantity adds up and degrades our quality of life. Let's leave the nation in banning these as well. (368-Docket)

Comment: Please go to Zero emissions. Thank you. (369-Docket)

Comment: Please ban the sale of polluting off road small engines, leaf blowers etcetera, soon. Thank you. (370-Docket)

Comment: We need to stop allowing internal combustion engines in our environment. They assault our hearing, our breathing, and also damage our Earth and water. If we do not change now when will we? We do not have the luxury of time, we need to act now for the very survival of life on this one and only home of ours. Please make the positive changes we need. No dollar amount can outweigh our environment. (371-Docket)

Comment: They are low hanging fruit in the fight against carbon emissions, so ban them now! A huge noise problem for everyone. Better electric technology is here now! Get rid of those terrible machines. (372-Docket)

Comment: This is low-hanging fruit. Lawn mowers, weed whackers, and leaf blowers are used every day in our neighborhoods. They don't travel long distances, but they emit as much pollution as cars. There is no reason they cannot be all electric. Landscaping companies that use these tools all day can stock extra batteries and replace them throughout the day. Homeowners who use them occasionally can charge them at home. (373-Docket)

Comment: Please consider air and noise pollution when approving the use of fossil fuel-burning products. Thank you. (374-Docket)

Comment: Please do everything in your power to prohibit gas powered leaf blowers. Not only do they pollute the air, they are also sound polluters. Thank you for your support and all your good work protecting our air quality. (379-Docket)

Comment: Climate change is happening all around us. Now is the time to end gas powered landscaping equipment including leaf blowers and lawn mowers and other. (380-Docket)

Comment: The use of this equipment causes numerous health problems, and contributes to California's poor air quality. Because our state continues to fail to meet national air quality standards, we must do everything in our power to reduce the use of fossil fuels -- in engines large and small. (381-Docket)

CARB's own public health benefit analysis determined that, in addition to saving billions on health insurance in the next two decades, these regulations will:

-- prevent 892 premature deaths,

-- reduce asthma-related emergency room visits by 438, and

-- result in 311 fewer hospitalizations for respiratory and cardiovascular issues. (381-Docket)

Comment: The SORE regulations will improve air quality, improve human health, save lives, and slow climate change. I, therefore, urge you to approve and amend the SORE regulations in accordance with the staff recommendation. (381-Docket)

Comment: With a reasonable period to transition -2024- small engines which pollute so greatly should stop being sold in CA. Millions will remain in service for a number of years but will Wear Out as all gas engines do and should then be replaced with electric options. The sad reality is that we rich nations have put out the largest amount of CO2 and other greenhouse gases and MUST take action before our world becomes a hell! (383-Docket)

Comment: As an East Oakland resident and environmental scientist, I have witnessed more air quality problems than anywhere else I have lived in the United States. Ten years ago in the city of Charleston, South Carolina, we worked to create a trade-in incentive for local residents to turn in their gas-powered lawn equipment in exchange for credits to buy electric. This had a profound impact on our neighborhood air quality! With the proposition of the SORE regulation, the Board has an opportunity to have an even greater impact on the air quality in our local communities. Please pass this regulation so we no longer have to close our windows and doors due to the toxic exhaust fumes of garden equipment polluting our homes! (386-Docket)

Comment: I support eliminating gas powered equipment. Not only do they pollute our air quality, that equipment is a significant disruptor of peace and quiet for way beyond the clean up area. No one likes the sound and people nearby can't wait for it to be over quickly. The sound and air is also bad for the workers. I know it will increase some costs in the short term for landscapers but the long term benefit for the neighborhoods and the planet is worth it. I've already spoken with HOA contractors that are currently upgrading methods and equipment because their large unit contractors won't allow them now. Maintenance people in particular are often expected to hold to low pricing from years ago. I've found that customers still expect their below market pricing to continue indefinitely. The new standards will allow companies to update pricing in a way that customers can understand. I'm a landscape designer, not a licensed contractor. I work full time with licensed contractors and also non licensed gardeners. (388-Docket)

Comment: I am a calif. resident & am writing to ask you to phase out all high polluting gas powered leaf blowers & lawn equipment a.s.a.p. (389-Docket)

Comment: Great idea to eliminate them. They put out abundant air and noise pollution. From early morning to nights and weekends. I know it will be a burden for many, financially, to purchase electric blower systems. The prices are ridiculously high for electric systems that work through the day for larger landscape maintenance sites. But, transition to non-gas systems is crucial now to our environment, neighborhood peace and quiet and global warming. Landscapers would be wise, if they can afford it, to lead and market themselves as true stewards of the environment. If grants or subsidies were available, then professionals and gardeners nationwide will transition faster. Plus, citizens should encourage this rapid transition. The payoffs in air quality, greatly improved peacefulness in neighborhoods and global warming will be profound. (390-Docket)

Comment: I urge you to ban small engines like gas-powered leaf blowers, lawn mowers, weed eaters, etc. as a step toward lessening the ever growing amount of carbon dioxide in our atmosphere. The clock is ticking and everyone needs to do whatever they can to halt green gas levels. (391-Docket)

Comment: I urge you to move ahead with removing gas powered leaf blowers from our neighborhoods. They not only pollute the air, use fossil fuels and denigrate our environment, but also are so noisy that some days around our house it feels as though we are in the middle of a large factory. (392-Docket)

Comment: Please pass the small off-road engine regulation. My wife is immunocompromised. We live in Richmond, California. We are already dealing with air pollution from coal at Port Richmond and from the Chevron refinery. We cannot afford to continue enduring air pollution from all of our neighbors "sweeping" their leaves and debris via leaf blowers or mowing their lawns (which they should not have anyway because of the drought) with gas powered lawn mowers. (393-Docket)

Comment: I support the ending of the sale and use of petroleum powered lawn equipment in California for several important reasons. One we are burning our forests down because of climate change driven extreme heat. The Caldor and Dixie fires are Exhibit 1 and 2. Second, the emissions from both petroleum by-products and PM 2.5 mobilized all summer and fall are the source of long terms adverse health effects. The epidemiological evidence is persuasive and combined with seasonal fire smoke, are the source of early mortality. Mortality for the operators has become an environmental justice issue. (394-Docket)

Comment: Finally there is noise and more noise with the clouds of road dust entrained by weekly gas fired lawn blowers. Climate change is killing our forests and the toxic dust is harming us. Please act in the public interest. (394-Docket)

Comment: Why would you not want to do everything in your power to make a cleaner more livable environment? (397-Docket)

Comment: These have got to go! The smell, the noise, the pollution. (399-Docket)

Comment: I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. Please vote to approve and amend the SORE regulations. (400-Docket)

Comment: All engines must be or become either electric or hydrogen powered. We must save the earth from more carbon in the air due to use of fossil fuels. (406-Docket)

Comment: We need to transition to non-fossil based energy as rapidly as possible without destroying the near-term economy. Please do all you can to make changes to encourage this transition. Furthermore, this change will also help with noise pollution. THANKS! (407-Docket)

Comment: CleanEarth4Kids.org supports the adoption of new regulations to phase out the sale of gas-powered leaf blowers, lawn mowers and other lawn equipment in California by 2024. Please approve the changes to SORE regulations as recommended by staff. According to CARB's own research, gas-powered equipment like leaf blowers and lawn mowers are a major source of air pollution:

- 1 hour of a gas-powered mower puts out the same emissions as driving a 2017 Toyota Camry from Los Angeles to Las Vegas and 1 hour of the best-selling leaf blower is the same emissions as driving from Los Angeles to Denver
- Leaf blowers and other small gas engines will create more ozone pollution than all the passenger cars in California (410-Docket)

Air pollution is linked to heart, lung and neurological conditions like dementia, Alzheimer's and Parkinson's. CARB must take action. The public health benefit analysis by CARB shows these new regulations would result in:

- $8.8 billion in health insurance savings through 2043
- 892 premature deaths avoided
- 438 fewer asthma related emergency room visits
- 311 fewer hospitalizations from respiratory and cardiovascular issues (410-Docket)

California has allocated $30 million for CARB to help small landscapers transition to zero emission equipment. This is in addition to existing subsidies and buy back programs in air districts. These regulations will improve air quality, help to slow the climate crisis, improve human health, and save lives. Please vote yes. (410-Docket)

Comment: Gas engine Leaf blowers. Why are they still allowed? Much too much pollution. I thought California did not allow them many years ago. I still hear them, smell them and get aggravated by them. Wake up and get rid of them or the people will get rid of you by voting you out of office. (411-Docket)

Comment: Please ban gas powered leaf blowers and support the purchase of electric ones so we can have cleaner air and quieter neighborhoods. (413-Docket)

Comment: Stop polluting to Mother Earth! Save our precious planet today (414-Docket)

Comment: Please make all future Small Off-Road Engines regulated to be zero emission engines. (415-Docket)

Comment: There is no good reason for allowing gas powered leaf blowers. Hearing damage, health damage, pollution, dirty street that just continuously stay dirty from leaf trash. In addition, while not the issue at hand, a vacuum bag would make so much more sense. Please ban gas powered leaf blowers and help people, the environment, and peace and quiet. (416-Docket)

Comment: I support the new phase-out regulations. It's long past time to try to save the planet. (418-Docket)

Comment: I am so glad you are considering this step statewide. We have a local ordinance here in Ojai and it has worked really well. There was opposition from the landscape industry at first but now electric powered tools are the norm. It is so much healthier for the workers as well. It is so much more pleasant to walk our streets without the fumes and the noise. Like electric cars I truly believe this is the future. (419-Docket)

Comment: The sale of gas-powered mowers, leaf blowers, and other small polluting gasoline engines should be prohibited beginning in 2024. (421-Docket)

Comment: **Subject: Support for California's transition to clean lawn care equipment**
While I support California's transition to cleaner and quieter lawn care equipment, I believe it is crucial to offer financial aid to the small, private landscaping companies who may find it difficult to re-equip themselves with all new electric equipment. Depending on number of employees, annual profits, etc, the transition should avoid driving "mom and pop" landscapers out of business. Let's improve our communities and support all community members and small businesses. (425-Docket)

Comment: PROHIBIT GAS POWERED LANDSCPING EQUIPMENT. I support new phaseout regulations; you should too. (429-Docket)

Comment: I support banning gas powered yard tools, not only do they add to pollution, dust, weeds and noise pollution, they are also a health hazard for those using, in the case of leaf blowers they gasoline tanks strapped to their and spend all day walking around breathing in fumes. For the safety of those forced to try and earn a living maintaining yards we need to ban the unsafe practice of carrying gasoline on their backs. (430-Docket)

Comment: No no no blow and go with fossil fuel-please! (433-Docket)

Comment: For all the reasons mentioned, from the need to electrify and end the burning of fossil fuels, to air quality and noise pollution, I urge you to ban the sale of gas-powered SORE equipment by 2024. It is a reasonable timeline given the market availability, improved performance, and reduced costs of the electric equipment. Thank you. (434-Docket)

Comment: Thank you for all you do. It must not be easy to oversee matters of air quality and have to balance competing interests. I hope the decision to phase out gas-powered lawn equipment is a relatively easy one to make: less air and noise pollution = healthier people. As a teacher in a California public school, I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. It makes sense both on a very personal level and for the health and well-being of everyone. When the gardeners use their lawn-equipment during class, it's hard for me to project my voice over the din. It makes it harder for the kids to concentrate. On weekends, when I am looking forward to a well-deserved nap, the gardeners next door power up their machinery and rob me of the rest I need. Most importantly, by phasing out gas-powered equipment, you will be giving my students hope, tangible proof that the state is doing all it can to address the looming climate emergency. Indeed, I was stunned and dismayed when a student told me the other day I was the only person he knew who was taking any steps to address climate change! Beyond how this issue impacts me and my students directly, the use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians breathe unhealthy air everyday. That also means more cases of asthma and missed school days. (435-Docket)

Comment: This regulation will improve air quality, help to slow the climate crisis, improve human health, and save lives, and give some needed relief to educators who are already working so hard. (435-Docket)

Comment: Everyone, all the consumers, must also be part of purchasing products that have Zero emissions for our health, for life on this planet & to be a solution of the climate crisis. It is your obligation to all life to only sell zero emission small engines. (439-Docket)

Comment: It is vitally important that you pass the proposed Small Off-Road Engine Regulation. We need to end the sale of polluting lawn and garden equipment as still another step to address Climate Change! (441-Docket)

Comment: I support new regulations to end sale of leaf blowers and lawn equipment powered by fossil fuels that emit greenhouse gases, contribute to climate change while worsening air quality and health. While the currently proposed regulations do not prohibit the use of polluting equipment, they do propose restricting the production of new equipment to sell or lease for use in the State of California beginning in 2024. This is a modest but important step to advance greater use of cleaner, healthier and quieter equipment. As your agency's own research has found, the use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, greatly contributing to California's sad role as home to seven of the top ten most polluted cities in the nation. In fact, California risks losing future federal funding if we continue to fail to meet national air quality standards. (442-Docket)

CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

- $8.8 billion in monetized health benefits through 2043
- 892 lives saved from premature deaths
- 438 fewer emergency room visits for asthma
- 311 fewer hospitalizations for respiratory and cardiovascular issues (442-Docket)

The California legislature has appropriated $30 million for your agency to distribute to small proprietor landscapers to help them acquire new, zero emission electric and manual equipment. In addition, air districts around the state are also operating effective buyback and subsidy programs. Funding also must be provided for training programs to help landscapers switch to clean tools. These regulations advance legislation enacted this year (AB 1346) to phase out the sale of gas-powered lawn equipment beginning in 2024, and also advance Governor Gavin Newsom's Executive Order N-79-20, which sets a goal to transition off-road vehicles and equipment operations to 100 percent zero- emission by 2035 where feasible. Please vote to approve and amend the SORE regulations per the staff recommendation. (442-Docket)

Comment: I urge you to pass the proposed Small Off-Road Engine Regulation to end the sale of polluting lawn and garden equipment. These types of engines are responsible for a disproportionate amount of air pollution. They also create unnecessary and disruptive noise pollution. We must have zero-emission SOREs for our health. We cannot afford the climate or health costs of these engines. Please approve and amend the SORE regulations per the staff recommendation. (445-Docket)

Comment: Leaf blowers are annoying & can be electric. (448-Docket)

Comment: You have the chance to move quickly to provide exchange programs to remove existing gas powered gardening equipment and replace them with electric version of leaf vacuums, blowers

(that still create dust for those of us with asthma) lawn mowers, etc. And for those of us living in noise impacted areas like Millbrae that gets blasted by BART, CalTrain, Caltrans, and SFO electronic equipment is quieter. Please move quickly. You are our lead agency on climate change while you ignore SFO air pollution you can at least do this for the people of Millbrae. (449-Docket)

Comment: Help save the environment, insure fresh air, prevent noise pollution. Gas leaf blowers may be a convenience, but they are hard on communities and the environment. There are better alternatives. Gas leaf blowers must be banned. (452-Docket)

Comment: I am writing to urge you to implement the phase-out of gas powered leaf blowers and other small gas powered vehicles and equipment. We know that pollution from gas is harmful to our health and to the health of our planet. Please, please for the sake of Californians and for the health of our planet do all that you can to eliminate the sources of that pollution. (454-Docket)

Comment: I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. This is a modest but important step to advance greater us of cleaner, healthier and quieter equipment. Use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems in our State. Let us transition to new, zero emission electric and manual equipment!!! Please vote to APPROVE AND AMEND the SORE regulations per the staff recommendations. (455-Docket)

Comment: I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. While these regulations do not prohibit the use of polluting equipment, they do propose restricting the production of new equipment to sell or lease for use in the State of California beginning in 2024. This is a modest but important step to advance greater use of cleaner, healthier and quieter equipment. As your agency's own research has found, the use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, greatly contributing to California's sad role as home to seven of the Top Ten most polluted cities in the nation. In fact, California risks losing future federal funding if we continue to fail to meet national air quality standards. (457-Docket)

Comment: Please let's do everything possible to reduce our carbon footprint. (467-Docket)

Comment: Please pass the proposed small off-road engine regulation that would end the sales of polluting lawn and garden equipment. Not only do leaf blowers cause air pollution but they also cause noise pollution! WE need to do all we can to save our EARTH. (468-Docket)

Comment: It's time to do something about leaf blower emissions. Please take action. The damage they cause is widespread. (469-Docket)

Comment: I am in full support of ending gasoline powered small engines especially leaf blowers and landscape equipment. Firstly, the emissions produced by those engines contribute to climate change and need to be put at a stop immediately. Every reduction of CO2 is important toward climate change solution, including by individuals, businesses and government. Secondly, zero emissions alternatives already exist for landscape maintenance regardless of size. I suggest all landscape maintenance be performed with electric motors. Electric equipment can be employed for residential, commercial and even large municipal or park size work. For example, electric mowers (even ride on style) are better than gasoline mowers for park settings. (470-Docket)

Comment: The facts in favor of the betterment of the health and welfare of those who use gas lawn equipment, those who live in the shadow of its use, and the earth generally point to the importance

of ending the sale of gas lawn equipment ASAP. Please, please, let's turn to clean equipment paired with ample education and $$ new equipment. Taking this step forward was never more important. (471-Docket)

Comment: I want to encourage CARB to pass the regulation requiring that leaf blowers, lawn mowers, weed whackers and the like all be electric powered engines. Gasoline-powered engines emit vile pollution from fumes. They also are another source of gases that contribute to climate change. Finally they are tremendously noisy, causing another type of pollution that impacts our neighborhoods. The pollution from them causes more respiratory conditions, the chemicals in the exhaust could be carcinogenic and they only continue our dependence on fossil fuels. Now is the time to pass the regulation that all of these engines need to be electric. They are quieter, do not spew exhaust and allow us to decrease our use of fossils fuels. (480-Docket)

Comment: Air quality, human health, the environment are all threatened by these horrible practices. Shut it down! (484-Docket)

Comment: Do all you can to help promote clean electronic garden equipment to replace polluting gas equipment as soon as we can. (490-Docket)

Comment: Leaf blowers were the invention of a truly short-sighted individual. They are soul crushing and degrade everyone's quality of life. For people who live in apartment complexes, like me, the leaf blower issue is particularly frustrating. As renters, we have no say in what happens with the landscaping, and are at the mercy of what the management deems to be an appropriate. I also hear leaf blowers at work. I am a substitute teacher, and often hear them during school hours. Do children need to be exposed to these pollutants? Does instructional time need to lost due to the noise? We cannot expect nature to constantly conform to our silly, unrealistic standards. In a forest, leaves are considered beautiful. The thought of using a leaf blower there would be ridiculous. Why is it so different anywhere else? The world has enough problems. Leaf blowers should not be one of them. (492-Docket)

Comment: I just wanted to register my support for this legislation. Leaf blowers are intrinsically obnoxious devices to begin with, and while we may not be able to get rid of them totally, we can at least ensure that they aren't producing more greenhouse gases in a world already suffering from climate change. (496-Docket)

Comment: I support the adoption of these amended regulations which will phase out the sale of highly-polluting gas-powered leaf blowers and landscaping equipment in California beginning in 2024. Any measures limiting or banning the use of these widely-despised nuisances—which infest almost all neighborhoods these days—will improve all Californians' quality of life. (500-Docket)

Comment: Ever since 1998, I have been advocating at the local level for a ban on gas-powered garden equipment. Initially the ideas fell on deaf ears. Over the years our community elected one city council member after another who held more sympathetic views. When they became the majority, gas-powered garden maintenance equipment was finally banned in the City of Ojai. It took just a short time for the professional landscape maintenance businesses to comply. The January 1,2024 deadline stated in AB 1346 is a reasonable advance notification that would allow businesses and homeowners to comply. There are many reasons to stick to this schedule rather than extending the deadline, not least of which is the continuing damage to our air quality perpetrated by these carbon spewing machines. Please do not delay the implementation schedule of AB 1346. (501-Docket)

Comment: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." -- Aldo Leopold
"The ultimate test of a moral society is the kind of world that it leaves to its children." -- Dietrich Bonhoeffer (506-Docket)

Comment: On behalf of the undersigned health and medical organizations, we write to express our support for the proposed Small Off-Road Engine (SORE) rulemaking amendments and call on the California Air Resources Board (CARB) to approve this rule to reduce harmful emissions from gas-powered leaf blowers, lawnmowers, and generators. These regulations will improve public health and are consistent with the goals outlined in Governor Newsom's Executive Order N-79-20 directing CARB to achieve 100 percent zero emissions from off-road equipment in California by 2035. (519-Docket) (2002-Docket)

The American Lung Association's State of the Air 2021 report found that California is home to seven of the ten most ozone-polluted cities in the United States and six of the ten most impacted by particle pollution. Currently, gas-powered SORE equipment emits more smog-forming pollution than light-duty vehicles and are projected to double passenger vehicles in 2031 without the proposal. SORE equipment directly impacts the health of workers and the communities they work in by emitting toxic air contaminants, fine particle pollution, Nitrogen Oxides ($NO_x$), and other smog-forming pollutants. These emissions cause human health impacts, including breathing problems, asthma attacks and other lung health issues, cardiovascular issues, and premature deaths. The proposed transition of SORE to zero-emission equipment (ZEE) starting on January 1, 2024, will reduce harmful engine exhaust and represents a major step forward for local air quality. As of 2024, new lawncare equipment sold in California would be required to have zero emissions, with later implementation for generators. If approved, the SORE rule will reduce an estimated 59,307 tons of $NO_x$ and 423,240 tons of Reactive Organic Gases (ROG) from 2023 through 2043 to support efforts to attain health-protective air quality standards. In addition, there will be major human health benefits, including:

- $8.8 billion in monetized health benefits
- 892 lives saved from premature deaths
- 438 emergency room visits for asthma
- 311 reduced hospitalizations for respiratory and cardiovascular issues (519-Docket) (2002-Docket)

CARB's own proposal notes that the above figures only represent a subset of the overall health benefits possible with rule implementation. California must continue to prioritize regulations that protect human health, and we applaud CARB for continuing to update emissions inventories and requirements as technologies mature. The Legislature and the Governor have shown strong support to reduce emissions from this category by passing and signing Assembly Bill 1346 (Berman and Gonzalez) into law. In addition, the Legislature and the Governor further supported implementation by providing a $30 million budget allocation to CARB for incentives. Lastly, at the November CARB meeting, the Board approved the Fiscal Year 2021 - 22 funding plan for clean transportation incentives, including SORE equipment incentives to accelerate the transition in advance of the 2024 implementation date. For these reasons, our organizations request that the Board approve the SORE rule amendments to reduce criteria air and climate pollutants. (519-Docket) (2002-Docket)

Comment: Thank you for rulemaking that diligently implements AB 1346. There is an impressive level of detail and quantitative analysis. I am pleased to note that you conclude ZEE to be "cost-effective" and "technologically feasible" as stipulated by AB 1346. Please finalize rulemaking by July so that implementation may commence in January 2024. (523-Docket)

Comment: I have been an elementary and middle school teacher in the Southern California for almost 25 years. More and more, I am getting concerned about the kind of world we adults will be leaving to the children I teach. Many of my students suffer from asthma or other respiratory issues, and many are rightfully worried about emissions, climate change and environmental degradation. Now is the time to act to alter course and do much more to assure a better future for these kids. One way to start is by approving the rule to promote the use of zero-emission landscape equipment. Gas-powered landscape equipment, especially leaf blowers, are a noisy, dirty nuisance. My students and I cannot sit idly by while these terrible, high-polluting machines continue to assault our ears, our lungs, and our atmosphere. Perfectly good electric-powered substitutes exist. Many landscapers probably have the same concerns we do and will probably welcome the new rule. Please do the right thing and ban small off-road engines, and take a big step toward removing gas-powered leaf blowers from our lives. (534-Docket)

Comment: Our organizations urge you to adopt the proposal to reduce pollution from Small Off-Road Engines (SORE) at your December meeting without any weakening amendments. These regulations implement legislation enacted this year (AB 1346, Berman & Gonzalez) and also advance Governor Gavin Newsom's Executive Order N-79-20, which includes the goal of making all off-road engines zero emission by 2035. The transition to zero emission equipment for SORE is necessary to protect the health of workers and residents and support attainment of health-based clean air standards. California is home to the nation's most difficult air pollution challenges, with mobile sources of pollution by far the leading contributor to unhealthy air in the state. Our cars, trucks, buses and off-road equipment such as lawn mowers, leaf blowers and generators are all important pollution sources to assess and reduce. Our state risks losing future federal funding if we continue to fail to meet national air quality standards. California's leading clean air programs have spurred innovation for decades and must continue to seek new pathways to clean, healthy air for all residents. (545-Docket)

Updating the SORE requirements to reflect the latest data, shifting market and emissions inventory is critical to CARB's mission. As noted by CARB, emissions of combined ozone- forming reactive organic gases (ROG) and oxides of nitrogen ($NO_x$) from the SORE category now surpass emissions from all of California's cars. CARB has also found high failure rates in evaporative emissions testing of SORE, preventing previously claimed emission reductions from being realized. Given the combination of exhaust and evaporative emission impacts from this sector and evidence of failure rates, coupled with the growing availability of zero emission options today, we strongly support the proposal to bring exhaust and evaporative emission standards to zero in 2024 for all SORE except for generators, a timeline that is technically feasible and brings significant benefits. (545-Docket)

According to CARB's own research, operating gas-powered equipment has significant air quality and occupational impacts:

- One hour of operation for a gas-powered mower generates emissions equivalent to driving a 2017 Toyota Camry from Los Angeles to Las Vegas;
- One hour of operation from the best-selling leaf blower generates emissions equivalent to driving from Los Angeles to Denver;
- Long-term exposure to certain exhaust compounds emitted by gasoline powered lawn and garden equipment may increase cancer risk by up to 80 excess cases per one million operators exposed. (545-Docket)

Despite widespread adoption of zero emission technology at the household level, commercial users are slower to transition, making a forward-looking rule necessary. While these regulations do not prohibit the use of polluting equipment, they do propose ending the sale of new gas-powered

equipment. Fortunately, this year's budget has appropriated $30 million to distribute to small-business landscapers and help them begin to acquire and transition to new zero emission electric and manual equipment. In addition, many air districts and utilities around the state operate buyback and incentive programs. We appreciate that CARB staff have brought forward new strategies to reduce the impacts of SORE, and we ask the Board to take action now to protect the health of local residents, workers, children and all who are breathing unhealthy air. (545-Docket)

Comment: We need to move to zero emission leaf blowers as soon as possible! (551-Docket)

Comment: As a physician concerned about air quality, I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. In addition to the pollution caused by the engine exhaust, blowers can create clouds of industrial pollutants, pollens, fertilizers, herbicides and pesticides, dried animal feces, dust and demolition debris such as lead and asbestos - further polluting the air we breathe. While these regulations do not prohibit the use of existing polluting equipment, they do propose prohibiting the production of new equipment to sell or lease for use in the State of California beginning in 2024. This is a modest but important step to advance greater use of cleaner, healthier and quieter equipment. As your agency's own research has found, the use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, greatly contributing to California's sad role as home to seven of the Top Ten most polluted cities in the nation. In fact, California risks losing future federal funding if we continue to fail to meet national air quality standards. (556-Docket)

Comment: I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. While these regulations do nothing to address the massive harms caused by the existing inventory of an estimated 10.6 million pieces of residential and commercial lawn care equipment currently owned and operated in our state, they do propose prohibiting the production of new equipment to sell or lease for use in the State of California beginning in 2024. This is a modest but important step to advance greater use of cleaner, healthier and quieter equipment. As your agency's own research has found, gas-powered lawn equipment makes up 69 percent of the state's small off-road engines which together create more air pollution in California than **all passenger vehicles combined**. The use of gas-powered lawn equipment causes numerous health and air quality problems, greatly contributing to California's sad role as home to seven of the Top Ten most polluted cities in the nation. In fact, California risks losing future federal funding if we continue to fail to meet national air quality standards. CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

- $8.8 billion in monetized health benefits through 2043
- 892 lives saved from premature deaths
- 438 fewer emergency room visits for asthma
- 311 fewer hospitalizations for respiratory and cardiovascular issues (562-Docket)

Fortunately the California Legislature has appropriated $30 million for your agency to distribute to small proprietor landscapers and help them begin to acquire and transition to new, zero emission electric and manual equipment. In addition, air districts around the state are also operating effective buyback and subsidy programs. Funding also must be provided to support training programs to help landscapers switch to clean tools. These regulations advance legislation enacted this year (AB 1346) to phase out the sale of gas-powered lawn equipment beginning in 2024, and also advance Governor Gavin Newsom's Executive Order N-79-20, which sets a goal to transition off-road vehicles and

equipment operations to 100 percent zero-emission by 2035 where feasible. Please vote to approve and amend the SORE regulations per the staff recommendation. (562-Docket)

Comment: For climate and public health reasons, I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. (593-Email)

Comment: I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. (594-Email)

While these regulations do not prohibit the use of polluting equipment, they do propose restricting the production of new equipment to sell or lease for use in the State of California beginning in 2024. This is a modest but important step to advance greater use of cleaner, healthier and quieter equipment. As your agency's own research has found, the use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, greatly contributing to California's sad role as home to seven of the Top Ten most polluted cities in the nation. In fact, California risks losing future federal funding if we continue to fail to meet national air quality standards. CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

- $8.8 billion in monetized health benefits through 2043
- 892 lives saved from premature deaths
- 438 fewer emergency room visits for asthma
- 311 fewer hospitalizations for respiratory and cardiovascular issues (593-Email) (594-Email)

Fortunately the California Legislature has appropriated $30 million for your agency to distribute to small proprietor landscapers and help them begin to acquire and transition to new, zero emission electric and manual equipment. In addition, air districts around the state are also operating effective buyback and subsidy programs. Funding also must be provided to support training programs to help landscapers switch to clean tools. These regulations advance legislation enacted this year (AB 1346) to phase out the sale of gas-powered lawn equipment beginning in 2024, and also advance Governor Gavin Newsom's Executive Order N-79-20, which sets a goal to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible. Please vote to approve and amend the SORE regulations per the staff recommendation. (593-Email) (594-Email)

Comment: **Subject: Strong Support for California's transition to electric-powered landscape equipment**
I support full implementation of the AB 1346 to phase out the sale of gas-powered lawn equipment beginning in 2024. CARB's own research has found the use of gas-powered leaf blowers and lawn mowers cause serious health problems and contribute to the unacceptable fact that California is home to seven of the ten most polluted cities in the nation. I understand that California risks losing future federal funding if we continue to fail to meet national air quality standards. That outcome must be avoided for the future health and welfare of the citizens of California. The benefits of fully implementing the transition to electric powered landscaping equipment, as documented in CARB's public health benefit analysis, are enormous and I ask that you take action to adopt clear and stringent policy to accrue these benefits:

- $8.8 billion in monetized health benefits through 2043
- 892 lives saved from premature deaths
- 438 fewer emergency room visits for asthma

• 311 fewer hospitalizations for respiratory and cardiovascular issues (597-Email)

As a prior employee of the California Air Resources Board who moved to California because it was the national leader for adopting and fully implementing progressive air quality standards that later became national standards, I ask that you continue this high level of evidence-based action. It is essential for the health and welfare of Californians and can set a precedent for other states to follow. Please vote to approve and amend the SORE regulations per the staff recommendation. (597-Email)

Comment: **Subject: SORE 2022 Support for California's transition to clean lawn care equipment**
CHA CHA (Clean Healthy Air - Clean Healthy Altadena) supports the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. While these regulations do not prohibit the use of polluting equipment, they do propose restricting the production of new equipment to sell or lease for use in the State of California beginning in 2024. This is a modest but important step to advance greater use of cleaner, healthier and quieter equipment. As your agency's own research has found, the use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, greatly contributing to California's sad role as home to seven of the Top Ten most polluted cities in the nation. In fact, California risks losing future federal funding if we continue to fail to meet national air quality standards. CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

* $8.8 billion in monetized health benefits through 2043

* 892 lives saved from premature deaths

* 438 fewer emergency room visits for asthma

* 311 fewer hospitalizations for respiratory and cardiovascular issues

Fortunately the California Legislature has appropriated $30 million for your agency to distribute to small proprietor landscapers and help them begin to acquire and transition to new, zero emission electric and manual equipment. In addition, air districts around the state are also operating effective buyback and subsidy programs. Funding also must be provided to support training programs to help landscapers switch to clean tools. These regulations advance legislation enacted this year (AB 1346) to phase out the sale of gas-powered lawn equipment beginning in 2024, and also advance Governor Gavin Newsom's Executive Order N-79-20, which sets a goal to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible. Please vote to approve and amend the SORE regulations per the staff recommendation. (600-Email)

Comment: **Subject: Ending fossil fuel pollution from buildings**
I would like to share some information from Rocky Mountain Institute, some links to specific solutions for you to consider. Here are a few recent things to bring to your attention: RMI's CEO, Jules Kortenhorst reports back on COP26 "COP26 Keeps 1.5 Degrees in Reach" <https://rmi.org/cop26-keeps-1-5-degrees-in-reach/>. With the recent exciting COP26 global methane pledge, RMI is working with the Climate TRACE coalition to track and address "Methane: A Threat to People and Planet." <https://rmi.org/methane-a-threat-to-people-and-planet/> And our most recent report to date is "How Air Agencies Can Help End Fossil Fuel Pollution from Buildings." <https://rmi.org/insight/outdoor-air-quality-brief/>

I hope you also saw "RMI's FY21 Annual Report," <https://rmi.org/annual-report-2021/> that highlights the breadth of work your donations helps to support. If you have any questions about the work of RMI, or are interested in particular areas of our work. please don't hesitate to be in touch! (601-Email)

Comment: For several years I have tabled at the Sunday morning farmers market in Sacramento under the freeway near Southside Park, advocating banning leafblowers, especially gas-powered blowers. I have encountered both resistance and support. The first Sunday I ever tabled about this, a guy came up to me and announced that he owned the biggest lawn care company in Sacramento, and that what I was proposing would never work. He proceeded to tell me a story about a client, a lawyer who one day while working on a brief was rudely interrupted by a gas-powered leafblower. The lawyer called the company and said, "Get rid of the damn leafblower." Okay. A month went by and the lawyer's wife got the bill, and called the company saying, "Use the damn leafblower." Then Mr. Landscaper Company said to me "See! It will never work! And I said, "What I am seeing is that nobody sat down and had a conversation about what they wanted, what they were willing to pay, and what they were willing to do." Oh. And I see that such conversations are still not happening. We are overdue.... (2006-Docket)

Comment: Thank you, Chair Randolph, for the opportunity to address the Board. California is home -- as you all know, California is home to the seven of the nation's ten most ozone-polluted cities in the United States. And as you just heard, gas-powered small off-road engines are an outsized contributor to smog-forming pollution, now outpacing the pollution from all passenger cars in California. Every hour of operating a commercial leaf blower equates to the smog-forming emissions of driving a car one 1,100 miles. These engines cause asthma, cardiorespiratory disease, and increased cancer risk and premature death. That's why I authored AB 1346, which directs the Board to adopt a zero-emission standard for new sales of small off-road engines as early as 2024. (3000-Oral Testimony)

With the passage and signature of AB 1346, the Legislature and the Governor have indicated our support for tackling this public health burden. It is important to emphasize that the regulation is not a ban on use. Nobody will have to give up or stop using equipment they already own. The force of this regulation fall on manufacturers to continue to produce clean equipment moving forward. In California and across the country, we know that communities of color and low-income communities pay the highest price for our reliance on fossil fuels. This issue is no different. Workers who use gas equipment are breathing in exhaust all day. Your own research concluded that using gas-powered equipment could double the risk of cancer for some users. (3000-Oral Testimony)

The regulation before you is an opportunity to change this paradigm and prevent nearly 900 premature deaths. Several cities, schools, and landscaping businesses have already successfully transitioned to fully zero-emission equipment on a commercial scale. More powerful zero-emission products continue to come to market representing 27 percent of the equipment purchased by professional landscapers in 2020. Again, this regulation only requires new equipment to be zero-emission, which will allow businesses to gradually replace their inventory. In recognizing that there are costs associated with this change, the Legislature appropriated $30 million to support small landscaping businesses and transitioning to clean equipment. (3000-Oral Testimony)

I urge the Board to be surgical in your allocation of this funding to ensure that it goes where it is most needed to small businesses. The Board should partner with local air districts and conduct extensive and relevant outreach to the landscaping community to ensure the effectiveness of this program. The Legislature will be monitoring implementation closely to make sure that the program achieves our goal of providing meaningful and targeted support to small landscaping businesses. I urge you to adopt this regulation today. These are the decisions we have to make if we're serious about reducing our reliance on fossil fuels and leaving future generations with healthier communities. (3000-Oral Testimony)

Comment: This is Bill Magavern with the Coalition for Clean Air. Quick on my finger with the raise hand function this morning, so happy to be speaking with you. And we urge the Board to approve

this rule with no delay in the transition to zero-emission equipment. We were pleased to support AB 1346 by Assemblymembers Berman and Gonzalez. They've been such champions on this issue. As Assemblymember Berman said, we need this rule to reduce the smog that continues to plague our state. We know that the current rules, while they've reduced emissions, actually have not worked as well as expected and compliance has not been close to a hundred percent. And it's the workers who are most exposed to the health damage that comes from burning fossil fuels in these engines. We also, of course, need this in order to have any hope of attaining national ambient air quality standards. We do think that as you move forwards, there will be more incentive money needed and we'll be asking the Legislature and the Governor for that. We agree that robust outreach on the incentives is crucial and that should include an element of workforce training for the small landscaping companies. (3001-Oral Testimony)

Comment: But we urge you to go forward with no change in the dates. The rule already allows for a gradual transition. We know that battery technology is improving rapidly. And, for generators, 2028 is already far away. So there's plenty of time to adjust in that sector. This has been a long and inclusive process. I can remember workshops back when we were meeting in person on this issue, as well as, of course, virtual meetings since then. So we urge you to approve the rule today. Thank you very much. (3001-Oral Testimony)

Comment: My name is Mariela Ruacho from the American Lung Association. We are in strong support of this proposal and urge the Board to approve. I want to start off by saying first that this is a health issue and an equity issue. CARB needs to take action now to reduce emissions from small off-road engines. These engines are now surpassing smog-forming emissions from passenger vehicles and are expected to double in the next 10 years with our proposed amendment. In addition, to regional clean air benefits, workers using this equipment are directly exposed to fumes and emissions for long periods of time, and therefore suffer the most from health impacts. It is important to note that the proposed amendments do not require businesses to get rid of their gas-powered engines. Instead, the rule applies to the sale of new SORE equipment by requiring manufacturers to phase-in zero-emission equipment by 2024. There is more than enough time to prepare the transition -- the transition of this to not -- technology, especially when considering the 2028 timeline for generators. To date, CARB has received guidance from both the Governor and the Legislature in support of eliminating emissions from SORE by passing Assembly Bill 1346 and the Governor's Executive Order 16 N-79-20. (3006-Oral Testimony)

Comment: The Lung Association and 20 lung and medical organizations have written in support of the Board approving this rule today. And adopting this rule will reduce smog-forming emissions and multiple health benefits. We appreciate all the work CARB has done to implement this policy in coming with the rule and we – (3006-Oral Testimony)

Comment: Hello. Daniel Barad on behalf of Sierra Club California and our half million members and supporters throughout the state. We strongly support the Small Off-Road Engine Rule and urge the Board to approve it today. We strongly support the Small Off-Road Engine Rule and urge the Board to approve it today. Leaf blowers, lawn mowers, and other gasoline-powered small off-road equipment have an outside -- outsized emission and health impacts. Phasing out polluting engines will substantially improve air quality and public health. According to CARB staff, through 2031, the proposed rule will reduce smog-forming $NO_x$ emissions by 43 percent and result in the avoidance of 892 premature deaths, 438 fewer emergency room visits for asthma, and 311 fewer hospitalizations for respiratory and cardiovascular issues. Zero emission models of equipment covered by this rule are widely available today. These products are clean, affordable, and do their jobs as well as their polluting counterparts. In 2024, when this rule goes into effect for most equipment, zero-emission options will be even better. The staff has also allowed even more time for this rule to apply to

generators to ensure that this rule delivers strong emission reductions, but is also feasible for consumers. (3007-Oral Testimony)

Comment: Nothing in this rule prevents Californians from using gas-powered equipment after the rule is implemented. And the Legislature approved $30 million in incentives to help small landscaping businesses transition their tools to zero-emission. This proposed rule is exceedingly reasonable and will improve health for all Californians, particularly those who regularly must operate this equipment. Legislature approved $30 million in incentives to help small landscaping businesses transition their tools to zero-emission. This proposed rule is exceedingly reasonable and will improve health for all Californians, particularly those who regularly must operate this equipment. It will also bring us a small step closer to slowing the climate crisis. We strongly urge you to approve this rule. Thank you very much. (3007-Oral Testimony)

Comment: I'm Kim Alexander, co-convener of Mow Better. We're a Sacramento-based collaboration of stakeholders and neighborhood groups working to phase out the use of gas-powered lawn equipment. And we urge you to approve these proposed amendments. There are an estimated 10.6 million pieces of residential and commercial lawn care equipment currently owned and operated in our State. And these regulations will do nothing to impact any of that existing equipment. No one is taking anyone's tools away. This is a modest but important step to advance greater use of cleaner, healthier, quieter equipment. Over two-thirds of SORE engines are gas-powered lawn equipment. And this greatly contributes to California's sad role as home to seven of the top 10 most polluted cities in the nation. In fact, we risk losing federal funding if we continue to fail to meet national air quality standards. And this is not an idle threat. We saw just last month, the Biden administration blocked $12 billion in federal public transit funding because of a long-standing dispute regarding the State's public pension laws. (3009-Oral Testimony)

Use of this lawn equipment causes numerous health care problems too. Your own agency's study found that it exposes operators to volatile organic compounds, carcinogens for which there are no safe levels of exposure. It also exposes people to extremely loud noise above the relevant national and California ambient air quality standards. And that persistent exposure causes permanent hearing loss, which leads to other health problems. In this time of drought, and mega fires, the Corona virus pandemic, and continuing poor air quality, we need to change our lawn and landscaping culture. Adopting these new regulations signals that California will continue taking the lead, as we have done with electric vehicles, to accelerate a shift toward cleaner, healthier, small off-road engines. (3009-Oral Testimony)

Comment: I am Dr. Ronald Askeland, co-leader of SD-SEQUEL. That's San Diegans for Sustainable, Equitable, and Quiet Equipment in Landscaping. We support the adoption of new regulations that will phase out the sale of highly polluting gas-powered leaf blowers, and other lawn equipment in California beginning in 2024. Please approve the amended SORE regulations per the staff recommendation. This regulation will improve the air quality, help to slow the climate crisis, improve human health, and save lives. Emissions and noise levels from gas-powered leaf blowers present a threat to public health. Smog-forming emissions from small off-road engines in California will surpass those of passenger vehicles this year. Equipment operators are overexposed to toxic fumes, respiratory irritating fine particles, and unsafe noise levels at close range. (3020-Oral Testimony)

Children and older persons and people with hearing disorders or other neurological conditions like autism are especially vulnerable. Health hazards posed by gas-powered leaf blowers are an environmental justice issues for both the equipment operators and our most vulnerable populations. Please implement a trade-in program for small landscaping businesses that cover 75 percent or more of the cost of replacement electric lawn maintenance equipment and coordinate this effort with the

local air pollution control districts. Replacing two-stroke engines needs to be the top priority due to their disproportionate level of emissions of hydrocarbons, carbon monoxide, and nitrous oxides. The time to act is now. (3020-Oral Testimony)

Comment: I'm Alan Abbs with the Bay Area Air Quality Management District. Thank you for the opportunity to comment and to provide overall support for the SORE Regulation. SORE includes some of the dirtiest and most common pieces of equipment, and transitioning them to zero emissions would result in significant reductions in local criteria pollutants and air toxics, and provide significant gains in local public health. Many types of equipment subject to the regulation, such as lawn and garden equipment, have many existing zero-emission substitutes making a 2024 deadline achievable. (3026-Oral Testimony)

Comment: We also encourage CARB to continue monitoring the feasibility of deadlines for larger pieces of equipment that may not have current widespread commercial availability or that may be predominantly used in remote areas. And we support the approach used for back-up generators that provides for the potential for non-zero options through 2032. (3026-Oral Testimony)

Comment: My name is Sarah Rees. I'm Deputy Executive Officer for South Coast Air Quality Management District. As you know, the South Coast region fails to meet federal air quality standards and faces upcoming hard deadlines to meet these standards. The SORE source category contributes substantial VOCs to our air basin. There is approximately two and six times more VOC emissions in passenger cars in 2018 and 2031 respectively. Seventeen percent of total South Coast Air Basin emissions for VOCs will be made up of SORE emissions in 2037. The 25 ton per day VOC reduction that the SORE regulation is expected to bring in 2031 is significant. While $NO_x$ is the key pollutant of concern for us to meet the federal ozone standards, these VOC reductions will help us attain. The $NO_x$ and VOC reductions expected from the SORE regulations will also help meet Clean Air Act requirements, such as meeting reasonable further progress requirements towards attainment of federal ozone and PM standards. We also believe that the VOC reductions will provide an important co-benefit as we move to attainment of the PM standards. Finally, the VOC reductions will have important health benefits reducing toxic species, such as 1,3-butadiene and benzene. While these emission reductions are important to a heavily urbanized system or region like South Coast, we do recognize that there are other regions in California that don't face the same pressing air quality challenges. (3040-Oral Testimony)

Comment: My name is Davis Harper and I'm the San Joaquin County community organizer for The Climate Center. We strongly support CARB in moving swiftly to implement this transition to zero-emission small off-road engines. The climate benefits to making this switch can't be overstated as we're seeing more extreme weather due to climate change every year. It's a code red for humanity and every bit of warming matters. In 2020, pollution from California's lawn equipment was higher than emissions from passenger cars. Banning leaf blowers and other small gas engines is low-hanging fruit in our collective efforts to dramatically cut greenhouse gas emissions, which disproportionately pollute communities of color and are driving increasing extremes in wildfires, drought, heat, and floods. Additionally, the public health benefits are substantial. Exhaust from gas-powered leaf blowers contains asbestos and lead that ends up getting inhaled by the equipment operators. CARB's analysis found that these new regulations could save nearly 900 lives and reduce hundreds of ER visits and hospitalizations related to respiratory and cardiovascular issues. Dozens of cities have already enacted some form of a ban on polluting lawn equipment. It will likely take a few years to completely replace the existing inventory. But given the rapid improvements in electric lawn equipment, it's likely the old gas versions will phaseout quickly. (3043-Oral Testimony)

Comment: My name is Tom Jordan. I'm with the San Joaquin Valley Air Pollution Control District. As you're aware, the San Joaquin Valley has difficult air quality challenges and most community level air pollution and toxics impacts come from mobile sources. Emissions from small engines are an important source of emissions to address, as we move forward with our clean air efforts. And for years, air districts have partnered with landscapers, CARB, and other stakeholders to identify opportunities for reducing emissions from this sector. (3046-Oral Testimony)

Comment: My name is Joel Ervice, the Associate Director with RAMP, Regional Asthma Management and Prevention, a project of the Public Health Institute. RAMP's mission is to reduce the burden of asthma with a focus on health equity. I'm speaking today in strong support of the staff proposal and urge you to move this life-saving rule forward. California is home to significant air pollution challenges and we know that this sector is increasingly taking a major role in harmful emissions. CARB staff notes that the SORE category now contributes more smog-forming pollution than all of the cars on California's roads. This is shocking and underscores why the transition to zero emissions is so urgently needed. We know the terrible toll that poor lung health can take on an individual and that the burdens of unhealthy air do not follow equally here in California. We believe that lung health will improve broadly, locally, and for workers exposed for hour after hour to the exhaust emissions from this equipment. CARB staff notes that nearly 1,000 lives will be saved through transitioning to zero-emission sales. The Legislature, Governor Newsom, and CARB itself have taken recent actions to spur the transition to zero emissions in the small off-road engine category. The requirements for new engines phasing into zero emissions starting in 2024 is an important action that must be taken today. (3053-Oral Testimony)

Comment: This is Will Barrett with the American Lung Association. Thank you very much for giving me a few minutes to speak. You've heard from Assemblymember Berman today. You've heard from my colleagues at the Lung Association, the Coalition for Clean Air, RAMP's asthma experts, community groups, and air districts all speaking to the importance of the proposals. I'm speaking today again on the behalf of the Health Professionals for Clean Air Network and the many health organizations, doctors, and nurses who couldn't be here to voice their support today. We support the proposed zero-emission SORE rule as a critical public health, occupational health, and health equity issue. The health benefits of this rule go far beyond those that have been quantified by the staff. And it's important to note just how substantial they are. Over the course of the program, we expect to save 900 lives, nearly nine billion in public health benefits. We appreciate that CARB is taking a manufacturer-based and technologically-feasible approach to phasing in sales of new zero-emission equipment in 2024 for landscaping and as far out as 2028 for generators. And there's additional time that's going to pass due to credits in the proposal. (3059-Oral Testimony)

So there's a long time out for a lot of these rules to hit. CARB must really continue to monitor technology improvements along the way, but again must act today to set the bar for zero emissions without delay. The proposals don't take away any equipment that's on the -- you know, in use today and that is going to continue to operate for a long time after the new sales standards begin. I think that's important to just restate that. The proposed amendments follow direction from the Legislature by AB 1346 from Governor Newsom's Executive Order, the Mobile Source Strategy that the Board heard in October, the State SIP, and the recent Board-approved incentive funding to accelerate the transition to zero emissions. We advocated for that 30 million in the State budget and will continue to speak for additional funding, but note that this 30 million is on the table now years in advance of the rule requirements. So with that, I thank you and urge you to approve the life-saving proposal before you. (3059-Oral Testimony)

Comment: Erin Rodriguez with the Union of Concerned Scientists. Thank you for the opportunity to comment today. Overall, we appreciate and thank CARB staff for all their work to bring forward new

strategies to reduce the impacts of SORE and we urge you to adopt this proposal. As others have mentioned today, the transition to zero-emission equipment for SORE is necessary to protect the health of workers, residents, and support attainment of health-based clean air standards. UCS is also committed to advocating for more incentive dollars for small businesses in the budget process to complement the $30 million that was already allocated earlier this year. We hope that any funding will also go to the needed robust outreach to small landscape businesses as well as workforce training. Again, we urge you to adopt this rule as proposed without delay. Thank you. (3064-Oral Testimony)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. The use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

$8.8 billion in health insurance benefits through 2043

892 premature deaths avoided

438 fewer emergency room visits for asthma

311 fewer hospitalizations for respiratory and cardiovascular issues

The California Legislature also appropriated $30 million for your agency to distribute to small proprietor landscapers to help them begin to acquire and transition to new, zero emission electric and manual equipment. This is in addition to subsidies and buy back programs already led by air districts throughout the state. This regulation will improve air quality, help to slow the climate crisis, improve human health, and save lives. Please approve and amend the SORE regulations per the staff recommendation. (Form Letter J)

Comment: I am a California resident and I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. (Form Letter J Part 1)

Comment: The use of gas-powered leaf blowers and lawn mowers in particular causes numerous health problems, and greatly contributes to California's notoriously poor air quality. California continues to fail to meet national air quality standards, which means that millions of Californians like myself breathe unhealthy air everyday. (Form Letter J Part 2)

Comment: CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

$8.8 billion in health insurance benefits through 2043

892 premature deaths avoided

438 fewer emergency room visits for asthma

311 fewer hospitalizations for respiratory and cardiovascular issues (Form Letter J Part 3)

Comment: The California Legislature also appropriated $30 million for your agency to distribute to small proprietor landscapers to help them begin to acquire and transition to new, zero emission electric and manual equipment. This is in addition to subsidies and buy back programs already led by air districts throughout the state. (Form Letter J Part 4)

Comment: This regulation will improve air quality, help to slow the climate crisis, improve human health, and save lives. (Form Letter J Part 5)

Comment: Please approve and amend the SORE regulations per the staff recommendation. (Form Letter J Part 6)

**Agency Response:**

These comments express support for AB 1346 and the Proposed Amendments for a variety of reasons, including but not limited to the benefits of improved air quality for people with asthma; the health of equipment users, neighbors, wildlife, and the planet; worker safety; improved safety from no longer storing and transporting gasoline cans; and reduction of noise and fumes. Some commenters thank CARB for implementing or otherwise discuss the requirements of AB 1346. Other commenters discuss climate change and provide information about greenhouse gas emissions and work to mitigate the effects of climate change. CARB made no changes based on these comments. CARB appreciates the support and agrees that it is necessary and important to transition to ZEE to reduce emissions and improve air quality. The following response provides clarification and context for several points within the above comments.

In response to the comments about "noise limitation standards," "decibel limits," and noise reduction, to clarify, regulating noise pollution is beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice. Nonetheless, while ZEE create noise while in operation, ZEE generally create less noise than SORE equipment (ISOR page 82), which reduces noise at worksites as well as in the community where the equipment is operating. Therefore, noise reduction is one of the benefits of the Proposed Amendments. Similarly, while the Proposed Amendments would reduce carbon and other greenhouse gas emissions, they are specifically designed to achieve the expected $NO_x$ and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20.

In response to the comments about banning the use of leaf blowers and other SORE equipment, to clarify, the Proposed Amendments would not prohibit the use of CARB-certified SORE equipment nor would they prohibit the use of zero-emission leaf blowers or other equipment that create noise or could disturb dust or remove mulch and leaf cover. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. The SORE regulations require new engines to be certified and labeled to meet emission standards and other requirements. CARB regulates the engines, but does not regulate the use of SORE equipment. People can continue to use and repair their current SORE equipment until the end of its life (e.g., until the SORE equipment breaks or people decide to upgrade equipment). There is no scheduled date of elimination for SORE equipment that California residents and businesses currently own.

In response to comments about requiring electric, battery powered, or hydrogen powered equipment, to clarify, the Proposed Amendments do not require a specific equipment energy source. The Proposed Amendments are inherently technology neutral because they specify emission standards of zero and do not specify a particular energy source or technology. As noted on ISOR page 24, hydrogen fuel cell powered equipment are considered ZEE under the Proposed Amendments. In addition, manufacturers may use emission reduction credits to offset emissions from engines that use low-emission technologies. Please refer to the Agency Response in section IV.A.2.6.3 for additional discussion about alternative fuels and

technologies and use of credits by manufacturers that participate in CARB's averaging, banking, and trading (ABT) emission reduction credit program.

In response to the comment, “These small engine nightmares have been destroying the air and peace everywhere they are used. Despite being illegal in LA … I hope this will have ANY impact,” new emission standards in the Proposed Amendments could go into effect as early as model year 2024. This means California residents and businesses likely will begin seeing fewer SORE equipment available for sale and rental in 2024. CARB's SORE regulations do not prohibit the sale or use of CARB-certified SORE. The comment seems to imply that a local municipality has an ordinance prohibiting the use of SORE equipment. Any such ordinance is beyond the scope of this rulemaking.

Regarding the comment, "…we must strive to go beyond "net zero" to ensure that we are ... also improving the quality of our clean energy supply": Improving the quality of California's energy supply is beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice, and, therefore, CARB made no changes based on this comment.

Regarding comments that state or imply that all SORE sold in California should be zero emission, to clarify, current and proposed California SORE regulations apply only to engines that are not preempt under the Clean Air Act. For additional discussion about new engines subject only to federal regulations, please see ISOR pages 5 and 12, and the Agency Response in section IV.A.29. Please also see sections IV.A.33 and IV.A.2.5.4 for information about exemptions for SORE equipment used for emergency response and engines used solely for competition.

Regarding the comment "...it is time to transition all off road vehicles from gasoline power to electric zero emissions" and other comments regarding vehicles and other types of equipment: Regulating emissions from off-road vehicles and equipment other than those with spark-ignition engines rated at or below 19 kilowatts (25.5 horsepower) that are subject to California's SORE regulations is beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice, and, therefore, CARB made no changes based on the comment.

Regarding the comment, "Small engines lubricate by mixed oil and gasoline, which burns to high smoke, carbon emissions", as well as other comments specific to two- and single-stroke engines: The current and proposed SORE regulations address emissions from both two-stroke and four-stroke engines. CARB is not aware of the existence of single-stroke SORE. Chapter I of the ISOR provides a review of the different types of emissions from the use and storage of two-stroke engines (those that mix oil and gasoline) and other types of small off-road engines. The Proposed Amendments do not require anyone to stop using two-stroke or other CARB-certified engines.

Regarding the comment, "Important too that for small businesses who are dependent on such engines (i.e. gardeners/landscapers, etc.) a system of financial assistance be created to help reduce the cost of transitioning to zero emissions equipment," and similar comments about the need for financial assistance, incentives, grants, subsidies, trade-in programs, education, and training, to clarify, requirements for financial assistance and training are beyond the scope of the rulemaking as described in the October 2021 45-Day Notice. The scope of the rulemaking does not include allocating funding or administering a program to distribute such funding. CARB agrees that financial assistance and training would be beneficial. CARB made no change based on these comments. Note, the Budget Act of 2021 provided $30 million in the FY21-22 California state budget "to create a program, or utilize an existing program, to provide incentives for professional landscaping services in California operated by small

businesses or sole proprietors to purchase zero-emission small off-road equipment." CARB will ensure this funding is used to provide incentives to sole proprietors and other small landscaping businesses in California to purchase ZEE, including batteries for the equipment, and will coordinate with air districts.

In response to the comment, "... saving billions on health insurance", to clarify, CARB's economic analysis estimated the economic value associated with reduced premature mortality, hospitalizations, and emergency room visits under the Proposed Amendments but did not estimate the associated savings for health insurance companies or for individuals who might have lower insurance premiums.

Regarding the comment, "Mortality for the operators has become an environmental justice issue," CARB does not have evidence specific to operator mortality in California, but, as discussed more in ISOR chapter VI, Environmental Justice, users of SORE equipment are exposed to CO, $PM_{2.5}$, TACs, and other pollutants when operating equipment, and frequent users of lawn and garden equipment, particularly landscaping professionals, would be exposed to these air contaminants less frequently by replacing their SORE equipment with ZEE. Employees of landscaping businesses typically have lower income than an average employee in California, and that 67 percent of landscaping business employees in the CSUF survey were identified as being Hispanic or Latino [CSUF SSRC, 2019[8]]. These users are disproportionately exposed to CO, $PM_{2.5}$, and TACs. Replacing SORE equipment with ZEE will reduce these exposures and protect the health of users, while offering a potential for cost-savings to businesses. The Proposed Amendments are consistent with CARB's environmental justice policy of reducing exposure to air pollutants and reducing adverse health impacts from TACs in all California communities.

In response to the comment, "We also encourage CARB to continue monitoring the feasibility of deadlines for larger pieces of equipment that may not have current widespread commercial availability or that may be predominantly used in remote areas," to clarify, CARB Resolution 21-28, dated December 9, 2021, states, in part, "Be it further resolved that the Board directs CARB staff to review annually the status of the implementation of the proposed amendments and to conduct a technological review in the 2025 to 2026 timeframe to assess the progress towards the MY 2028 zero-emission standards for portable generators and any other engine or equipment category that may be newly subject to the MY 2028 zero-emission standards." Such technological review is beyond the scope of the Proposed Amendments to the SORE regulations for this rulemaking. However, it will be an important component of implementing the Proposed Amendments.

In response to the comment, "And we support the approach used for back-up generators that provides for the potential for non-zero options through 2032," to clarify, under the Proposed Amendments, emission standards of zero would apply beginning in MY 2028 for pressure washers with displacement 225 cubic centimeters (cc) or larger and portable generators, and MY 2024 for all other SORE subject to California SORE regulations. Manufacturers have the option to participate in the averaging, banking, and trading (ABT) program, which allows emission reduction credits to be banked for up to five years and therefore provides for the potential for nonzero pressure-washer and generator engine options through MY 2032.

[8] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

## A.2. Alternatives to the Proposed Amendments

### *A.2.1. Requests to accelerate and/or expand the rulemaking scope*

#### A.2.1.1. Require ZEE before MY 2024 and/or require 100 percent of small off-road equipment to be ZEE

Comment: Since this is "Model Year MY" the conversion date should be EARLIER. Immediate Manufacture of zero emission should be the Rule, NOT 3 long years away in the future. After all, Breathing is a problem NOW. "The proposed amendments would set emission standards for smog-forming pollutants to zero beginning with model year (MY) 2024 for all new SORE except for portable generator engines. Text proposed": (5-Docket)

Comment: Gas powered blowers have been outlawed for many years with no enforcement. Maintenance companies have known this and have just been trying to get away with it for as long as possible. And they will continue to delay until the last possible moment. So even if you move the date forward, it will not cause folks to purchase new equipment until the deadline. So demand will not be created and we will be in the same exact position 4 years later. (41-Docket)

Comment: Please ban gas-powered lawn equipment. I support the transition to electric ASAP for the sake of the planet. (55-Docket)

Comment: Yes I think they should all be banned and only electric or battery powered allowed from now on. (69-Docket)

Comment: I am a California resident and I support the adoption of new regulations that will PROHIBIT the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning January 1, 2022. (128.011-Docket)

Comment: I am a California resident and I whole-heartedly support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024 (if not sooner!). (128.143-Docket)

Comment: I live in a dense, R2 neighborhood in Santa Monica. Despite the regulation banning leaf blowers here, nobody is enforcing it. I call code enforcement frequently, and rarely has there been a remedy. My house is downwind of a large multi-unit building and in the summer especially, the gasoline fumes from single stroke engine yard tools fills my open house (we have no AC) almost daily. I don't know when to shut my windows and I am always too late. It is bad enough to have the increasing summer heat these days, but to have to close up your house because the air is toxic in 90 degree heat is doubly unhealthy. I can't escape the fumes inside my house by going out into my yard because the fumes are pooling there. I get headaches, and I feel terrible about what it is doing to my kids. This is a "no-brainer". Gardeners need to return to rakes, brooms, and buy rechargeable mowers (like me). (128.212-Docket)

Comment: As a nurse, I have been deeply concerned about the air pollution and climate effects caused by gas-powered leaf blowers and other two-stroke engines for many years. The egregious amount of air pollution created by the use of these motors is well-documented, and there are much cleaner alternatives available for tools and vehicles now powered by these gasoline motors. The emissions from these motors are also disproportionately contributing to the climate crisis, which has already resulted in horrible damage to California in the forms of drought and wildfires, to name just

two. In my opinion, these motors should have been banned years ago, but since they have not been banned, I am writing to ask that you adopt new regulations that will at least phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. Better yet, please phase out the sale in 2022 and enact a total ban by 2024. (128.214-Docket)

The California Legislature has appropriated $30 million for your agency to distribute to small proprietor landscapers to help them begin to acquire and transition to new, zero emission electric and manual equipment, in addition to subsidies and buy back programs already led by air districts throughout the state. We cannot allow the continued damage these motors do to persist for economic reasons that can be more easily overcome than the health and climate effects of their pollution. So, please adopt the regulation to phase these motors out in the fastest, strongest way possible. (128.214-Docket)

Comment: I am a California resident asking you to adopt new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. California's communities and environment deserve better. To ensure that all communities have breathable air in the state, please require 100% of the Small Off-Road Engines sold in California to be zero emission. (128.229-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. CARB must require 100% of the SOREs sold in California to be zero emission now. CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

A huge decline in carbon emissions to curb climate change

$8.8 billion in health insurance benefits through 2043

892 premature deaths avoided

438 fewer emergency room visits for asthma

311 fewer hospitalizations for respiratory and cardiovascular issues

Decreased noise pollution in neighborhoods

This ban is long overdue and needs to be implemented as soon as possible. (128.236-Docket)

Comment: I support the transition to clean lawn care equipment. And although the transition date is 2024, I believe that it can and should be accomplished by 2023. (141-Docket)

Comment: Gas-powered leaf blowers and lawn mowers are a health hazard in every neighborhood in the country. In order to maintain the health and safety of the community, CARB must require 100% of the small off-road engines (SOREs) sold in California to be zero emission. (142-Docket)

Comment: California must lead the nation in eliminating deadly pollution from small off-road vehicles, leaf blowers and other landscape maintenance equipment. 100% of SORES must be zero emissions. (153-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality

standards, which means millions of Californians breathe unhealthy air every day. California's communities and environment deserve better. To ensure that all communities have breathable air in the state, CARB must require 100% of the SOREs sold in California to be zero emission. (157-Docket) (160-Docket) (204-Docket) (254-Docket) (302-Docket) (351-Docket) (Form Letter K-Docket)

Comment: CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

$8.8 billion in health insurance benefits through 2043

892 premature deaths avoided

438 fewer emergency room visits for asthma

311 fewer hospitalizations for respiratory and cardiovascular issues (160-Docket) (254-Docket) (302-Docket) (351-Docket) (505-Docket)

Comment: PLEASE pass the proposed Small Off-Road Engine Regulation to end the sale of polluting lawn and garden equipment. As I'm sure you know, the use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. California's communities and environment deserve better. To ensure that all communities have breathable air in the state, CARB must require 100% of the SOREs sold in California to be zero emission. These items have been under the radar for far too long. Let's move toward correcting this now! (168-Docket)

Comment: There are many very hard steps we need to take to have an effect on climate control, but transitioning to cleaner lawn care equipment is one of the easier steps that should be taken ASAP. I live in California and support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024--or sooner, if possible, as this obvious change with its major positive benefits should have happened years ago. (174-Docket)

Comment: We Californians need to rid the state of gas-powered, noise polluting, and air polluting leaf blowers now! (179-Docket)

Comment: Please do the correct thing and address the issue of gardening equipment that uses gasoline and mixed fuel. Now is the time, not a year from now. This equipment is unhealthy for the environment and for the users. We need action taken now, not promises that are broken. If you are on this board then you should be promoting healthy air; if you aren't then get a different job like a lobbyist for the energy companies. (184-Docket)

Comment: We have an existing city ordinance that prohibits this gas-powered equipment. Isn't it time to enforce it? (191-Docket)

Comment: I respectfully urge you to update our laws to add additional protections for our health. Please ensure that all leaf blowers and landscape machinery go 100% electric. (197-Docket)

Comment: We need 0 emissions Now! Yes, impossible, but saying 0 by some future date does not convey the urgency of our current situation. (209-Docket)

Comment: We need zero emissions leaf blowers NOW!! (215-Docket)

Comment: Gas-powered leaf blowers and lawn mowers must be phased out, and quickly get to zero emissions. Zero noise would be welcome too! (247-Docket)

Comment: Please pass the proposed Small Off-Road Engine Regulation to end the sale of polluting (254-Docket)

Comment: Climate change is an immediate existential threat that we all need to take action in order to survive. Small Off-Road Engines that run on gas are significant greenhouse gas emitters. They need to phased out on an aggressive and accelerated timetable. (259-Docket)

Comment: As a person with asthma, I am aware that the use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. California's communities and environment deserve better. To ensure that all communities have breathable air in the state, CARB must require 100% of the SOREs sold in California to be zero emission. (261-Docket)

Comment: As a long-time resident of quiet neighborhoods in Los Angeles (30 years), I have been daily beset by the sound and smell of gas-powered blowers. The quality of air here is definitely worsened by their emissions. I often have to close my windows to keep the bad air out. I have discovered that the use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air every day. California's communities and environment deserve better. To ensure that all communities have breathable air in the state, the California Air Resources Board (CARB) must require 100% of the SOREs sold in California to be zero emission. (269-Docket)

Comment: We need zero emission leaf blowers, now! (273-Docket)

Comment: Transition to Zero Emissions and Clean Air has to begin now. There is too much delay and this issue should not be tied to politics. (289-Docket)

Comment: Please help stop our relationship with polluting lawn and garden equipment. Please vote to make all these types of equipment 100% zero emission. (290-Docket)

Comment: No more delays. And, it needs to be enforceable. Currently, there is no enforcement! (298-Docket)

Comment: Ban all polluting lawn equipment and leaf blowers. (320-Docket)

Comment: Please ban gas fueled lawn and landscape tools (329-Docket)

Comment: Please regulate the use of gas powered, polluting leaf blowers. We need zero emission leaf blowers now! (332-Docket)

Comment: We need to make all Garden equipment 100% electric, now!!! (337-Docket)

Comment: Please vote to rid the county of all pollution making machines, such as weed-wackers, leaf blowers, lawn mowers, etc. We should not tolerate the pollution they make any more. (343-Docket)

Comment: Ensure that 100% of leaf blowers, lawn mowers, weed wackers and other "Small Off-Road Engines" (SOREs) sold in the state are zero emission. Please pass the proposed Small Off-Road

Engine Regulation to end the sale of polluting lawn and garden equipment. Polluting smoke in air (351-Docket)

Comment: I share Governor Newsom and other California policymakers desire to reduce carbon emissions from gas-powered equipment as quickly as is feasible. However, a two-year timeline is not fast enough. Commercial users need to be part of the solution, if they don't like battery powered they can use a rake. Enough is enough. Please move forward with your initiative. (359-Docket)

Comment: Ensure that Small Off-Road Engines are 100% zero emissions. (364-Docket)

Comment: We need zero emission leaf blowers now! (366-Docket)

Comment: Time is running out for our planet to avoid the most catastrophic effects of climate change. Please ensure that 100% of leaf blowers, lawn mowers, weed wackers and other "Small Off-Road Engines" (SOREs) sold in the state are zero emission by passing the proposed Small Off-Road Engine Regulation. (409-Docket)

Comment: I support and encourage the Board to ban the sale of small off-road gasoline engine equipment by 2024, or as soon as possible. In fact, it is possible now. There currently are reliable and effective electric alternatives for lawn mowers, leaf blowers, chain saws and numerous other equipment that pollute the air, make excessive noise, and that negatively impact the quality of life for us and the very existence of numerous plants and animals. Please take this bold step to reign in our careless and excessively selfish lifestyle. (417-Docket)

Comment: Gas powered mowers, edgers and "leaf" blowers should be completely banned. Phasing out sales of new equipment in 2024 will allow the continuation of this extremely LOUD and TOXIC ritual by those who already own these "tools". They fill our homes with toxic fumes, blow dirt and weeds everywhere and make horrendous noise. These deplorable so-called "yard tools" also significantly contribute to greenhouse gases. Roving yard crews should use rakes and brooms instead of polluting every neighborhood with their destructive "tools". I urge you to ban them completely. Now in 2021. (423-Docket)

Comment: Ban the sale of gas powered leaf blowers, edgers and lawn mowers. Phase out existing over 3 years. (436-Docket)

Comment: I support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024. (444-Docket)

Comment: These types of small engines produce a lot of greenhouse gasses. Better alternatives are available, and developments in both this field and others show that recommendations and gradual phase-outs are not effective. We need to ban the sale of this equipment immediately; it's too late to dilly-dally about climate change. Financial subsidies provided by the state will help any small businesses that are hurt by rule changes. There are no more excuses. (444-Docket)

Comment: I just wanted to weigh in here. I've owned and operated Down to Earth Landscaping for 24 years now in the East Bay and I am a strong advocate for the environment and the health of our workers. While I agreed with the ban on gas leaf blowers because of its direct impact on workers health and the environment, most landscapers have not stopped using them. On any given day in an area that hires gardeners, I'll see most if not all gardeners are still using the banned equipment with no enforcement. (451-Docket)

Comment: Without enforcement, these bans are useless and enforcement would only create a further rift between those of us following the law and the vast majority who are being hired as gardeners who don't and won't. (451-Docket)

Comment: Please continue and accelerate the transition to zero emissions. (497-Docket)

Comment: California's communities and environment deserve better. To ensure that all communities have breathable air in the state, CARB must require 100% of the SOREs sold in California to be zero emission. (498-Docket)

Comment: To ensure that all communities have breathable air in CA, CARB must require 100% of the SOREs sold in California to be zero emission. Please make the 100% requirement effective as soon as possible. (499-Docket)

Comment: The use of gas-powered leaf blowers and lawn mowers can cause numerous health problems and contributes to poor air quality. California consistently fails to meet national air quality standards, which means millions of Californians breathe unhealthy air everyday. California's communities and environment deserve better. To ensure that all communities have breathable air in the state, I strongly urge you to require 100% of the SOREs sold in California to be zero emission. (505-Docket)

Comment: We are concerned by the proliferation of petroleum-fueled generators, which cause significant air pollution, and urge CARB to seek ways to make all new-generator sales zero-emission sooner than the proposed 2028. (545-Docket)

**Agency Response:**

These comments directly or indirectly request that implementation of the Proposed Amendments take place sooner. The rationale for the implementation dates specified by the Proposed Amendments is discussed in ISOR section II.A.2.a and in section II.A of this document. We provide further elaboration here to address the additional variations raised in these comments. Under the Proposed Amendments, emission standards of zero would apply beginning in MY 2028 for portable generators and pressure washers with displacement 225 cubic centimeters (cc) or larger, and MY 2024 for all other SORE subject to California SORE regulations, to provide sufficient lead time to permit the development of the necessary technology giving appropriate consideration to the cost of compliance within that time period, as required by Section 209 of the Clean Air Act. This allows time for manufacturers to meet the emission standards. Implementing emission standards of zero earlier than the time periods identified in the Proposed Amendments would not provide adequate consideration for the costs. CARB made no changes based on these comments.

In response to the requests to ban all SORE landscape equipment and other SORE equipment: The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. The Proposed Amendments would not require people to stop using their SORE equipment. In addition, under the federal Clean Air Act § 209(e)(1), "New engines which are used in construction equipment or vehicles or used in farm equipment or vehicles and which are smaller than 175 horsepower" are preempt from CARB's regulations and only subject to federal regulations. Therefore, some types of new SORE equipment that may be used by gardeners and landscapers will continue to be legal to manufacture for sale or lease for use or operation in California if they are certified and labeled in compliance with federal regulations.

In response to the comment, "We need to make all Garden equipment 100% electric," to clarify, the Proposed Amendments specify emission standards of zero for equipment and do not specify a particular energy source or technology. The Proposed Amendments do not require ZEE to be electric.

In response to the statement, "Gas powered blowers have been outlawed for many years with no enforcement," and similar statements: CARB's SORE regulations do not prohibit the use of CARB-certified SORE. The commenters seem to imply that local municipalities have ordinances prohibiting the use of SORE leaf blowers. Any such ordinance is beyond the scope of this rulemaking.

In response to the comments related to attainment of NAAQS and greenhouse gas emissions, air quality impacts, and health effects from the use of SORE equipment: Air quality and health benefits of the Proposed Amendments are discussed in Chapters III and IV of the ISOR. Please refer to the Agency Responses in sections IV.A.2.2.2 and IV.A.2.2.3 for discussion of comments regarding greenhouse gas emissions, health impacts, and attainment of NAAQS.

Please refer to the Agency Responses in sections IV.A.2.1.3 and IV.A.2.2.1 for discussion of comments regarding the noise generated by SORE.

Please refer to the Agency Responses in sections IV.A.1.2 and IV.A.2.4.2 for discussion of comments regarding incentives for landscapers to purchase ZEE.

### A.2.1.2. Assess new taxes or surcharges on the sale of SORE and regulate how SORE are used

Comment: **Avoiding a Last-Minute Flurry of ICE Purchasing**
Die-hard fans of ICE SORE will be tempted to stock up on this prior to January 2024. Some may even stockpile ICEE for future use or surreptitious sales to others after the effective date of the ban. To minimize this, consider adding a rule that disincentivizes purchase of new and used SORE, effective starting in July. An environmental mitigation tax could be added to the cost of ICEE and that fee could be credited to purchase of ZEE. This would be revenue-neutral for the CA Treasury because the decline in sales tax revenue from ZEE would equal the increase in tax revenue for ICEE. Manufacturers that make ZEE typically make ICEE, so sales revenue decrease of ICEE would be offset by sales revenue increase of ZEE. (523-Docket)

**Issues for Future Sore Rulings**
Decreasing the inventory of SORE after 2023
In the case of the transition from ICE SORE to ZEE, a statewide program that recycles used ICE equipment for scrap metal and provides rebates on the purchase of ZEE, while imposing a surcharge on sales of used ICE, would retire ICE equipment more rapidly. This would diminish emissions more swiftly. Another revenue source to consider is GGRF funded by Cap & Trade. (523-Docket)

Vacuum Mode
Most leaf blowers have a vacuum mode. This gathers debris whereas in blow mode debris is re-aerosolized. The smallest-diameter blower-driven particles may stay aloft for weeks. So, if a yard has blow service weekly (and assuming that PM lingers over the yard), there is continuous contamination of air quality 24/7. In addition to stationary and SORE sources of PM, mobile sources contribute to PM levels in urban areas. ICE engine exhaust and brake and tire wear on all kinds of vehicles emit PM on a daily basis. After fires deposit PM in our yards, the volume of PM dispersed into the air by leaf blowers is elevated. (523-Docket)

Noise
Because higher decibel levels cause more pathology including hearing impairment, medical costs due to use of high-decibel SORE probably exceed the costs from use of quieter SORE. Thus, a surcharge should be imposed on the sale of SORE that have a peak-RPM volume exceeding 65 decibels. This would apply to new and used SORE including ZEE SORE. The surcharge would increase significantly with each higher ten-point range. This would decrease sales of higher-decibel SORE and would incentivize manufacturers to produce quieter designs. (523-Docket)

**Agency Response:**

These comments make recommendations for various new taxes or surcharges on the sale of SORE, suggest revenue sources, and discuss operational modes for leaf blowers. They are beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice. The scope of the Proposed Amendments described in the October 2021 45-Day Notice does not include assessing taxes or surcharges on the sale of SORE. The scope of the rulemaking focuses only on amendments to California's SORE regulations. The SORE regulations require new engines to be certified and labeled to meet emission standards and other requirements. Regarding the comment about leaf blowers having a vacuum mode, CARB regulates the engines, but does not regulate the use of equipment. The comments seem to refer to internal combustion engines (ICE) rather than the frozen beverage brand ICEE®, although the acronym "ICEE" is used in the comments. CARB made no change based on these comments.

Please refer to the Agency Responses in sections IV.A.2.1.3 and IV.A.2.2.1 for discussion of comments regarding the noise generated by SORE.

### A.2.1.3. Consider native plants, human-powered equipment, urban agriculture training, and regulation of noise pollution

Comment: I belong to the CLCA. Contrary to what most of my colleagues think, I wonder why the new law to outlaw gas-powered engines hasn't come sooner? Grass lawns are an extreme waste of water and the labor to maintain such is a total waste of manpower. I suggest replacing all grass lawns with native plants which are drought tolerant and sequester carbon better than grass could ever do. Native plants sequester carbon and keep it in the soil by encouraging mycorrhizal fungi to build out its structure made of carbon and keeping it in the soil, not in the air. Native plants are also food factories for pollinators and promote bio-diversity which is essential to the well-being of the soil food web for our planet. (62-Docket)

Comment: Since leaf blowers are not very essential, and they are adding to our pollution/ climate change problem, we need to change the fact that they are profusely used all over the country. We need an alternative to carbon emitting blowers, or just not have them. (190-Docket)

Comment: They pollute they are loud they serve ZERO purpose. Rake and compost!!! There is no such thing as "away". Pushing your junk on another's yard is not possible on a global scale. Why do we allow loud pollutants?!?? (207-Docket)

Comment: **Subject: Carbon Reduction...and financial solvency**
We owe it to the planet...get the CDCR expand fire camps to work camps...producing Ag starts and replanting fire burn ares and maintaining all manual labor that can be done locate the camps to areas with vast amounts of non sensitive large public projects that can utilize the labor instead of heavy machinery...move the camp along the corridor of work every twenty miles or so...this can be done for

piping projects or road and grid ...desalinization pipelines...small changes like leaf blowers (think they should use electrical chainsaw in fire service? - I think not, probably could not get an electric jaws of life for extrication and life saving instances where time is of the essence.....) and such seem to be more activity than accomplishment or busyness than business but hopefully with this conceptual frame of mind thinking we can upscale the utilization of more optimal resource balancing...Newsom has done a lousy job with many things in between...from Sanctuary state to budget...and soup to nuts...we do not need to raise the bridge we need to lower the river so to speak...lets think smarter not harder and discern wants from needs and work smarter not harder...for decades the state has balanced its budget by expanding college enrollment increasing tuition and relying on students to balance the budget by incurring student debt...nothing but robbing Peter to pay Paul and saddling future generations with debt load and irresponsible patterns of government spending...this all needs to be reined in... (282-Docket)

Comment: Please require all landscaping businesses to switch to electric leaf blowers or brooms and rakes. The pollution from gasoline leaf blowers and lawn mowers is awful. Additionally the noise pollution is disturbing and goes on all day long every day. Our air quality in Southern California is horrible and a danger to everybody's health from kids to the elderly. (432-Docket)

Comment: Leaf blowers are an abomination! These polluters are easily replaceable by honest, clean, human labor. (437-Docket)

Comment: 2 stroke engines need to be banned as part of our immediate response to stopping climate catastrophe. This also helps against noise pollution and by default to put more people to work for longer periods as leaf blowers are the lazy man's way to rake. (438-Docket)

Comment: I would like motorized leaf blowers completely banned in the future for certain areas, such as residential and commercial, to stop the increase of airborne particulates. The use of leaf blowers causes pollutants, including road metals and urban bacteria, to become airborne, resulting in health and ecosystem impacts. (470-Docket)

Comment: I also strongly urge CARB to support replacement of all fossil-fuel powered equipment with manual equipment. Programs offering subsidies for electrical replacements should also always include subsidies for human-powered equipment. (500-Docket)

Comment: Looking ahead to a radically different and more challenging future, we would be wise to reorient our landscape maintenance to be as useful as possible, rather than superficially attractive. More specifically, landscape maintenance workers should be offered retraining in urban agriculture: http://motherearthhome.blogspot.com/ (500-Docket)

Comment: I also urge CARB to seek the mandate and authority to regulate noise pollution, the orphan form of air pollution: https://www.newsreview.com/sacramento/content/dirt-blasters/1864716/ (500-Docket)

Comment: If we cannot even stop using leafblowers, especially the horrid ones with engines, we deserve to be toast. (500-Docket)

I urge CARB to approve these amended regulations, and in the future to support the development, manufacture and use of human-powered equipment as much as possible. Using human-powered equipment creates more jobs than equipment powered by engines or motors. (500-Docket)

Comment: **Manual Tools**
CARB should provide education on its website and in conjunction with "road shows" that demonstrate ZEE, re. minimization of use of power tools by increasing use of manual tools. Many landscapers report that manual tools are effective for many kinds of tasks that SORE mowers and blowers are used for. The lifecycle emissions from manual tools is significantly less than that of SORE. Landscaping crews, and other SORE operators, would benefit in many ways. Noise pollution from manual tools is far less than that of ZEE and other kinds of SORE. Laborers would also benefit from increased aerobic exercise. They would be compensated by their employer for exercising on the job, instead of setting aside after work time to work out in a fee-based gymnasium. Please consider establishing a program of incentives for trading in SORE in exchange for new manual tools. (523-Docket)

**Agency Response:**

These comments directly or indirectly request CARB to seek the authority to regulate noise pollution, to consider prohibiting the use of all leaf blowers (not just leaf blowers with small engines) or all two-stroke engines, to require the use of electric leaf blowers or brooms and rakes, to consider native plants instead of grass lawns, to offer retraining in urban agriculture for landscape maintenance workers, and to support the development, manufacture, and use of human-powered equipment, including through the use of inmate labor. These requests are beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice, and, therefore, CARB made no changes based on the comments. The scope of the Proposed Amendments also does not include providing incentives to use manual tools. CARB agrees manual tools are ZEE and can be used for many of the tasks for which SORE and other ZEE are used.

Regarding the comment "small changes like leaf blowers (think they should use electrical chainsaw in fire service? - I think not, probably could not get an electric jaws of life for extrication and life saving instances where time is of the essence.....)": As discussed in sections IV.A.33.1 and IV.A.2.5.1, CARB does not anticipate that the availability of suitable chainsaws for fuel mitigation and firefighting applications will be adversely affected by this rulemaking. In addition to the preemption of large chainsaws primarily used in firefighting and fire prevention efforts as discussed in the aforementioned sections, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision.

Please refer to the Agency Response in section IV.A.2.1.1 for discussion of comments regarding requiring ZEE before model year 2024.

Please refer to the Agency Response in section IV.A.2.2.1 for additional discussion of comments regarding the noise generated by SORE.

Please refer to the Agency Response in section IV.A.2.1.1 for additional discussion of comments regarding banning the use of SORE.

### A.2.1.4. Outlaw wood-burning fireplaces

Comment: AND OUTLAW WOOD BURNING FIREPLACES. My neighbor's wood-burning fireplace spews dirty smoke into my kitchen window to pollute and dirty MY home. There are BILLIONS of people on this planet now and wood-burning fireplaces have NO place in our world!! (338-Docket)

**Agency Response:**

This comment suggests that CARB undertake action to prohibit the use of wood-burning fireplaces. The comment's suggestion is beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comment. The scope of the rulemaking described in the October 2021 45-Day Notice does not include making changes to rules regarding wood-burning fireplaces. The SORE regulations do not contain provisions related to the use of wood-burning fireplaces. The current rulemaking focuses on reducing emissions from SORE.

### *A.2.2. Requests to not proceed with the rulemaking*

#### A.2.2.1. Opposition based on multiple points

Comment: The ban for gas powered machines would impact our operation a lot. Electric equipment is very loud too and it will take a lot longer to get a job done. We would have more complains from patients and visitors. The short last of charge means we have to buy a lot of very expensive batteries who run out quickly. More time to get a job done means to we need more people doing the same job in a certain amount of hours. The disposal of batteries is not resolved ether. No on the ban for batterie powered equipment! (472-Docket)

**Agency Response:**

This comment requests CARB not to move forward with the current rulemaking for a number of reasons. The Proposed Amendments would not require people to stop using their SORE equipment. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. Although ZEE create noise while in operation, ZEE generally create less noise than SORE. As described on page 82 of the ISOR, SORE equipment operation typically exposes users to sound above the threshold of 85 decibels (dB) set by the Occupational Health and Safety Administration (OSHA). OSHA requires employers to implement a hearing conservation program when employees may be exposed to noise above this threshold. In contrast, ZEE typically expose users to sound below the threshold of 85 dB. ZEE are typically quieter, which reduces noise at the worksite as well as in the community where the equipment is operating. The comment regarding battery disposal is discussed in the Agency Response in section IV.A.6.2. CARB made no changes based on these comments.

As described in the ISOR (sections I.B, I.D, and II), it is necessary for CARB to complete this rulemaking for several reasons. The current rulemaking is necessary to achieve SORE emission reductions expected under the Revised Proposed 2016 State Strategy for the State Implementation Plan (2016 State SIP Strategy), to meet the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible, and to meet the requirement of California Assembly Bill (AB)1346 (Chapter 753, Stats. of 2021) to adopt cost-effective and technologically feasible regulations by July 1, 2022, to prohibit engine exhaust and evaporative emissions from new small off-road engines. As described in the ISOR (sections II.A.1 and III.A.3), current SORE regulations will not achieve emission reductions expected under the 2016 State SIP Strategy. The predicted growth in ZEE sales will be insufficient to maximize the reduction of SORE

emissions without further regulation [CARB, 2020[9]]. SORE emissions are expected to increase as California's population grows and are forecast to be nearly twice those from light-duty passenger cars in 2031.

As described in ISOR section I.E, the level of performance, number of brands, and number of equipment options among ZEE for both residential and professional use have increased greatly and continue to do so today. Battery and electric motor technology has advanced rapidly in recent years, while costs have declined. For the most common types of SORE equipment, there are ZEE equivalents available in the market with similar or better performance characteristics and lifetime. As explained in ISOR sections I.E and II.A and in section II.A.1.e and II.A.2.d of this FSOR, the Proposed Amendments include a longer compliance timeframe for SORE equipment that do not yet have cost-effective equivalents—higher-power pressure washers typically used by professionals and portable generators—to comply with emission standards of zero. A delayed phase-in for generator engines and pressure washer engines with displacement 225 cc or larger would allow time for the zero-emission generator and pressure washer markets to further develop. Please refer to ISOR section I.E. and Agency Responses in sections IV.A.35.1 and IV.A.35.2 for additional discussion of the current technological feasibility of ZEE for other equipment types and why more time is not needed for them to comply with emission standards of zero.

The commenter does not provide evidence to support its statements, "it will take a lot longer to get a job done," and, "More time to get a job done means to we need more people doing the same job in a certain amount of hours." CARB does not have evidence to suggest that using ZEE will result in the need for additional labor to complete work or that individuals will need more time to complete jobs. The commenter does not provide evidence to support its statement, "We would have more complains [*sic*] from patients and visitors." CARB does not have substantial evidence to suggest that using ZEE will result in additional complaints.

In response to the statement, "The short last of charge means we have to buy a lot of very expensive batteries who run out quickly": The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[10]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. As described on page 17 of the ISOR, CARB assumed professional users will purchase sufficient batteries for a typical day of use and will recharge the batteries overnight when not operating equipment. As described on page 39 of Appendix I of the ISOR, professional-grade equipment costs in the economic analysis for the Proposed Amendments include enough batteries for ZEE to operate for the relevant portion of a full eight-hour workday with fully charged batteries at the start of the day. CARB agrees that upfront costs for ZEE for professional users under the Proposed Amendments will often be higher than those for current SORE equipment. Savings in ongoing costs can enable

[9] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[10] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

users to save money overall with ZEE. Users have flexibility in the capacity of batteries when making purchase decisions. Those who value longer runtime may choose to purchase higher-capacity batteries, including backpack batteries. Those who value lighter-weight equipment or prefer not to wear a backpack may choose to purchase lower-capacity batteries.

Health and Safety Code (HSC) section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards at the earliest practicable date. Allowing emissions to continue for SORE equipment that have feasible zero-emission options would fail to comply with requirements under Health and Safety Code section 43018. As provided in CARB's enabling statutory authority, "[t]he control and elimination of … air pollutants is of prime importance for the protection and preservation of the public health and well-being, and for the prevention of irritation to the senses, interference with visibility, and damage to vegetation and property." (HSC § 43000, subd. (b)). Emission reductions under the current rulemaking would result in significant health benefits for Californians, and the economic value of these benefits and other cost-savings from using ZEE would exceed the costs of implementing the Proposed Amendments. Health benefits include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease. Therefore, since public health benefits are one of the primary purposes of CARB's statutory mandate for adopting and implementing regulations, like the Proposed Amendments, discontinuing this rulemaking to accelerate the transition to ZEE would not be consistent with HSC section 43000, subsection (b). Please refer to ISOR Chapter IV for a detailed description of public health benefits and other benefits anticipated from the Proposed Amendments.

### A.2.2.2. Reduce forest fuels

Comment: It has become clear to me that the California air resources board will only allow you to pollute if you have a lot of money. I have made numerous air pollution complaints unto facilities I live down wind from. They continue to pollute on a daily basis. As a victim of ridiculous legislation that has forced me to sell perfectly good equipment and has drastically altered my way of life and my ability to make a living I can say that as a tax-paying member of society I am considering moving to another state where the legislation and cost of living doesn't put a strain on me and my family. Now there is legislation that has been and is further limiting my Recreation. Please be realistic and consider fuel reduction in the forest as a way to limit carbon emissions as an alternative to the drops in the bucket of emissions that this legislation attempts to halt. (7-Docket)

**Agency Response:**

This comment requests CARB to consider forest fuel reduction as a way to limit carbon emissions as an alternative to this rulemaking. This request is beyond the scope of the Proposed Amendments. The scope of the rulemaking described in the October 2021 45-Day Notice focuses only on amendments to California's SORE regulations. Also, while the Proposed Amendments would reduce greenhouse gas emissions, they are specifically designed to achieve the expected $NO_x$ and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20. Emissions of $NO_x$ and ROG from SORE contribute to three criteria air pollutants—ozone, PM, and $NO_2$—either directly ($NO_2$ and PM) or indirectly (ozone, $NO_2$, and PM). As described in Chapter I of the ISOR, all of these criteria air pollutants have adverse health effects. Health benefits of the Proposed

Amendments for California residents include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease. The Proposed Amendments are necessary to help protect the health and welfare of all California residents, including residents who live in urban areas and other regions that are not downwind of forests. Therefore, reducing forest fuels is not a viable alternative for the rulemaking. The Proposed Amendments are not in conflict with efforts to reduce forest fuels. As described in more detail in the Agency Responses in sections IV.A.2.5.1, IV.A.29.1.1, and IV.A.29.1.3, CARB does not anticipate that the Proposed Amendments will affect the availability of equipment used for forest fuel reduction, fire mitigation, and maintenance of defensible space. Consequently, CARB made no changes based on this comment. For additional explanation of the necessity for the current rulemaking, its benefits for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV.

In response to the statement, "As a victim of ridiculous legislation that has forced me to sell perfectly good equipment and has drastically altered my way of life and my ability to make a living I can say that as a tax-paying member of society I am considering moving to another state where the legislation and cost of living doesn't put a strain on me and my family": This statement is beyond the scope of this rulemaking. The commenter does not provide information suggesting this statement is related to the Proposed Amendments. The Proposed Amendments would not require anyone to sell or stop using SORE equipment.

Regarding the comment "Now there is legislation that has been and is further limiting my Recreation": The commenter did not provide any additional information to explain how the Proposed Amendments would limit the commenter's recreation. CARB made no changes based on this comment. Note, depending on the type of recreation, the commenter may experience minimal or no impacts from the Proposed Amendments for one or more reasons. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. People can continue to use and repair their SORE equipment, including equipment used for recreation, until the end of its life. The Proposed Amendments include a longer timeframe for portable generators to comply with emission standards of zero to help reduce impacts to those who use portable generators for back-up power and in recreational vehicles (RV). Please see the Agency Responses in sections IV.A.2.3 and IV.A.27 for discussion about portable generators. Vehicles that are used solely for competition and not operated on public highways are exempt from California emission standards; please refer to the Agency Response in section IV.A.2.5.4 for more information on this topic. While ZEE can have higher upfront purchasing costs than SORE equipment, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. Please refer to ISOR Appendix I SRIA sections B and C, for analyses of potential economic impacts and benefits for California residents under the Proposed Amendments.

Regarding the comment "drops in the bucket of emissions that this legislation attempts to halt": As described in detail in ISOR sections I.A and III, SORE emissions are still expected to grow as California's population continues to grow. Emissions of smog forming pollutants from SORE already exceed those from light-duty passenger vehicles and are forecast to be nearly twice those from light-duty passenger vehicles in 2031 under current regulations. Maximum emissions reductions must be achieved from SORE in order to avoid this increase in emissions and instead reduce SORE emissions to achieve 2016 State SIP Strategy expected emission

reductions necessary to attain the ozone NAAQS and protect public health and welfare. Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards for ozone and other criteria air pollutants at the earliest practicable date. Consequently, CARB made no changes based on this comment.

In response to the statement, "It has become clear to me that the California air resources board will only allow you to pollute if you have a lot of money. I have made numerous air pollution complaints unto facilities I live down wind from. They continue to pollute on a daily basis": These statements are beyond the scope of this rulemaking. The commenter does not provide evidence to support its statement regarding being able to pollute if one has a lot of money. The commenter implies it complained directly to facilities. It is likely the air quality agency with jurisdiction over stationary sources such as facilities near the commenter is the local air district. It may be helpful for the commenter to contact the local air district regarding its complaints.

### A.2.2.3. Grow more forests, reduce construction, reduce automobiles, provide incentives, and pursue a voluntary approach instead of a regulatory approach

Comment: We provide homes with multiple services with the use of gasoline hand held blowers and hard scape pressure washing tools. It's effective and efficient for business, and allows us to provide many homeowners and renters a great way to keep their home and neighborhoods clean. Removing (not making them for future persons/businesses) these efficient tools that will in all likelihood under-improve our state's smog emissions will very likely hurt small and medium businesses instead. Battery operated engines are not currently light enough, effective enough, repair-easy as the gas counterpart. The answer to affectively reducing and or removing bad emissions worldwide is for countries to grow more forests and reduce construction development (and the energy & equipment that is needed to build it), reduce automobiles by nation-advocating walking or biking distance local shopping, and for government to assist in providing finances for inventors and educators in the small engine industry to produce tools that are as efficient and effective or better than current ones; BUT we are not there yet! (22-Docket)

Comment: I oppose this due to the hardship this will put on many especially gardeners and those who can't afford to buy new products, this to me seems like another power grab to increase regulations. This need to be a choice. Not a forced mandated regulation. Instead why not offer incentives for those who would like to participate. (Form Letter E-Docket)

**Agency Response:**

These comments seem to suggest that CARB consider several alternatives to the current rulemaking for SORE: grow more forests, reduce construction, reduce automobiles, and offer incentives with a voluntary approach rather than new requirements. These alternatives are beyond the scope of the Proposed Amendments. The scope of the rulemaking described in the October 2021 45-Day Notice focuses only on amendments to California's SORE regulations. The Proposed Amendments are specifically designed to achieve the expected $NO_x$ and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20. As described in detail in ISOR sections I.A and III, SORE emissions are still expected to grow as California's population continues to grow. Emissions of smog-forming pollutants from SORE already exceed those from light-duty passenger cars and are

forecast to be nearly twice those from light-duty passenger cars in 2031 under current regulations. Maximum emission reductions must be achieved from SORE in order to avoid this increase in emissions and instead reduce SORE emissions to achieve 2016 State SIP Strategy expected emission reductions necessary to attain the ozone NAAQS and protect public health and welfare. The predicted growth in ZEE sales will be insufficient to maximize the reduction of SORE emissions without further regulation. Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards for ozone and other criteria air pollutants at the earliest practicable date. Therefore, the suggested alternatives are not viable alternatives for the current rulemaking. CARB made no changes based on these comments. For additional explanation of the necessity for this rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV.

Regarding the comments, "Removing … will very likely hurt small and medium businesses instead," and "the hardship this will put on many especially gardeners and those who can't afford to buy new products": The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. Gardeners and other people can continue to use and repair their current SORE equipment until the end of its life. A landscaping business would not need to purchase a full suite of ZEE at once, thereby avoiding a significant one-time cost to transition to ZEE. Rather, landscaping businesses can gradually purchase ZEE to replace SORE equipment as it breaks or for other business reasons, such as upgrading equipment. While CARB's economic analysis found that ZEE can have higher upfront purchasing costs than SORE equipment, it also found that many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. Please refer to ISOR Appendix I SRIA sections B and C, for analyses of potential economic impacts and benefits for California gardeners (landscapers) under the Proposed Amendments. As described in the next paragraph, incentive funding is available to help reduce the impact of the higher upfront costs of ZEE. CARB made no changes based on this comment. Please also refer to the Agency Response in section IV.A.13.1.1 for discussion of comments regarding potential loss of business or jobs.

Regarding the comments about incentives and "government to assist in providing finances for inventors and educators in the small engine industry to produce tools that are as efficient and effective or better than current ones": Several programs provide incentive funding for professional and residential users to purchase ZEE. These programs are an important complement to this rulemaking. While the scope of the rulemaking described in the October 2021 45-Day Notice does not include providing finances for inventors and educators or other incentives, $30 million in incentive funding for the transition to ZEE will be available through CARB's Clean Off-Road Equipment Voucher Incentive Project (CORE). The Board approved this inclusion at their November 2021 hearing. Details of how the SORE funding will be distributed will be determined through a public process. Please refer to ISOR section I.F for additional discussion of sources of incentive funding.

Regarding the comments "BUT we are not there yet!" and "Battery operated engines are not currently light enough, effective enough, repair-easy as the gas counterpart": As described in detail in ISOR section I.E, the level of performance, number of brands, and number of equipment options among ZEE have increased greatly and continue to do so today. Battery and electric motor technology has advanced rapidly in recent years, while costs have declined.

For the most common types of SORE equipment, there are ZEE equivalents available in the market with similar or better performance characteristics and lifetime. As explained in ISOR sections I.E and II.A and in sections II.A.1.e and II.A.2.d of this FSOR, the Proposed Amendments already include a longer compliance timeframe for SORE equipment that do not yet have cost-effective equivalents—pressure washers typically used by professionals and portable generators—to comply with emission standards of zero. Consequently, CARB made no changes based on this comment. Please refer to the Agency Responses in sections IV.A.35 and IV.A.2.5.5 for additional discussion of the current technological feasibility of ZEE for other equipment types and why more time is not needed for them to comply with emission standards of zero.

Regarding the specific comment about ZEE repairs, "Battery operated engines are not … repair-easy as the gas counterpart," the commenter does not provide information to support its statement. CARB does not have information to suggest maintenance or repair costs for ZEE are higher than those for SORE equipment or that ZEE are more difficult to repair than SORE equipment.

### A.2.2.4. Opposition due to economic impacts

Comment: The end of landscape development and maintenance. (60-Docket)

Comment: Our messed governor is trying to put us out of business by banning gas powered equipment. Unfortunate we were unable to recall him. Maybe he really got GBS from his covid booster shot. The Lord works in mysterious ways. Please recall the ban of gas powered equipment because it will cause an undue hardship on my and my business. (83-Docket)

Comment: This legislation, to ban gas powered small engines, is entirely misguided and will cause great economic turmoil to many small businesses and homeowners. Replacements for these tools are not well developed, they are expensive, and dependent on batteries that expire rapidly. (476-Docket)

Comment: This regulation needs to be scrapped due to its impracticality and high long-term economic burden. (485-Docket)

Comment: The proposed amendments will substantially increase costs for consumers and businesses, limit consumer choice, and have a catastrophic impact on the industries that rely on SORE-powered commercial equipment. (528-Docket)

**Agency Response:**

These comments express broad conclusions about the potential economic impacts of the Proposed Amendments on small businesses and consumers. The commenters do not provide any supporting evidence for their conclusions, and their conclusions are not supported by evidence described in the ISOR. Consequently, CARB made no changes based on the comments. Emission reductions under the current rulemaking would result in significant health benefits for Californians, as described in ISOR chapters III, IV, and VII, and the economic value of these benefits and other cost-savings from using ZEE would exceed the costs of implementing the Proposed Amendments. The Proposed Amendments are specifically designed to reduce emissions of pollutants that have multiple known adverse health effects and therefore protect the health and welfare of all California residents. Emissions of $NO_x$ and ROG from SORE contribute to three criteria air pollutants—ozone, PM, and $NO_2$—either directly ($NO_2$ and PM) or indirectly (ozone, $NO_2$, and PM). As described in Chapter I of the

ISOR, all of these criteria air pollutants have adverse health effects. Health benefits of the Proposed Amendments for California residents include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease. In addition, some users may experience savings when using ZEE. While ZEE can have higher upfront purchasing costs than SORE equipment, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. Also, as described in sections II.A.1.e and II.A.2.d of this FSOR, in response to other stakeholder comments about technological feasibility specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers used by professional cleaning services and maintenance companies to comply with emission standards of zero. These modifications are expected to reduce impacts to professional cleaning services and maintenance companies that would have occurred under the Proposed Amendments as they were defined in the ISOR. For additional explanation of the necessity for the current rulemaking, its benefits for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV. Please refer to sections II.A.7 and II.D in this document, and ISOR Appendix I SRIA sections B and C, for analyses of potential economic impacts and benefits for California residents and businesses under the Proposed Amendments. The estimated net benefits of the Proposed Amendments are $3.81 billion through 2043.

In response to comments claiming the Proposed Amendments would limit consumer choice: The Proposed Amendments would not require anyone to stop using SORE equipment and would not prohibit the sale of CARB-certified SORE. As described in ISOR section I.E, the level of performance, number of brands, and number of equipment options among ZEE for both residential and professional use have increased greatly and continue to do so today.

For additional discussion of comments regarding the impacts of the Proposed Amendments on landscapers, please refer to the Agency Response in section IV.A.2.4.2.

For discussion of comments regarding the feasibility, cost, and lifetime of ZEE, including batteries, please refer to the Agency Response in section IV.A.35.1.

### A.2.2.5. Disagreement with California/national strategy to address climate change

Comment: Should gas powered lawn equipment be banned. The short answer is no. These governments mandate trends are nothing more than the government creating its own new market and agenda on the backs of hardworking people across the country. The clear facts are we ban oil and gas production only to increase production from other parts of the world that don't even come close to the high environmental standards currently in use by the United States. Do let's have other countries that don't regard the environment produce oil and gas so we can feel better here in the muted states as if we have reduced the worlds carbon footprint. Another analogy is our countries distain for suppressing people and human rights yet we have shipped our manufacturing jobs to places like China that are one of the worlds leading countries in human rights abuse. But American politicians can smuggly talk about our progress. Ronald Reagan once spoke on appeasement and how it can only end in surrender or fighting. So I say stand up for your rights now. Don't fall for the lies. (53-Docket)

Comment: This communist/socialist proposal is bullshit. I can't even run a diesel truck that I paid good money for, for more than 1000 miles a year, with a new regulation. The California communists will

eventually put a 100% tax on our profits to pay for this eco bullshit that is not proven, and that is what they are essentially doing. Down with governor Grusome. Keep doing what you're doing and not only will we be taxed to death, but the prices to retool will be passed on to the consumer. (56-Docket)

Comment: I know that humans cannot change the climate; it has always changed without our influence. Computer models are bogus, because there is no way to predict heat from the sun, wind currents, and air pressure. Plants need carbon dioxide for survival. This potential ban is a very bad idea that won't do anything to "cool" the climate. Even if it does get warmer, why is the ideal temperature right now? (127-Docket)

Comment: The Climate Change Narrative Oversimplifies the Situation.
Let Residents Rebuild and Make Their Own Choices! "Mr. Biden's current promise—100% carbon emission reduction by 2050—will be even more phenomenally expensive. It breaks down to $11,300 per person per year, or almost 500 times more than what a majority of Americans is willing to pay." - Bjorn Lomborg, WSJ, October 14, 2021 (573-Email)

"If you don't agree with us, you are not only wrong but morally wanting, and as such should be not only denounced but destroyed." - Robert D. Kaplan, The Tyranny of the 21st-Century Crowd, WSJ, Oct 8, 2021 (573-Email)

Some people like to assign blame. It's in their nature. Other people, with specific agendas, like to find a villain to give such audiences easy targets to place blame. And other folks are simply perennial alarmists. Michael Shellenberg provides one example, "Climate alarmism has led many people to believe natural disasters are getting worse. They're not. In fact, they're getting better. Over the last century, deaths from natural disasters have declined by over 90%, while there has been no increase in the economic damage they cause ..." In our neck of the woods, Pacific Gas and Electric (PG&E), the utility supplying our homes with gas and electricity, is enemy number 1 on the most wanted list of corporate villains and a top target for climate alarmists. It's so easy to blame them for a myriad of sins, over the utility's decades of miscues, for which neither the politicians nor the regulators held them to account. (573-Email)

Renewable Proponents Paint the Target on PG&E Too
Many folks that are "all in" on the Green New Deal resolution[1] and aggressive on forcing "all electric" home building codes[2] to be enforced on a city by city basis, are finding their schemes very costly to bring to reality. This is not PG&E's fault. [Footnote 1: As reported in the New York Times in February 2019, "The Green New Deal is a congressional resolution that lays out a grand plan for tackling climate change. Introduced by Representative Alexandria Ocasio-Cortez of New York and Senator Edward J. Markey of Massachusetts, both Democrats, the proposal calls on the federal government to wean the United States from fossil fuels and curb planet-warming greenhouse gas emissions across the economy. It also aims to guarantee new high-paying jobs in clean energy industries. The resolution is nonbinding, so even if Congress approves it, nothing in the proposal would become law." This "deal" remains nebulous, even in House Resolution 332 introduced on April 20, 2021.] [Footnote 2: An all-electric home simply means the residence cannot be serviced by heating oil, natural gas, or propane. This reach code has created quite an outcry across Sonoma County. "Some builders objected to the speed of reach- code adoption process or the cost comparisons between gas-serviced homes and all-electric homes when Santa Rosa and Sonoma Clean Power officials presented the proposal at an industry roundtable in mid-September," according to the North Bay Business Journal, October 17, 2019. Since then, Windsor has repealed its natural gas ban, while others attempt to force compliance by denying this key element of resilience for residents of Sonoma County and beyond.] (573-Email)

Codes Too Costly for the 2020s

The financial burden to adopt such codes is excessive, especially on those trying to rebuild after the Tubbs (Oct 2017) and Kincade (Oct 2019) megafires. Most were under-insured and can't afford all of these new building code updates. We're talking tens of thousands of dollars added to new home construction and over $100,000 to retrofit a home to bring it up to the "all-electric" code by 2025. (or is it 2030? 2040? 2050?). Any policyholder fortunate to have "Code Upgrade" coverage in their homeowner's policy, soon finds this portion of their policy is quickly used up. The balance of code upgrades is paid "out of pocket" by the homeowner. (573-Email)

A Sonoma County Supervisor responded to my list of concerns about "all- electric" building codes, "You are right, these decisions may be expensive, and we are moving towards incentives, tax credits to defray the cost." In the Supervisor's reply, two villains - PG&E and the California Public Utilities Commission (CPUC) - were trotted out as potentially helping frustrated homebuyers and homeowners, "PG&E offers incentives on battery backups. And CPUC is now offering grants in the near future for battery backup systems, I think." All of a sudden, PG&E is the good Samaritan helping to make the "all-electric" implementation easier. (573-Email)

The CPUC is another reviled regulatory body that has shirked its duty to provide fairly priced and safely delivered gas and electricity to Californians. It too, according to our County supervisor, will be helping with subsidies (read, increased electric rates for all) to make the "all-electric" implementation easier. (573-Email)

So, these two anointed villains could become the heroes if individuals rebuilding their lives can find the time to beg for credits and subsidies to offset, for one example, the $50,000 needed for a mandated solar system and the associated optional solar battery backup. The idea is to eliminate natural gas, propane, and gasoline as a fuel and replace it with electricity for every appliance in and around every residential structure. Editorial cartoon courtesy WSJ (573-Email)

Natural Gas Ban Deferred, for Now

Voter ire is rising. Maybe that's why, at the County level, the decision to ban natural gas was deferred for 2020. Our District Supervisor wrote back to me, "The board of supervisors did not choose to enact Reach Codes this year. Biggest reason is that we do not develop much housing in the Unincorporated County area and our bigger issue is legacy houses." (573-Email)

Voters, who also own homes, do not want to see their gas appliances designated obsolete nor see their home values plummet. However, two cities within the county have banned natural gas on all new construction: Santa Rosa and Petaluma. The legal challenges continue as choice, resiliency, and security for homeowners come into play. It seems that the silent majority is responding. Poking a sleeping bear is not a good idea, especially when the villain becomes the politicos that are pushing a green agenda without any thought given to the impact of forgoing energy diversity and removing individual choice. One City of Petaluma council member doesn't believe in choice, dialog, or debate on these issues. Upon providing him information on the country and the state's carbon dioxide (CO2) reductions over the past decade, he wrote, "You are NUTS. Stop sending me your rants." (573-Email)

The hypocrisy can be frustrating and sometimes comical, especially when different green/environmental groups battle over how to green the world. Sometimes it's just BANANAS. As Peter Tarnawskyj of South Wales, N.Y. says,"...the acronym Nimby (not in my backyard) seems to have changed to Banana: Build absolutely nothing anywhere near anything." Indeed, breakaway green groups now want to ban solar farms and wind farms that utility operators manage in favor of putting all of the upfront costs onto individuals who must now, across California, install solar panels on their roofs and some residents, by local decree, must forgo using natural gas. Next up will be the

mandates for electric vehicles[4] and their required EV chargers ($$$), battery backup systems ($$$) to make up for the unavailability of rooftop solar for 78 percent of the time in Sonoma County, and the banning of gasoline for lawn mowers, weed whackers, leaf blowers and the like[5]. [Footnote 4: "Thanks to electric vehicles, utilities are already seeing the greatest amount of new load demand added to their portfolios in decades, and they'll continue to have requests to build out new transmission and distribution infrastructure to meet the growing electricity needs of EV charging." - Preparing Utilities for the EV Revolution with Kevin Hernandez, October 2021] [Footnote 5: Gavin Newsom signs law banning sale of new gas-powered leaf blowers, lawn mowers by 2024, Andrew Sheeler, October 10, 2021, Sacramento Bee: "Assembly Bill 1346 directs the California Air Resources Board to phase out the sale of small off-road engines by 2024 or as soon as feasible, whichever comes later. The new law also directs the board to identify and make available, where feasible, funding for commercial rebates to go toward the purchase of electric equipment." https://www.sacbee.com/news/politics-government/capitol-alert/article254416318.html] (573-Email)

This is not the way to go. It seems more than just an overreach when new building codes for an all-electric home are specified, yet the infrastructure can't support it and the up front costs and lifecycle costs don't add up.] "I think an all-electric society would be a good future to work toward, but for now the best thing we could do is work on getting all existing and future power lines underground. The amount of pollution put into the atmosphere during a fire season from fires caused by power lines probably would rival the amount saved by all-electric homes ... When we have a system that can safely deliver electricity from the source to communities and homes, then we can talk about increasing the use of electricity in the community." - Roy Sprague, Santa Rosa, November 20, 2019 (573-Email)

"Brazil benefits from abundant, year-round sunlight and, in the northeast region, nearly constant strong winds during the night, resulting in a supply of renewable energy that is more reliable than in many places. Still, the government wants to ensure Brazil has access to enough power that doesn't rely on volatile sources, and it is planning a major natural-gas power auction for later this year." - Paulo Trevisani & Jeffrey T. Lewis, WSJ, Oct 12, 2021 (573-Email)

"The upshot of such crowd coercion is widespread self-censorship: the cornerstone of all forms of totalitarianism." - Robert D. Kaplan, The Tyranny of the 21st-Century Crowd, WSJ, Oct 8, 2021 (573-Email)

**Agency Response:**

These comments request that CARB not proceed with the current rulemaking based on commenters' concerns about national, California, and regional policies related to climate change, oil and gas production, "all electric" home building codes, and other issues that are beyond the scope of the Proposed Amendments. Consequently, CARB made no changes based on these comments. The scope of the rulemaking described in the October 2021 45-Day Notice focuses only on amendments to CARB's SORE regulations. Also, while the Proposed Amendments would reduce greenhouse gas emissions and petroleum use, they are specifically designed to achieve the expected $NO_x$ and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20, and would reduce emissions of pollutants that have multiple known adverse health effects. Emissions of $NO_x$ and ROG from SORE contribute to three criteria air pollutants—ozone, PM, and $NO_2$—either directly ($NO_2$ and PM) or indirectly (ozone, $NO_2$, and PM). As described in Chapter I of the ISOR, all of these criteria air pollutants have adverse health effects. Health benefits of the Proposed Amendments for California residents include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma,

especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease. In addition, some users may experience savings when using ZEE. While ZEE can have higher upfront purchasing costs than SORE equipment, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. For additional explanation of the necessity for the current rulemaking, its benefits for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, and IV.

The comment, "…we ban oil and gas production only to increase production from other parts of the world…," seems to imply that the Proposed Amendments would not result in a net reduction in petroleum use. However, the Final Environmental Analysis for the 2016 State SIP Strategy (Final EA, provided in ISOR Appendix H) concluded that implementation of the 2016 State SIP Strategy measures, including measures to reduce SORE emissions and increase use of ZEE, "would effectively shift the use of petroleum-based fuels (i.e., gasoline and diesel) to battery-electric, hydrogen and natural gas". In addition, the Proposed Amendments would not increase in petroleum usage indirectly because SORE equipment would not be required to be replaced any sooner under the Proposed Amendments than it would otherwise. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. People can continue to use and repair their SORE equipment until the end of its life (e.g., until the SORE equipment breaks or people decide to upgrade equipment).

For discussion of comments regarding the feasibility, cost, and lifetime of ZEE, including batteries, please refer to the Agency Response in section IV.A.35.1.

### A.2.2.6. Alternate use for California's greener electricity that would power ZEE under the Proposed Amendments

Comment: My limited research shows that gas engines produce between .52 and .59 pounds of carbon dioxide/KWH of energy. Looking at the site that shows CA emissions for power (which is an awesome tool and site), shows numbers ranging from .16 to .34 pounds of CO2/KWH. So I can see that there is a savings that might average to about a savings of about .32 pounds of CO2/KWH. That as an awesome savings. But the national average for power generator is .92 pounds of CO2/KWH. Clearly California is leading in Green House admissions. However, right now it seems that each small engine that is replaced in CA with electric would produce MORE CO2, as CA could provide that greener power supply to the rest of the country. Think of it, if you can eliminate .92 pounds of CO2/KW, or even more as that is a weighted number at it includes California Power. Has the comparison of .59 pounds CO2/KWH for SORE been compared with the much higher environmental cost of .92 pounds of CO2/KWH from power generation? (13-Docket)

Comment: The research shows that gas engines produce between .52 and .59 pounds of carbon dioxide/KWH of energy. Base upon the site that shows CA emissions for power shows numbers ranging from .16 to .34 pounds of CO2/KWH. So I can see that there is a savings which could average to about a savings of about .32 pounds of CO2/KWH. This would be an incredible savings, based on the national average for electrical power generation is .92 pounds of CO2/KWH. Clearly California is leading in Green House emissions. However, right now it seems that each small engine that would be replaced in CA with electric would produce MORE CO2, as CA could provide that greener power supply to the rest of the country. Think of it, if you can eliminate .92 pounds of CO2/KW, or even more as that is a weighted number as it includes California Power. Has the comparison of .59 pounds

CO2/KWH for SORE been compared with the much higher environmental cost of .92 pounds of CO2/KWH from power generation? (14-Docket)

**Agency Response:**

These comments include discussions of greenhouse gas emissions from SORE and electrical power generation and seem to suggest that CARB consider an alternative to the Proposed Amendments: Provide greener energy to the rest of the country to reduce the national average carbon dioxide emissions instead of requiring SORE equipment to reduce emissions in California. This alternative would not achieve a key purpose of the rulemaking: Reduce ROG and $NO_x$ emissions in California in order to improve air quality in California communities where ambient air quality standards for ozone are being exceeded. In addition, greenhouse gas emissions from electrical power generation and the commenters' questions are beyond the scope of this rulemaking. Therefore, CARB made no changes based on the comment. Emission reduction benefits from the Proposed Amendments, including reductions of greenhouse gas emissions, are discussed on pages 62-67 of the ISOR.

### *A.2.3. Requests for alternatives for portable generators*

#### A.2.3.1. Requests for alternative emission standards and/or exemptions for marine generators

Comment: Westerbeke Corporation appreciates the opportunity to comment on the California Air Resources Board's (CARB's) Proposed Amendments to the Off-Road Engine Regulations: Transition to Zero Emissions. Westerbeke Corporation is an 84-year-old, family-owned manufacturer located in Massachusetts with 60 employees. For over 80 years, Westerbeke has been offering durable and reliable power solutions to meet the challenges of commercial and recreational marine applications. We manufacture gasoline and diesel fueled generators, diesel propulsion engines, climate control systems and specialized sound enclosures. Since July 2018, Westerbeke is the only manufacturer/supplier of SORE Gasoline Marine Generators in the US. Westerbeke prides ourselves on being among the cleanest and safest possible solutions for the Gasoline Marine Generator market. Westerbeke has taken it upon ourselves to push the technological boundaries for Gasoline Marine Generators for over 15 years now, producing generators over that time that had emission levels far, far below the requirements. Carbon monoxide (CO) emissions are of particular concern to the marine industry because of the risk of CO poisoning in the marine environment. Westerbeke brought the first low-CO gasoline generators to the market. As a result of the potential reduction of CO-related fatalities, in 2004 Westerbeke was awarded the NMMA Innovation Award for our Low-CO Gas Generators. (488-Docket)

With all our experience, Westerbeke is intimately familiar with what is technologically feasible and cost-effective with regards to the emissions control of Gasoline Marine Generators. The technology simply does not exist to replace a Gasoline Marine Generator with any currently available Zero Emissions Equipment (ZEE). EO N-79-20, section 1 states, "It shall be further a goal of the State to transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible." Section 2 states "In implementing this Paragraph, the State Air Resources Board shall act consistently with technological feasibility and cost-effectiveness." The EO clearly and specifically accommodates off-road equipment like generators that do not have a technologically feasible replacement and allows sufficient time for the potential development of technology that does not yet exist within the framework of the EO's stated goals and 2035 timeline. (488-Docket)

There are no suitable replacements available, or even realistically projected to be available in the next 10 years that would be a feasible and cost-effective ZEE replacement for a Gasoline Generator. In the event of a power outage (whether unplanned power outage or PSPS) it is essential to have access to electrical power. Operating lifesaving home medical equipment and having heat and/or air conditioning are not mere conveniences, they are lifesaving necessities to vulnerable populations. Having the ability to refrigerate food, cook food, have running water, have lights for safety are all necessities, not luxuries. This is even more true in the case of Gasoline Marine Generators. When a boat is underway, or out at anchor, there is no access to shore power, often for extended periods of time. (488-Docket)

The extremely high power density requirements make even the best ZEE option currently available completely useless for replacing a Gasoline Marine Generator, or really any Gasoline Generator. Consider the case of replacing even the smallest Gasoline Marine Generator currently on the market with a ZEE battery-inverter system. Even the tiny output of 3.5 kW operating for just 2 days with a battery powered inverter would require almost 8 tons worth of batteries alone at a cost of almost $100,000. What happens when replacing a much bigger 7.5 kW, 10 kW or even a 15 kW generator, all of which fall under SORE regulations? $428,000 and 32 tons worth of batteries? No reasonable person would consider that either technologically feasible or cost-effective. And keep in mind that will only cover a 2-day outage. (488-Docket)

The general idea of replacing power from the grid by using a device that relies on the grid to recharge is fundamentally flawed logic. Using solar panels to recharge batteries during a storm or outage is highly unreliable and even in the best conditions is much too slow to keep up with the demand. There is no ZEE option available to replace generators, either now or in the foreseeable future. Until such a time as a suitable, cost- effective solution is actually commercially available, Gasoline Generators should be allowed to continue to be available in the marketplace. (488-Docket)

Dramatically lowering the emissions standards, while simultaneously increasing the durability hours, and then further restricting CO emissions for Marine Gasoline Generators is not acting "consistently with technological feasibility and cost effectiveness" as N-79-20 requires. There is a fundamental balance in gasoline engine emissions between $NO_x$ production and CO production. As CO production is reduced (running the engine leaner) $NO_x$ production is increased. As $NO_x$ is reduced (running the engine richer) CO production is increased. While Westerbeke appreciates and supports the long-term goal of reducing $NO_x$ in California, we strive to not do so at the expense of elevated CO levels when CO poisoning is IMMEDIATELY dangerous to life and health. The EPA and CARB regulations both recognize this chemical balance in the rulemaking. (488-Docket)

In the EPA's regulation 40 CFR 1048.101(a)(3) for example, the EPA offers a formula that describes the technical relationship between HC+ $NO_x$ and CO when considering alternate emission standards. In this example, the standard is 2.7 g/kW-hr for HC+ $NO_x$ and 4.4 g/kW-hr for CO. Application of the formula to favor a lower $NO_x$ standard necessarily results in an elevated CO standard. The extreme case for $NO_x$ reduction is 0.8 g/kW-hr for HC+ $NO_x$, which when applying the formula results in a standard of 20.6 g/kW-hr for CO. These are clearly the same standards that CARB uses in the 2024-2027 generator exhaust emission standard for engines >825cc. However, in the proposed CARB regulations, because of the danger of CO in the marine environment, Gasoline Marine Generators are additionally capped to 4.5 g/kW-hr of CO. This is done without consideration of the governing formula which shows that an increase in the $NO_x$ standard is necessary to maintain the balance with the additionally lowered CO standard. (488-Docket)

While Westerbeke understands and supports the goal of lowering $NO_x$ emissions levels for all generators, Gasoline Marine Generators are being uniquely and unfairly penalized with the unilateral

capping of CO to 4.5 g/kW-hr without the corresponding and required increase to $NO_x$. This contradicts the physics inherent to the function of a gasoline powered engine's emission control system. (488-Docket)

Arbitrarily increasing the durability period standard to 1000 hours for engines larger than 225cc without regard to the engine's actual in-use life effectively further reduces the emissions standard that has already been dramatically reduced. The reduction in the basic emissions standards alone while maintaining durability is nearly unattainable. Halving or quartering that already barely attainable standard by doubling or quadrupling the durability period makes it technologically unfeasible. (488-Docket)

Currently in California, stationary Gasoline Generators with engine power <19kW are not regulated beyond EPA regulations. Gasoline Marine Generators are operated similarly to these home standby generators. Boats preferably operate on shore power except when reliable shore power is not available, then the generators are used to provide secondary power to the vessel. SORE Gasoline Marine generators represent a miniscule fraction at approximately 0.12% of the total US Portable Generator Market. Westerbeke's direct SORE Gasoline Marine Generator shipments into CA represent less than 0.07% of the total US Portable Generator Market. Given this de minimus percentage of Gasoline Marine Generators in California, we respectfully request that SORE Gasoline Marine Generators be separated from other generators and be allowed to maintain the current emissions standards of 8.0 g/kW-hr HC+ $NO_x$ and 4.5 g/kW-hr CO, and maintain Westerbeke's current durability period as is. (488-Docket)

Given all of the factors above, Westerbeke respectfully requests that for the period of 2024-2027 and beyond, SORE Gasoline Marine Generators be separated from other SORE engines and SORE generators and be allowed to continue with the current emissions standards and durability periods until such a time as the emissions control technologies demonstrate that a lower standard is technologically feasible and cost- effective for a marine generator and/or until a practical ZEE solution to effectively and cost-effectively replace a Gasoline Marine Generator application is readily available in the marketplace. Generators as a whole, and marine generators specifically, have no technologically feasible and cost-effective alternatives, period. Banning generators without any suitable alternatives would be irresponsible governance. In the case of land-based generators, it would be putting the citizens of California at substantial risk of harm during California's frequent power outages. In the even more specialized case of Gasoline Marine generators, it would render the boats requiring anything more than minimum levels of electrical power essentially unusable. (488-Docket)

Westerbeke respectfully requests that Gasoline Marine Generators be exempted from ZEE transition regulations and be allowed to continue to be sold in California at the emission levels and durability period as currently regulated by the EPA. We further request that Gasoline Marine Generators should be allowed to be sold in California until such a time as a practical ZEE solution to replace a Gasoline Marine Generator is readily available in the marketplace. (488-Docket)

Comment: The National Marine Manufacturers Association (NMMA) appreciates the opportunity to comment on the California Air Resource Board's (CARB's) Proposed Amendments to the Off-Road Engine Regulations: Transition to Zero Emissions. NMMA is the trade association for the U.S. recreational boating industry, representing nearly 1,300 marine businesses, including recreational boat, marine engine, and accessory manufacturers. Our members are often U.S.-based small businesses, many of which are family owned. NMMA members collectively manufacture more than 85 percent of the marine products sold in the U.S. Furthermore, the recreational boating industry has a $170 billion impact on the nation's economy and in communities across the country, with nearly

700,000 American jobs across 35,000 U.S.-based marine businesses. In addition to the NMMA comments, NMMA supports the comments submitted by Westerbeke Corporation a US based manufacturer of gasoline marine generators. (507-Docket)

NMMA has worked closely with the staff at the Air Resources Board for close to 30 years to deliver clean recreational marine technology for California boaters. Everything from evaporative emissions to new technology outboard, sterndrive and inboard and personal watercraft engines that are cleaner, quieter and more fuel efficient, NMMA is proud of what we have accomplished working closely with ARB staff. NMMA members have always been able to achieve stringent clean air standards while continuing to supply California boaters with safe and affordable products. (507-Docket)

Unfortunately, the staff proposal before your board to eliminate gasoline powered marine generators is not achievable and more time is needed to determine if a feasible solution will ever exist. Marine generators are critical components in recreational boats that provide the energy necessary to keep the batteries charged to support bilge pumps, carbon monoxide and smoke alarms, ship to shore radio, sea keepers that provide stabilization, electric bow thrusters and other marine equipment necessary to insure the safe operation of a vessel. NMMA has discussed these safety and operational concerns with ARB staff and technical data has been provided supporting the need for more time to determine if a feasible solution can be developed. Directing staff to achieve a zero- emission goal for political reasons and ignoring feasibility is irresponsible. As detailed in the NMMA comments to follow, the board has both the opportunity and responsibility to consider the facts and decide on a sensible path forward that achieves the governor's goals while protecting California boaters. The technology simply does not exist to replace a Gasoline Marine Generator with any currently available Zero Emissions Equipment (ZEE). (507-Docket)

Comment: The extremely high-power density requirements make even the best ZEE option currently available completely useless for replacing a Gasoline Marine Generator, or really any Gasoline Generator. Consider the case of replacing even the smallest Gasoline Marine Generator currently on the market with a ZEE battery-inverter system. Even the tiny output of 3.5 kW operating for just 2 days with a battery powered inverter would require almost 8 tons worth of batteries alone at a cost of almost $100,000. What happens when replacing a much bigger 7.5 kW, 10 kW or even a 15 kW generator, all of which fall under SORE regulations. The data that NMMA has reviewed estimates the cost at $428,000 requiring 32-tons worth of batteries. No reasonable person would consider that either technologically feasible or cost-effective, nor would the boat float. Furthermore, all these batteries would only cover the boats energy requirements for two days. (507-Docket)

The general idea of replacing power from the grid by using a device that relies on the grid to recharge is fundamentally flawed logic. Using solar panels to recharge batteries during a storm or outage is highly unreliable and even in the best conditions is much too slow to keep up with the demand. There is no ZEE option available to replace gasoline marine generators, either now or in the foreseeable future. (507-Docket)

Until such time as a technically feasible, cost-effective solution is commercially available, NMMA strongly urges that for the period of 2024-2027 and beyond, SORE Gasoline Marine Generators be separated from other SORE engines and SORE generators and be allowed to continue with the current emissions standards and durability periods. (507-Docket) (507-Docket)

Gasoline Generators should be allowed to continue to be available in the marketplace. Failure to allow remote alternative power that can be used when direct power is not available, such as on water or in remote locations will jeopardize the benefits of the entire SORE rule. (507-Docket)

For generators as a whole, and marine generators specifically, there are currently no technologically feasible and cost-effective alternatives. Banning marine generators without any suitable alternatives would be irresponsible governance. In the case of land- based generators, it would be putting the citizens of California at substantial risk of harm during California's frequent power outages. In the even more specialized case of Gasoline Marine generators, it would render the boats requiring anything more than minimum levels of electrical power essentially unusable. Nowhere in this proposal has ARB staff considered replacement marine generators. If a marine generator fails on a recreational boat and the generator cannot be replaced the entire vessel becomes unusable. For example, the marine generator on a two year old open bow fishing boat throws a piston rod through the wall of the engine block and the vessel becomes unusable. (507-Docket)

NMMA strongly urges the board to allow Gasoline Marine Generators be exempted from ZEE transition regulations and be allowed to continue to be sold in California at the emission levels and durability period as currently regulated by the EPA. We further request that Gasoline Marine Generators should be allowed to be sold in California until such a time as a practical ZEE solution to replace a Gasoline Marine Generator is readily available in the marketplace. NMMA supports ARB's efforts to reduce the state's carbon footprint and we want to work with board and staff to achieve these goals. What we fear is the banning of energy sources that are critical to maintaining power on water and in remote locations. (507-Docket)

Comment: My name is Glenn Amber and I am the Director of Engineering for Westerbeke Corporation. I had a conference call with you back in April during which I presented some compelling information demonstrating that technologically feasible and cost effective ZEE alternatives to gasoline generators simply do not exist in the marketplace. And there are no indications that they will be available in the in the foreseeable future. Now that the proposed rulemaking has gotten closer to finalization, it is obvious that technological feasibility and cost have continued to have been ignored with regard to generators and other high-power demand equipment. If even possible at all, the emissions restrictions applied to Gasoline Generators as a whole will be very, very difficult to achieve, especially in just a 2-year window with a maximum of 3-year sales window after that to try to recover even a small portion of that investment. The additional restrictions applied only to Gasoline Marine Generators above and beyond the requirements for other Generators are simply not feasible to achieve. (598-Email)

Comment: My name is John McKnight and thank you for the opportunity to testify on behalf of the National Marine Manufacturers Association. I urge the Board not to approve the staff recommendation to ban permanent stationary marine generators and direct staff to spend more time on this section of the proposal. The reasoning is simple, there are recreational boats where batteries and inverters can equip to run electrical systems necessary to operate a boat safely. Boat builders are not only investigating, most of the boats that are sold in California do not have generators. But there are also recreational boats just like you've heard from the RVs due to their size and application that require a lot more electrical equipment. A recreational boat, just like an RV, can have air conditioning, ice makers, television, stereo, electric toilets, Seakeepers for stability, bilge pumps for safety, carbon monoxide detectors, smoke detectors, the list goes on. None of them work, unless you have electricity. Think of the energy equivalent to operate your home and cut the wire coming in from the utility pole. (3011-Oral Testimony)

To put it in perspective, even if we were to take a simple 3.5 kW gasoline generator and replace it with batteries, we'd need 101 large-sized batteries. We're figuring eight tons in batteries and $97,000 in cost. Here's the most important part though. The most significant issue is that staff has not considered in this proposal a replacement for a marine generator. If somebody in the room here buys a boat today with a marine generator, in 2029, and that generator fails, the proposal that's out there

right now would require the person to scrap the boat. There's nothing in there. The generator is integral to the boat. You can't just go in and put a battery there and replace it. You need -- without a generator, the boat is rendered useless. So what we do -- we urge the Board to direct staff to go back and take a look at these stationary generators that are permanent to vehicles and vessels. And we'll work with them to come back with a proposal that takes all this into account. Thank -- thank you for your time. (3011-Oral Testimony)

Comment: My name is Glenn Amber. I'm the Director of Engineering for Westerbeke Corporation. Since 2018, Westerbeke is the only U.S. manufacturer of SORE gasoline marine generators. Westerbeke believes that gasoline marine generators should be exempted from the SORE ZEE transition at this time. Like RVs, marine generators are stationary generators. They are not portable. They're permanently bolted into the vessel and meet all the other criteria defining a stationary generator. They should be regulated as stationary generators and therefore be preempted from the SORE ZEE transition. Marine generators are technically advanced compared to other SORE engines and generators. There are special EPA restrictions in place on carbon monoxide emissions to prevent CO poisoning on boats. To meet these restrictions, marine generators are already calibrated for the lowest possible CO emissions while still considering the HC plus $NO_x$ balance necessary to meet the SORE regulations. Westerbeke has been developing and manufacturing these type of generators for almost 20 years now. While the staff and other consultants can speculate what they think might be feasible, we have conclusively demonstrated what is feasible in a production environment. Since marine generators are already uniquely and separately regulated by the EPA and CARB for low CO emissions, we believe they should be dissociated from other SORE engines and should be given technologically feasible standards. Taking the proposed 2024 to 2027 SORE standards and then applying a marine only additional cap on CO is capricious and technically unfeasible to attain. (3017-Oral Testimony)

In conclusion, marine generators have no technologically feasible and cost effective alternatives period. In the very specialized case of gasoline marine generators, it would render the boats unsafe and unusable. Please don't be fooled. ZEE alternatives are not even remotely adequate replacements for SORE generators. Westerbeke respectfully requests that marine generators be exempted or preempted from the SORE ZEE transition until such a time as a practical ZEE solution to replace the gasoline marine generator is actually available in the marketplace. (3017-Oral Testimony)

Comment: And I'd ask you to please do some more questioning about generators. As we've seen from the RV, marine generators are an essential part of our life, and I would appreciate -- please ask that you do a little bit more investigation dealing with generators themselves. (3047-Oral Testimony)

**Agency Response:**

These comments suggest or imply an alternative to the Proposed Amendments that would not include more stringent emission standards or changes to emissions durability periods for marine generator engines. Commenters also include introductory remarks that describe the commenters' organizations. Some of the comments refer to the commenters' assumptions and calculations regarding the cost of ZEE. CARB made no changes in response to these comments. The following response provides clarification and context for several points within the above comments. For an explanation of the necessity for the current rulemaking and why CARB cannot discontinue the rulemaking or exempt some engines, such as marine generators, from the proposed emission standards or emissions durability periods, please refer to the Agency Response in section IV.A.2.2.1. The Proposed Amendments allow more time for generators to meet emission standards of zero to allow the zero-emission generator market to develop further, as discussed in Chapter I.E.3.b. In response to the requests to retain the

current emissions durability periods for marine generator engines: Page 41 in the ISOR includes this text: "Westerbeke's 9.9E, J3 and J4 generators are each certified to an emissions durability period of 250 hours, but their website says, "It is not uncommon to hear that generator sets and engines have run up to 10,000 hours with no major repairs." [Westerbeke, 2016[11]]. This discrepancy means some SORE may be emitting at levels above the emission standards for a large portion of their use time."

In response to comments regarding technological feasibility and cost effectiveness of the MY 2024-2027 emission standards for marine generators and of zero-emission marine generators: Commenters state their opinions regarding the use of marine generators, the current state of technology for zero-emission generators, and the technological feasibility of emission standards of zero for marine generators but do not provide evidence that marine generators cannot meet the MY 2024-2027 emission standards or that zero-emission generators cannot be used in marine applications. As described on page 165 of the ISOR, "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[12]] lists ten MY 2020 engine families with HC + $NO_x$ certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-2 of the ISOR. Whether or not manufacturers installed engines from those engine families in MY 2020 generators, they might choose to install them in generators in the future. Also, Westerbeke's marine generators meet the proposed CO emission standards. Manufacturers may use emission reduction credits to offset emissions from engines with emissions greater than the proposed MY 2024-2027 generator emission standards. Under the Proposed Amendments, section 2766, subsection (c), is revised to read as follows:

> "(c) Equipment Fueled by a Vehicle Fuel Tank – Generators that are fueled from the fuel tank of an on-road motor vehicle or marine vessel are exempt from the diurnal emission, hot soak plus diurnal emission, fuel tank permeation, and carbon canister design standards in section 2754. However, these generators must use fuel lines that meet the design standard specified in section 2754."

The Proposed Amendments provide more time for generators to meet emission standards of zero to allow the zero-emission generator market to develop further. The upfront cost of zero-emission generators is often significantly higher than the upfront cost of a comparable SORE generator. The Proposed Amendments do not require anyone to stop using a SORE generator in a home or marine environment. As discussed on page 24 of the ISOR, a zero-emission generator can be used to power a refrigerator for several days. The technological feasibility of the Proposed Amendments is discussed in Chapter I.E of the ISOR and in the Agency Responses in section IV.A.35 of this FSOR. The cost-effectiveness of the Proposed Amendments is discussed in Chapter VII of the ISOR and in the Agency Responses in sections IV.A.13 and IV.A.35 of this FSOR.

In response to comments regarding the proposed carbon monoxide (CO) emission standards for marine generator engines: These proposed emission standards are consistent with the CO

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[11] Westerbeke. 2016. Frequently Asked Questions - Products. Available at: https://www.westerbeke.com/faq-product.htm. Last accessed May 5, 2021.

[12] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

emission standards set by U.S. EPA for marine generators tested with California test fuel, as discussed on page 146 of the ISOR. These CO emission standards are intended to prevent injury or death from CO poisoning.

In response to comments that suggest marine generators powered by SORE be treated as stationary generators: These requests are beyond the scope of the Proposed Amendments. The scope of the rulemaking described in the October 2021 45-Day Notice does not include making changes that would result in SORE marine generators, such as those certified by Westerbeke, no longer being subject to the SORE regulations.

In response to comments regarding the compliance of marine generator engines with the proposed HC + $NO_x$ emission standards: Emissions from a marine generator engine that does not meet the proposed emission standards may be offset with emission reduction credits to certify the engine. The Proposed Amendments allow for the use of emission controls, such as three-way catalysts, to reduce HC, $NO_x$ and CO to acceptable levels and meet the respective emission standards and safety requirements for each pollutant.

In response to comments regarding the continued sale, use, or repair of marine generator engines: The Proposed Amendments do not require anyone to stop using their marine generators, do not preclude repair of marine generator engines, and do not prohibit the sale of CARB-certified marine generators at any date. Marine generator owners who do not use zero-emission generators may purchase, use and repair CARB-certified marine generators. Manufacturers may use emission reduction credits to certify marine generators as late as MY 2032.

These comments express the commenters' concerns that the emissions durability period of 1,000 hours of operation, specified for generator engines with displacement greater than or equal to 225 cc, is infeasible and inappropriate and implying or suggesting a change to the rulemaking specifying a shorter emissions durability period for these engines. CARB made no changes in response to these comments.

Under current regulations, manufacturers already have the option to certify to a durability period of 1,000 hours or more for this category of engines, which may be advantageous to the manufacturer for credit-generation purposes, and a number of generator engines are certified to this optional durability period and to FELs consistent with the proposed standards. CARB therefore disagrees that meeting these requirements is infeasible. Additionally, the fundamental purpose of the durability requirements is to ensure that engines meet the standards throughout their actual operating life. The survey conducted by California State University Fullerton [CSUF SSRC, 2019[13]] established that SORE usage rates and operating lifetimes vary but that 1,000 hours is not atypical, as discussed in detail on pages 40-42 of the ISOR. As such, the proposed durability period is both feasible and appropriate, and no change is in order.

In response to statements regarding power or energy density requirements for generators: These statements include commenters' opinions. The commenters do not provide evidence to support their claims and conclusions. For example, while the power or energy density of

[13] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

batteries for zero-emission generators may differ from the power or energy density of fuels for SORE, commenters don't provide evidence that a difference in power or energy density precludes the use of zero-emission generators for similar tasks to those for which SORE generators are used. The extra time for generators to meet emission standards of zero under the Proposed Amendments will allow the zero-emission generator market to develop further.

Please refer to the other Agency Responses in this section IV.A.2.3 for discussion of the comments that request exemptions and/or alternative emission standards for marine and other portable generators, and section IV.A.27 for discussion of the comments about the uses of portable generators.

### A.2.3.2. Delay compliance dates for RV generators

Comment: The RV Industry Association (RVIA) appreciates this additional opportunity to provide written comments on the California Air Resources Board (CARB) staff proposal to amend the regulations pertaining to small off- road engines (SORE). RVIA is a national trade association representing the manufacturers and their component suppliers of America's family camping vehicles, including motorhomes, travel trailers, fifth-wheel trailers, truck campers and park models, collectively referred to as Recreation Vehicles or RVs. RVIA is a unifying force for safety and professionalism within the RV industry, works with government agencies to protect and promote the interests of RV businesses and camping consumers, serves as a clearinghouse for industry information and works with the media to educate the public about the benefits of RVing. (531-Docket)

**Background**
RVIA has followed this rulemaking since its inception. Over the course of the past fifteen months, RVIA has interacted with CARB staff on multiple occasions, yet there was absolutely no mention of our concerns or products in the ISOR, SRIA or any other rulemaking documents made available to date by staff. On August 31, 2020, RVIA submitted nine pages of written comments to rulemaking staff discussing our many concerns about the feasibility and cost-effectiveness of Staff's zero emission equipment (ZEE) standards, if applied to fixed mount stationary RV generators. RVIA's Aug. 31, 2020, comments addressed the following topics:

- Background on RVs and RV Generator Fitment
- RV Registration in CA 2016-2019, by type
- RV Generator Fitment by RV Type
- RV Generator Facts
- RV and RV Generator Use
- Alternatives to Traditional Generators
- CARB's Proposed SORE Regulation Upgrade

A copy of RVIA's Aug. 31, 2020, comments is included with our written comments (see Appendix A). (531-Docket)

RVIA supplemented its written comments with a presentation entitled, "High Energy Density Auxiliary Power Systems for Recreational Vehicles" (attached as Appendix B). This presentation was given to CARB Staff virtually on May 10, 2021. Slide 27 of the presentation asked that CARB defer subjecting fixed mount RV SORES to the zero-emission requirements until there exists sufficient evidence that

zero emission technology will be capable of accommodating the unusually large and long-duration power demands of RVs in a cost-effective manner. (531-Docket)

Most recently, RVIA met virtually with CARB staff on November 17, 2021, to discuss the RV industry's concerns with the formal proposal that was released in October of 2021. We noted in that meeting, that despite efforts to make our concerns known in advance of the proposed regulation being released for public comment, it seems that our comments and concerns had been overlooked in the drafting of the proposed amendments. As will be discussed in greater detail below, we also pointed out some new issues with the regulation relating to definitions (or rather lack thereof) for exempt stationary generators, non-exempt portable generators, and RV fixed mount stationary generators. (531-Docket)

At our meeting with Staff on November 17, 2021, we were informed that there would be no modifications to the proposal by staff and that the only mechanism at this point in time would be to appeal to the Board to have our concerns addressed. Chair Randolph, we now appeal to you and your fellow Board members to address our concerns and direct Staff to modify the proposal as appropriate. (531-Docket)

**RVIA's position with regard to the applicability of the SORE regulation**
RVs utilize SOREs to run onboard fixed-mount stationary generators that supply large amounts of electricity used to power life-sustaining equipment such as air conditioning, heating, refrigeration and lighting. Without SORE-powered onboard generators, many types of RVs will lose the functionality that makes them an attractive form of outdoor recreation. RVs will also lose the utility that is critical to the role they play in solving serious social problems, emergencies and disasters in the State of California. During the COVID-19 pandemic, California Governor Newsom obtained 1,309 travel trailers from the Federal Emergency Management Agency and private companies to house the homeless to protect them from COVID-19. RVs were also used to house medical personnel and to serve as laboratories to free up space in hospitals. For decades, RVs have served as police commands during emergencies. RV are often deployed following natural disasters as was the case when hundreds of units served as temporary housing following Hurricane Katrina in 2005. (531-Docket)

Comment: In the event CARB modifies its proposal to explicitly state that fixed-mount stationary RV generators are subject to the regulation, RVIA makes the following recommendations to the Board. The zero emission equipment (ZEE) standards should not be applied to Fixed-Mount Stationary RV Generators until 2035 or later. In our written comments submitted to Staff on Aug. 31, 2020, and also in our presentation to Staff on May 10, 2021, we provided Staff with data on RV sales, generator fitment, CA registrations by type, RV generator fitment by RV type, RV generator facts, RV and generator use information, etc. While RVIA has not sought to trivialize the environmental impact that emissions from RV generators might have on the environment, it is important to understand the emissions impact that is specific to RV generators. We note that CARB staff has not endeavored to conduct an emissions impact assessment specific to RV generators. RVIA understands that comments being filed by the Engine Manufacturers Association (EMA) will reference an emissions impact study conducted by AIR on behalf of EMA and its members.[1] [Footnote 1: EMA's members include Cummins which sells the Onan brand RV generators.] Our understanding is that emissions from RV generators represent an infinitesimal fraction of SORE emissions in California. We ask the Board to take this de minimis impact into consideration as we discuss the challenges of complying with the proposed rule and the impacts that the rule will have on California residents and businesses. The ZEE mandate in 2028 is neither feasible nor cost-effective for RV generators. In our May 10, 2021, presentation to Staff (see attached Appendix B), we attempted to explain how, depending on size and accessories, RVs typically have either a 50-amp service @ 120 volts AC (6,000 watts) or a 30-amp service @ 120 volts AC (3600 watts). RVs are, for all intents and purposes, already electrified. When

they are operated (on average about 22 days/year), they are more often than not plugged into the electrical grid at an RV campground or park. When they are occasionally operated off the grid, important life-sustaining equipment such as air conditioning, heating, refrigeration and lighting are powered by the generator. Large motorhomes will have two to three rooftop air conditioners to keep the unit cool which can be especially challenging in parts of California. Typically, a 7000-watt LP generator will be used to power these 15,000 BTU AC units. Multiple AC units, lights, refrigerator, microwaves, television, motors to power slideouts, etc., all place a tremendous demand on the generator. Batteries can theoretically provide the power needed to power these appliances, but not for long. In the case of a medium size RV that consumes just 4000 watts per hour, we estimate that you would need a 100-kwh battery to support operations for just 24 hours. In the case of a medium size RV that consumes just 4000 watts per hour, we estimate that you would need a 100-kwh battery to support operations for just 24 hours. This is twice the size of a battery found on a Tesla. The battery alone, at $200/kwh, would cost about $20,000. Consider separately a long weekend trip or week-long trip to a location in California where there is no grid power (e.g., Cherry Lake, Willow Lake, Anza Borrego State Park, Laguna Mountain, Oceano Dunes State Vehicular Recreational Area, Death Valley National Park, Joshua Tree National Park, etc.). For such trips, much larger batteries would be necessary to support life in the unit for days at a time. Motorhomes, as they exist today with current technology, have no place for the batteries needed for such operations. Such batteries would add upwards of a ton in weight to the vehicle which in and of itself would have countless negative impacts (road safety, vehicle fuel economy, cost). If forced to be powered by batteries, the motorhomes would need to be designed to recharge the batteries using the diesel engine of the vehicle that is responsible for propelling the vehicle down the road. The cost of such batteries would approach $100,000 per unit. Emissions from this large diesel engine will far offset any emissions reductions realized from not having the LP or gas SORE-powered generator onboard. Until such time that motorhomes are capable of reasonably being equipped with motors and batteries to replace the prime mover source, there is no feasible or cost-effective way to modify an ICE powered motorhome to be fitted with zero emission SORE solution. Based on conversations RVIA has had with the supplier community, it is our understanding that the motorhome segment is more likely to be electrified via a fuel cell solution than a battery solution. This, however, will not happen in the foreseeable future. RVIA also understands that the Advanced Clean Truck (ACT) rule does not require motorhomes to be electrified. Rather, the rule gives chassis manufacturers the flexibility to electrify some vehicle types, but not all. In 2035, only 55% of Class 2b-3 vehicles[2] and only 75% of Class 4-8 vehicles[3] are required to be zero emissions (see table from the ACT rule below). [Footnote 2: A Sprinter van type motorhome is exemplary of a Class 2b-3 vehicle.] [Footnote 3: Large Class A and Class C motorhomes are exemplary of Class 4-8 vehicles.] (531-Docket)

Table A-1. ZEV Sales Percentage Schedule

| Model Year | Class 2b-3 Group[a] | Class 4-8 Group | Class 7-8 Tractors Group |
|---|---|---|---|
| 2024 | ~~3%~~ 5% | ~~7%~~ 9% | ~~3%~~ 5% |
| 2025 | ~~5%~~ 7% | ~~9%~~ 11% | ~~5%~~ 7% |
| 2026 | ~~7%~~ 10% | ~~11%~~ 13% | ~~7%~~ 10% |
| 2027 | ~~9%~~ 15% | ~~13%~~ 20% | ~~9%~~ 15% |
| 2028 | ~~11%~~ 20% | ~~24%~~ 30% | ~~11%~~ 20% |
| 2029 | ~~13%~~ 25% | ~~37%~~ 40% | ~~13%~~ 25% |
| 2030 ~~and beyond~~ | ~~15%~~ 30% | 50% | ~~15%~~ 30% |
| 2031 | 35% | 55% | 35% |
| 2032 | 40% | 60% | 40% |
| 2033 | 45% | 65% | 40% |
| 2034 | 50% | 70% | 40% |
| 2035 and beyond | 55% | 75% | 40% |

(531-Docket)

Generally, RV chassis manufacturers make many other types of vehicle chassis (e.g., dump trucks, school buses, delivery trucks and vans, etc.) We anticipate that RV chassis manufacturers will not be

electrifying RV chassis and will instead opt to electrify medium and heavy-duty vehicles likes school buses and delivery trucks (i.e., vehicles that each night return to a central location for recharging). Motorhomes have no opportunity for recharging when they are boondocking in Death Valley for days at a time. Again, please keep in mind that, more often than not, RVs today are operating already as electric vehicles (because most of the time they are parked at RV campgrounds where they are plugged into grid power). The SORE generator is only there for the limited use cases when the RV is operated off-grid. We have informed CARB that, on average, an RV generator is typically only run about 50 hours per year. Please reference the AIR emissions impact study conducted for EMA to better understand the de minimis impact our generators have on SORE emissions in California. Governor Newsom's Executive Order No. N-79-20 sets a goal to "transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible." While there is no evidence that motorhomes will be electrified by 2035 (certainly the ACT does not require this), our industry is prepared to do what it can to help California meet the goal that was set out by the Governor. We believe that 2035 may be a point in time that zero emission RV generators might be feasible, should they be deemed to be subject to the SORE regulation. (531-Docket)

Comment: In the event RV generators are subject to the 2028 SORE generator ban, California residents will either forego purchasing an RV altogether, thus depriving the state of significant sales tax revenues and harming a vibrant all-American industry and many California RV dealers in particular, or they will travel across the state line where they can legally purchase a SORE-equipped RV that suits their needs. There is nothing in California law that would prevent them from doing so. When a new vehicle dealer submits a vehicle registration request to the California Department of Motor Vehicles, they must attest only to the fact that the vehicle has an appropriate California Emissions Label affixed to the vehicle or engine pursuant to Title 13, California Code of Regulations, Chapter 1, Article 2, Section 1965 or Title 13, California Code of Regulations, Chapter 9, Article 3, Section 2413, and that it is in compliance with California Vehicle Code Section 24007(b)(1) See REG 397 (REV. 1/2019). Ensuring compliance with the SORE regulations is not part of the vehicle or trailer registration process. Thus, the law would not prohibit California residents from buying RVs with generators in Nevada neighboring states and registering them for use in California (or outside California). We note that, already today, one of the leading sellers of RV to California residents is already located out of California. Through October 2021, National RV Indoor RV Centers with its location in Las Vegas had sold 86 motorhomes to residents of California (placing it at #14 on the list of top motorhome dealers per the California RV Dealers Association). If RVs are subject to the zero emissions standards in 2028, residents of California who decide not to opt for another form of recreating, will go to Nevada one of those neighboring states for their RV purchase. As a consequence, California's RV dealers will see a massive loss in sales to out-of-state dealers and a commensurate loss of income - many will inevitably go out of business. Given that California residents will have the opportunity to buy what they need across the state line, these damages will be suffered without realizing any benefit in air quality. We direct you to the comments submitted by the California RV Dealers Association for more details about the implications that are likely to be experienced by the business community in California. Regarding the more stringent engine emissions standards that are proposed for the years leading up to the proposed zero emissions generator ban in 2028, we note that, when asked by RVIA, engine suppliers have no idea how they will comply or what will be the cost impact born by RV manufacturers and ultimately by consumers. They "think" they might be able to comply, but simply have yet to engineer or cost out compliant solutions. CARB itself has conducted no research specific to RV generators and has no cost numbers specific to our products. Because fixed-mount stationary RV generators have nothing in common with portable generators, CARB cannot and should not attempt to use costs for portable generators when evaluating the economic impact of the rule on the RV community. This is yet another reason for concluding that RV fixed-mount generators should be deemed stationary and thus exempt from the regulation as we believe to be the case. (531-Docket)

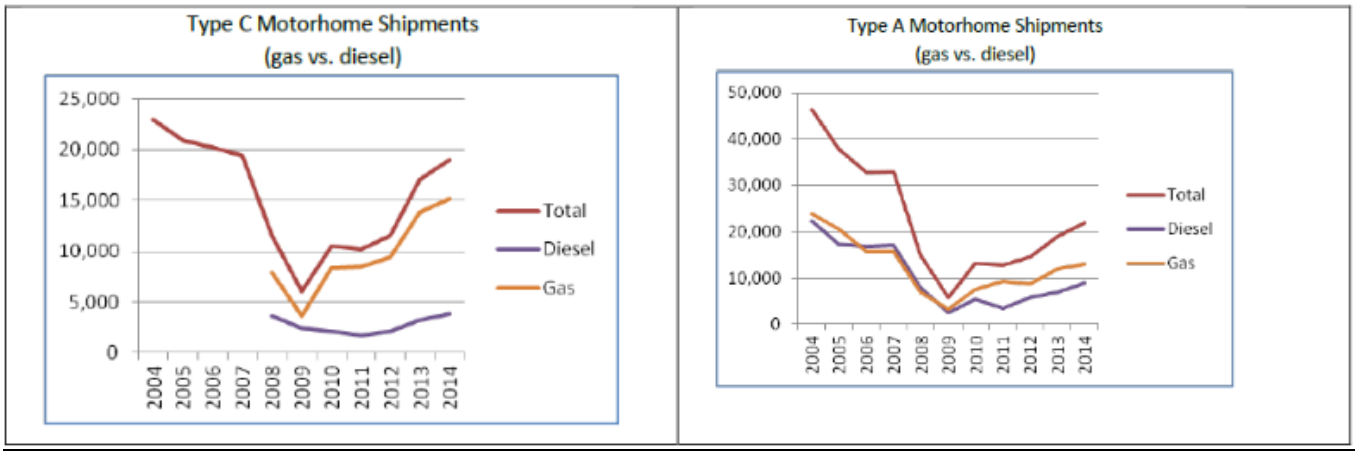
Comment: Appendix A - RV Industry Association Input on CARB's Draft SORE Regulations, Letter to Ms. Dorothy Fibiger, Ph.D., Aug. 31, 2020 (531-Docket)

Comment: A typical LP generator for a medium-sized RV (e.g., Cummins Onan RV 5500 watt LP generator uses a 10.7 HP 653 cc 4-cycle OHV V-twin engine to produce 5500 watts of electricity. It can run two 13,500 BTU AC units w/1100 additional watts available. A larger motorhome might use a 7000 watt LP generator to power 2 15,000 BTU AC units with 2000 additional watts available. This generator uses a 14 HP 653 cc gas 4 cycle OHV v-twin engine. Very large diesel motorhomes might use one of Onan's diesel RV generators providing 12,500 watts for powering three 15,000 BTU AC units and 5000 watts worth of other devices. By comparison, the generator found on a typical Class B motorhome might be the Cummins Onan 3200-watt gas generator for powering a 13,500 BTU AC unit (which uses about 1800 watts leaving 1400 watts for other purposes). (531-Docket)

Comment: A small number of RV manufacturers have begun to offer Class B motorhomes with lithium-ion based systems. For example, certain Winnebago Class B motorhomes can be equipped with their 3600 watt Pure3 Energy Management System lithium-ion energy pack and inverter which includes a second under-hood alternator powered by the chassis engine and energy pack heating system. Such vehicles are otherwise fitted with a similarly-sized gas generator. The lithium-ion system (equipped with rooftop solar) is capable of running the air conditioning system on the vehicle for about twelve hours. After that, the diesel or gas vehicle engine must start up to in order to continue delivering electricity to the unit. The lithium-based system available on the Winnebago Class B motorhome is about a $19,000 upgrade.[2] [Footnote 2: https://www.lichtsinn.com/blog/the-travato-59kl-and-59gl-pure3-energy-management-system-pros-and-cons/?gclid=Cj0KCQjw4f35BRDBARIsAPePBHx180_i8o3JWWz65g2izHz76HH5Ya6hnHQlamB2lMaFstH0Sphtg7M aArNrEALw_wcB] While battery-based systems are scalable, larger systems increase in price. In the case of a medium size RV that consumes 4000 watts per hour, you would need a 100 kwh battery to support operations for 24 hours. This is twice the size of a battery found on a Tesla. The battery alone, at $200/kwh, would cost about $20,000. (531-Docket)

Comment: As noted above, virtually all generators supplied to the RV industry come from Cummins Onan. It is RVIA's understanding that while compliance with the proposed 3 g/kWh HC + $NO_x$ standard for 2023 engines ≥ 225 cc - < 825 cc may be technologically feasible, it is unlikely to be complied with by Cummins Onan given the cost of developing a compliant engines cannot be supported by the very small RV generator business in California. To avoid a situation where RV manufacturers are unable to purchase compliant SI engine-based generators starting in 2023, we urge CARB to establish a standard that does not jeopardize the ability of RV manufacturers to source generators for the 2023 and later timeframe. It is important CARB understand that the SI engine product produced to support the RV industry is unique to the RV industry. The cost of developing compliant products for our small industry cannot be spread across other industries. If the cost of compliance cannot be supported by sales to our industry, the manufacturer will simply drop the product from its portfolio and focus its efforts elsewhere. Were this to happen, it would seriously impact our industry and consumers. Similarly, and with regard to staff's proposed 2025 and later zero emissions standards, we recommend the proposal be significantly modified to prevent extreme adverse impacts on our industry and consumers. It is clear that, within the RV industry, there is a growing demand for RVs incorporating alternative clean energy solutions. This is evidenced by limited demand in the Class B motorhome segment for lithium-based systems. RVIA and its member companies fully support and embrace the long-term goal of net-zero emissions. That said, it is important that we acknowledge the current state of technology, its limitations, and its costs. We see that today, it is possible to power an RV with a lithium-based storage system, but we know that such systems have a very- limited ability to satisfy the electrical needs of the product for more than a very short period of time. We also know that the cost penalty is large and palatable only to those willing to

pay a large premium to go green. We also know that RV consumers are diverse in their wants and needs, and importantly in their ability to afford RVs with all the bells and whistles. We know that the success of the RV industry is tied to the economic well-being of the country. We know this from past history. During the recession of 2007-2009, as depicted below, RV sales declined 76%. This contrasts to 39% reduction in commercial truck sales for the same period. It is evidence that the RV buyer is a spender of discretionary funds. Motorhomes are purchased by middle class families with a median income of $91,000 and a median age of 48 years. Generally speaking, the RV consumer is extremely cost conscious. Cuts in discretionary funds or product price increases have a large influence on RV sales and the well-being of our industry. Unlike landscapers and other commercial business owners who earn money from their gas-powered products, RV consumers earn no revenue from their product and thus cannot write off increased product costs as the cost of doing business. Rather, when costs increase, the RV buyer looks for a less experience alternative to meet their recreation needs. This could be abandoning the RV lifestyle altogether. Such an outcome would be extremely bad for our industry which consists of hundreds of manufacturing sites in the U.S employing nearly 94,000 full-time employees, including dozens in California which employ more than 4900 workers. Our industry is dominated by small volume manufacturers located in rural areas that depend on the jobs tied to RV manufacturing. Roughly half of all motorhome manufacturers produce fewer than one hundred motorhomes per year.[3] [Footnote 3: Statistical Survey, Inc.] (531-Docket)




We are confident in saying that the average Class C motorhome buyer or travel trailer buyer that is spending between $50,000 and $100,000 on an RV unit will not be able or willing to spend 20 to 40 percent more for a unit equipped with a zero emission solution that provides reduced utility at a cost that is currently 6x the cost of conventional technology. We also know that from a practicality standpoint, battery-based systems scaled up to satisfy the electrical demand of large Class A motorhomes and/or large travel trailers would require massively large batteries that would have extreme weight implications for the vehicle and the roads they travel. It should also be understood that, at least for motorhomes, a product lacking a reliable backup power source will end up relying on the motorhome's large gas or diesel engine. Thus, imposing a zero emission standard on the RV sector would likely have result in increased emissions compared to today, not the reductions intended. (531-Docket)

For these reasons, we believe that staff's zero emission standards proposal should be modified to exclude SI engines used in RV generators. We believe that, rather than mandating a zero emission solution for the RV sector, you could incentivize the development and adoption of zero emission solutions in our sector by finding a way to give credits to suppliers of zero emission systems which they could in turn sell to suppliers of conventional systems that are subject to the zero emission standard. In other words, don't force the RV consumer to spend many times more on a system that

fails to fully meet their needs. Instead, craft a regulation that, for our sector, gives suppliers an incentive to innovate and develop solutions that make no sense economically for end users. If through credits, suppliers can recoup cost of developing and producing new zero emission systems, they will be more likely to grow and find ways to make systems more financially attractive in the future for sectors like ours. (531-Docket)

Comment: We urge you to revise your draft to address our concerns with the proposed near-term 2023-2024 exhaust and evaporative emissions standards as well as the zero emissions standards that have been proposed for 2025 and later. (531-Docket)

Comment: Appendix B - RV Industry Association High Energy Density Presentation Auxiliary Power Systems for Recreational Vehicles – May 10, 2021 (531-Docket)

Comment: **Comparison of RV Generators to Portables** [slide 14]
While recreational vehicles and portable generators both utilize SOREs there are several important differences in the impact that each has on California's emissions inventory:

Generators on RVs are:

- Permanently attached to vehicle.
- Fueled by 30 - 40 gallon permanently installed fuel tanks.
- Refueled at a gas station with EVR systems.
- Refueled infrequently (60 to 80 hours of run time).
- On average used less than 100 hours per year. (531-Docket)

Portable generators:

- Portable.
- Most often refueled by hand (gas can).
- Refueled on average every 10-15 hours of run time.
- Requires two refueling events per refueling (i.e., first the gas can and then the generator). (531-Docket)

Comment: **Auxiliary Power Challenges for RVs** [slide 19]
We have RVIA member companies that are currently in the "New Energy" power segment and working on electric and fuel cell solutions, but the technology is extremely expensive and limited in its ability to address RV power requirements today. (531-Docket)

Comment: **New Technology Development Criteria** [slide 20]

- Sustainability
  - Criteria emissions GHG's, safety, noise, vibration, service ergonomics, heat, codes and standards, etc.
- Affordability
  - Initial cost, cost to maintain, resale cost, etc.
- Availability
  - Unplanned downtime like reliability, downtime due to maintenance, battery capacity and recharge frequency
- Efficiency

    - Cost per Kilowatt hour
- Productivity
    - Power density, ability to cover all loads, transient response, weight, etc. (531-Docket)

Comment: **Adoption of New Technology** [slide 21]
RV Manufacturers are trying Lithium-ion batteries on a very limited basis to replace or downsize the generator. (531-Docket)

- Lithium-ion battery system is a $20k upcharge over the generator
- While running the AC and limited other accessories the unit can run on battery for 4 hours before recharging
- To recharge the vehicle engine needs to run at idle for 45-60 minutes
- Prevost chassis product with a new cost of $2.7 million
- The generator was downsized from a 20kW to a 12.5kW Lithium-ion battery system and 4 inverters is a $75-100k additional cost (531-Docket)

Comment: **Auxiliary Power Challenges for RVs** [slide 22]

- Regardless of the battery solution, there will be a need to recharge the batteries on a regular basis. Moving the RV to recharge the batteries is not an option.
- An engine of some type must be run to recharge the batteries
    - Optimized "fixed mount" generator
    - Vehicle engine at idle for 45-60 minutes every 4 hours (531-Docket)

Comment: **Future RV Motorized Power Trains** [slide 24]

- Semi electric product will continue to have a drive engine and will be similar to a hybrid car.
- The batteries would be charged while the unit is underway.
- While the unit is "dry camping" the drive engine will still need to run to recharge the batteries (531-Docket)

Comment: **RV Industry Recommendation** [slide 27]
RVIA requests that CARB defer subjecting fixed mount RV SOREs to the zero-emission requirements until there exists sufficient evidence that zero emission technology will be capable of accommodating the unusually large and long- duration power demands of RVs in a cost-effective manner (531-Docket)

Comment: B. The alternative to using a generator is both less effective and more polluting:
Using the vehicle's engine to recharge the batteries: Charging an RVs batteries by running the motor home's or tow vehicle's engine takes a long time, is very inefficient, takes a lot more fuel, and is more polluting than using a generator. Further, even fully charged RV batteries can't run air conditioners.
Using the vehicle's heater to warm up the RV: Running the motor home's or tow vehicle's engine to operate the RV cab's heater is of no value in trying to heat up a travel trailer or 5th wheel; and a motor home's cab heater is insufficient to warm an entire motor home's interior. This is not only ineffective, it takes a lot more fuel and is more polluting that a generator.

C. Our RV is our 2nd Home. It should be treated no differently because it's on wheels.

D. For full-time RVers, their RV is their only home. They, and we, should not be denied access to the power needed to live comfortably in their, and our, homes.

E. Finally, please don't destroy one of the country's remaining great inexpensive family experiences: enjoying nature up close from remote off-the-grid RV campsites. (2003-Docket)

Comment: Staff did not conduct a cost effectiveness study for RV generators. They conducted instead a study for portable generators, which have nothing in common with RV generators (see earlier table) [slide 16] (2004-Docket)

Comment: Implications for California RV businesses and tax revenues for the State [slides 17-18]

- If CARB bans SORE-powered RV generators in 2028, California residents will go to neighboring states to purchase RVs equipped with such generators. Nothing in the law prevents this.
- This will result in a huge loss of sales in CA, so large that many CA RV dealers may go out of business.
- Air quality will be no better or worse as a result of the ban, yet RV dealers in CA will be out of business and tax dollars from the lost sales will go to Nevada and other bordering states.
- One of the current top-selling RV dealers for CA residents is located in Las Vegas.
- Dealers outside CA will be the only beneficiaries of this ban. (2004-Docket)

Comment: On board power generation provides power for air conditioners in the event of a power disruption for pets left in RV's. Batteries will not supply the power required to run an air conditioner. A vehicles temperature can rise fairly quickly and a pet left in a recreational vehicle that looses utility power would be at a great risk. Have you considered the risk of a power loss to life safety equipment used by elderly or at risk travelers in a RV. Additionally, on board power generation is used in first responder vehicles. I am familiar with a MRI mobile treatment vehicle that has saved stroke victims and would not be operable without a mobile generator. These are not 'portable generators' and I disagree with any ban of mobile generators for 2022. (2007-Docket)

Comment: Generators in RVs are not often used, but critical when needed; and the available alternatives to address an RV's need for a generator are much less effective, use more fuel, and cause more pollution that using a generator. In our 15 years of traveling with an RV, we've only used our generator 6 times, each time for an emergency where our health was at risk, be it when evacuating from the terrible smoke and fires in the SF Bay Area in 2020 (where my wife's compromised lungs needed continuous 110 powered air filtration and a nebulizer and thick clouds cut down our solar panel's ability to keep up), or during snap heat or cold spells while camping off-grid. We support clean air regulations, power our home and RVs with solar panels and back up batteries, and strive to be energy efficient. But there are times when generator power is absolutely necessary in our RV. We don't have a second home. Our RV is our second home on wheels. Why should that home be denied back-up generator power like all other homes? (2003-Docket)

Comment: We are writing to request CARB exempt generators installed on Recreation Vehicles (RVs) from its proposed regulations limiting the use portable generators of less than 25 HP. If you're not experienced RVers, you need to understand: Generators in RVs are not often used, but are critical when needed; and the alternatives for generating the electrical energy occasionally needed from a generator cause more emissions and pollution than using generators. (2003-Docket)

Comment: A. We only used our RV generators 5 times in 15 years. It was a critical emergency each time:

1. Avoiding Heat Stroke, Twice: once in the Arizona desert's 112 degree heat, and once in a CA Gold Country's 105 degree heat wave. Our RV became dangerously hot inside. We used the generator so our air conditioning could bring down the internal temperature to a level that was safe for occupancy.

2. Avoiding Freezing, Once: Camping at June Lake in the California mountains in the Fall, it was overcast and cold for days and our solar panels didn't produce enough power to keep our batteries charged. It became dangerously cold. We used our generator so our lights and heater could keep us warm and safe.

3. Charging our Critically Low RV Batteries Due to Cloud Cover, Twice: Our batteries wore down after 3 days of heavy cloud cover made our solar panels ineffective. Our internal lights, refrigerator, heater, induction burner and other power needs could not be met without occasional generator use. (2003-Docket)

Comment: RVIA's position on the proposed ZEE standards for RV generators [slides 12-14]

- In the event that CARB decides to treat fixed-mount stationary RV generators like portable generators, RVIA asks that the Board direct staff to delay the effective date of the ZEE standards to 2035 for RV generators
- ZEE solutions for RVs are neither technologically feasible nor cost-effective
- Costs: $50,000 to $100,000 or more
- Weight increase: minimum of 1000 to 2000 lbs
- Emissions benefits: none/worse (owners will run the large diesel/gas motorhome engine to recharge the batteries)
- RV are essentially already electrified (they are plugged into grid power most of the time).The SORE engine exists only for off-grid charging (a fraction of RV use).
- Battery solutions for RVs will only make sense when the motorhome is electrified for propulsion (the ACT reg will not result in motorhome electrification). (2004-Docket)

Comment: Staff's lack of focus on RV industry concerns [slides 15-16]

- RVIA has participated in the rulemaking since its inception
  - RVIA filed detailed written comments with CARB in August 2020
  - RVIA met with Staff in May 2021
  - RVIA met with Staff Nov. 17, 2021
  - RVIA filed written comments on Nov. 29, 2021
- Not one rulemaking document issued by Staff in October acknowledged our concerns
- **Staff has indicated that revisions to the proposal can now only be made at the direction of the Board** (2004-Docket)

Comment: I own a 36-foot gasoline-powered motorhome, which I pull my Jeep with to go to Jeep rallies. We are often parked with no power supply. I have installed a very up-to-date solar and lithium battery system on my RV. We brought in the industry's expert to do this. (3002-Oral Testimony)

This system cost over $20,000 and will run only one of my air conditioning units for four hours. If I start the AC at 2 p.m., the batteries die about 6 p.m. The solar system will not charge at night and takes eight hours to recharge the next day. If the sun comes up at 6 a.m., that will get me ready to go at 2 p.m. again. That is only four hours. I can make this work and if it's not too terribly hot, but someone in a situation with a medical device could not. A cloudy, foggy, or rainy day stops this process completely. (3002-Oral Testimony)

PG&E has been cutting off power to some cities for as much as two weeks. For many people, this is their home and a permanent mounted generator is a need not a recreational item. Roughly 20 percent of every RV we sell goes to a full-time or extended stay user. This is driven by retirement for some and cost of housing for others. Some of these RVs are dependent on medical devices. (3002-Oral Testimony)

When the RV parks lose power as they often do, the only way to run the oxygen tanks, CPAP machines, wheelchair lift, refrigeration, and air conditioners is a generator. Currently, there is no other way. (3002-Oral Testimony)

Comment: Our research shows there is nothing in the next ten years or so that will appropriately replace the generator in an RV. As technology advances, the generator usage is already dropping, but it must not be eliminated in 2028. There is not a replacement for many years after that, that is cost effective or technologically feasible as required. (3002-Oral Testimony)

Comment: This will severely impact employment and business and will not help the environment even a little bit. This will move over $1 billion of revenue to bordering states. Thank you for your time. (3002-Oral Testimony)

Comment: My name is Leo Akins. I'm a Senior General Manager at Forest River, Inc. We're the second largest recreational vehicle manufacturer in the world. And many of my comments I would like to say that I mirror David Tenney's comments. I can cut this relatively short, but one of the additional points is there are more new RV buyers and more off-grid campers than ever before and that number continues to grow. (3005-Oral Testimony)

With off-grid camping, there is not a feasible way to recharge even with solar, due to the real estate on the roof. So we are in agreement with what CARB is trying to do with getting to zero emissions, but the timetable is not feasible for us as a manufacturer. We are working towards this, as I am our industry's chair for the solar committee and a voting member on the lithium committee. It's close to my heart to find these solutions, but we are requesting that we urge the Board to consider pushing this to 2035 or to reclassify RV generators as stationary as they are mounted stationary on the RV and utilize evaporative canisters as dictated by CARB. (3005-Oral Testimony)

Comment: I am Linda Burdette and I am with the Family Motor Coach Association, which represents over 135,000 members across the U.S. and Canada. FMCA members own recreational vehicles, which include motorhomes, fifth wheels, and travel trailers. My concern with your proposed rule is that while you exempt stationary generators used to power homes in an emergency, you did not extend that exemption to those which provide the same service to RVs. When I travel, I 18 may have to spend a night or two in an area with no electric support, for instance on federal land. As soon as I can, I'm heading to a campground where I can get electrical hookups. But during that time with no electricity,

I need the generator for quality of life support. My CPAP, my refrigerator, my air conditioning, my heat, they all need to work. That's when I rely on the generator. I don't see any difference in my camping use compared to the emergency generator sitting outside my home, which kicks on if the power goes out to provide me with those same support services. (3010-Oral Testimony)

I understand that with this proposal, you hope to spur development of new zero-emission technologies and we should be doing that whenever possible, but you can't spur the impossible, even with the new ZEE technologies being developed even when using the newest lithium batteries. I don't see enough batteries being available or reasonably installable to power a recreational vehicle just as your exemption of home generator shows that we don't expect a zero-emission home generator being completely developed before 2028. (3010-Oral Testimony)

Comment: My name is Andrew Baer with Tiffin Motorhomes. We're a manufacturer of motorized recreational vehicles. While our motorhome owner base is varied and wide ranging, a large percentage of our users are retired and fall in the 60- to 80-year old demographic. These families have chosen the RV life style to experience and enjoy travel while living in a home-like setting. Every week I spend some time at our service center visiting with these owners and users to find out how they utilize our product. An important part of this lifestyle is the ability to continue medical treatment and have the support of dependable power while camping. Examples of this are oxygen generators, CPAP machines, and even home dialysis. The ability for these families to receive treatment while enjoying our country and traveling is critical to both them and our industry. I would ask that you please consider amending this regulation to exclude the permanently installed power generators we use in our recreational vehicles. (3013-Oral Testimony)

Comment: Thank you. My name is Todd Woelfer. I'm the Chief Operating Office of Thor Industries. Thor owns a family of companies who make RVs, including Airstream. Thank you for the opportunity to speak with you today. Thor shares the values and the mission of the Board and specifically of this rule. And we recognize the importance of the initiatives that drive rules like the one we're talking about today. At Thor, we make significant investments in trying to improve our environmental impact on the earth. We publicly announced our own program to drive to a greenhouse gas net neutral position across our entire footprint from manufacturing, to users, to every aspect of our business and how -- and how it relates to the earth. Today, as we consider this rule, the impact on RVers would be very similar to the impact of homeowners. And the exception for stationary generators for homeowners is a very important one for a lot of reasons, and really drive to what potentially could be health crises in the event that those generators were not available to homeowners.
(3014-Oral Testimony)

RVers count on those generators as either a back-up or primary source of energy, and that powers the appliances across the RVs, and those -- and also powers other aspects and uses in the RV that could include important medical devices and uses for RVers across the state. (3014-Oral Testimony)

Comment: Yes. RVs need an exemption from these new rules. The pandemic has change the way people live and how they use RVs. We sell 50 percent of our units to people who live full-time in their RVs. We sell them to fire victims, firefighters, PG&E workers, and an aging population that needs to use the breathing and oxygen machines, CPAP machines, and other medical devices that need these generators to run them. (3018-Oral Testimony)

Comment: Our dealer group has planted over 120,000 carbon offsetting trees this year alone. If your goal is to reduce emissions in California by reducing the number of generators sold in California that are permanently installed in an RV, this will not solve the problem. It may even make it worse. All this will do is drive RV dealers out of the state and create border town dealers in surrounding states

selling the same number of RVs with permanently mounted generators to California residents who will bring them back into the state, thus not reducing emissions at all. This will also give the state less insight and control over the efforts to reduce emissions. There is currently not a viable replacement option, but the RV industry is confident that by 2035 there will be better technology and more options that could create a quadruple win for consumers, the State of California, California dealers, and most importantly the environment. I respectfully ask the Board to have permanently mounted generators installed in RVs excluded from the new SORE amendment, and if unwilling to do this, defer application of the ZEE standards to 2035 for permanently mounted RV generators and allow the RV industry and consumers the opportunity to create a sustainable long-lasting solution that benefits everyone. (3021-Oral Testimony)

Comment: My name is Jeff Burian and I am the Operations Manager for Forest River, which manufacturers RVs in the state of California. To the point of many that spoke today, I can say that we recently designed and tested an RV that was built with the maximum number of solar panels allowable by RVIA codes and standards. The RV was equipped with large -- four large solar batteries that used up all the storage space we could utilize in an RV and an inverter capable of handling the electrical demands of the average RV. This test was conducted in mild weather conditions where demands on the heating and air conditioning systems were minimal. We also asked end users of our products to participate in the testing. What our test revealed was that the solar paneled unit -- powered unit did not meet the expectation of the average RV owner and would leave them without back-up power under normal operating conditions. Upon revealing the cost to the consumer of $20,000 or more than the cost of an RV built with a fix-mounted generator, the customers surveyed stated they would not purchase the RV. (3022-Oral Testimony)

As an employer of over 500 employees in the state of California, I'm concerned with how the new regulation could affect our industry with regards to loss of sales, jobs, customer satisfaction, and the safety of RVs in the state of California. It will ultimately have a ripple effect that will travel well beyond the RV industry and its dealerships. Although we could stop the sales of gas-powered generators in the state, there will still be generators out there for consumers to get their hands on, whether those generators are new, rebuilt, or outdated, or on their last leg, they will acquire them and attempt to install them on their own. Generators that are designed and installed at the factory level meet the most stringent codes to ensure they meet CARB as well as safety standards. Generators to -- consumer-installed generators do not. For these reasons, I request fix-mounted generators be exempt from the proposed amendment or given more time to comply. (3022-Oral Testimony)

Comment: This bill being discussed today will only cost California businesses sales and California families income. I am responsible to run three dealerships in three counties, and we have on average 95 employees. In 2020, we sold 1,147 new motorhomes and trailers for a total sales of $72 million. Of those sold units, over 600 were factory equipped with on-board permanent mounted generators to supply the RV with the necessary power to operate as a home. The idea to prohibit emissions is a great long-term plan and I personally believe it is something we should all work towards. (3023-Oral Testimony)

Comment: But with this Board's intentions to abandon the sale of portable generators as defined in RVs will only have a negative financial impact on not only just us a company, but to all RV dealerships throughout the state. (3023-Oral Testimony)

Comment: If you pass this bill as you've written, you'll potentially be prohibiting our ability to sell 600 plus units a year, which will cost us approximately 40 million in annual sales. With this -- with this dis -- decrease in sales, you will force me to close and consolidate our stores from three currently to only one in 2027. That will also require me to reduce staff by over 50 percent, therefore putting over

40 families (inaudible). Air quality is important and as a father I want nothing more than my children to grow up in this beautiful state with the state -- with the best air quality possible. (3023-Oral Testimony)

Comment: I'm asking the Board to really consider a better way to look at the true impact this bill represents to the RV industry and the devastating financial implications it has because of definitions. Stopping the sale of on-board generators for RVs in the state will not stop the use of them within the state. This will only cause California consumers to shop neighboring states for motorhomes and trailers, possibly putting hundreds, if not thousands, of employees out of a job. (3023-Oral Testimony)

Comment: I'm Michael Ochs with the RV Industry Association and I thank you for the opportunity to speak with you today. RVIA agrees with several previous commenters that fixed mount RV generators should be categorized as stationary, since they have much more in common with those generators than they do with portable generators. However, CARB currently disagrees and will continue to treat RV generators as portable generators. In this vein, RVIA asks that the Board direct staff to delay the effective date of the ZEE standards for RV generators to 12 2035. This would still allow CARB to satisfy the goal of Governor Newsom's Executive Order. RVs and their generators are not comparable to lawn and garden equipment that has been shown throughout this or the staff's presentation. (3024-Oral Testimony)

They require sufficient electrical power even in situations where plugging into grid power is not available, such as blackouts and natural disaster emergencies to be able to operate off of life-sustaining equipment such as oxygen concentrators or CPAP machines, not to mention air conditioning, heating, refrigeration, or cooking. (3024-Oral Testimony)

Comment: The battery required to supply needed power to an RV for just one day would need to be twice the size of the battery currently used in a Tesla Model S would cost upwards of sixty to a hundred thousand dollars and would add at least 1,000 to 2,000 pounds to the vehicle decreasing its fuel economy. The main engine on the motorhome would need to be run for lengthy periods of time just to recharge the batteries each day. This would detract from over -- overall air quality not improving. Such solutions are neither technologically feasible nor cost effective. Zero-emission solutions for RVs only make sense when the entire vehicle runs on alternative electric energy, such as electric or fuel cells. I thank you for your time this afternoon and this morning and look forward to working with the Board and the staff to find an equitable solution. (3024-Oral Testimony)

Comment: I'm Mark Rosenbaum, General Manager of Mike Thompson's RV Superstores. I just want to point out a few facts, that motorhomes, unlike a lot of the different motors and stuff that we're talking about today are completely different. Go RVing just reported in an article not too long ago that the average age -- average usage of a motorhome is anywheres from 20 to 25 days. That's throughout the entire year of every owner. (3027-Oral Testimony)

I'd like to take -- have you take into consideration some of the following facts, that in 2021 only 5,618 motorhomes were sold - that's homes with motors. That's what we sell homes with motors - in 2020, 6,369; in 2019, fifty-six hundred and thirty-eight. So these units that are being out there and they've got these permanently mounted generators to their -- to their homes, they're being used, but they're being used on an average of 22 days in a full year. And in that 22 days, only 50 hours of usage, that's two and a half hours a day for 22 days. Keep in mind, the total hours of the 50 hours is less than a half a percent of the total hours available in a full year. (3027-Oral Testimony)

I'd also like to take into consideration, we are a large company as well. We employ about 400 employees. If something like this goes down, where we can't -- motorhomes cannot be excluded

from the deal, then we're going to be in a situation where we're going to have to reduce our staff and we're going to have to reduce the way we do business. And in the end, all you're going to do is move the revenue out of California and you're going to have the same emissions with these -- with these motorhomes, which is not very impacting anyway. That's my voice and thank you for letting me speak. (3027-Oral Testimony)

Comment: Dave Johnston, Air Pollution Control Officer for El Dorado County. I and several other rural air district representatives are opposed to staff's proposed SORE amendments because of the this will have a great effect on manufacturing in the state of California, as well as RVs that are sent into the state, as well as the many dealers that sell -- the thousands of dealers that sell RVs in the State of California. (3028-Oral Testimony)

Comment: As far as another aspect of this around the unintended consequences of the good that we're trying to do, if we misstep this, people will find workarounds using not only the engine gen -- the engine on the vehicle to run systems in a probably much less efficient way, but also they will be sourcing less robust generator systems from third-market parties or big box stores from out of state, and running those in a much more energy inefficient method and noise pollution standard from a portable standpoint. (3030-Oral Testimony)

Comment: So with that, agree with all the other RV- and marine-specific content that was delivered, but just wanted to give the Board the opportunity to think on the consequences that could happen if the carve-out isn't made for RV-specific generation moving forward. (3030-Oral Testimony)

Comment: My name is Garry Enyart and I lead the fixed mount RV generator business at Cummins. We are the primary supplier of RV generators to the industry. And as you've heard, they allow users to enjoy the comforts of home, including air conditioning, medical device usage, and one application that hasn't been mentioned, keeping their pets cool while they're away from their RVs for short periods of time. (3049-Oral Testimony)

Comment: We've modeled usage patterns of what it would take to provide the needs of campers for a typical vacation outing without a fixed-mount generator by using a battery solution. The amount of batteries required, the footprint of those batteries, and the cost of the batteries and other related controls and accessories are cost prohibitive at this time. (3049-Oral Testimony)

Comment: As an example, for a Class A motorhome, which has a fixed mount generator at a cost of around $4,000, a like battery system would cost 90 to $100,000, wouldn't have the same functionality as the generator, making the purchase of that RV cost prohibitive for most consumers. Likewise, solar solutions are not able to keep up with the power needs of an R V. (3049-Oral Testimony)

Comment: Lastly, Cummins, the company I work for, has a rich history of providing products that limit emissions. We have aggressive emissions reduction goals, and most recently formed a new energy power division and invested hundreds of millions of dollars in both mobile and stationary fuel cell companies, battery technology and green hydrogen production. We, too, are power solution agnostic and we embrace future zero-emissions technology, but recognize that the adoption of these technologies will take some time. (3049-Oral Testimony)

Comment: My name is Matt Spendlove, Managing Director of Next-Gen Power Systems. I appreciate the opportunity to speak to you today about our company and the impact of the proposed ban on the RV industry. We launched our company in June of 2020 and are now one of two companies nationwide that manufacture and sell RV on-board generators. Our mission, as stated in our name, is to provide the RV industry with the most advanced power systems available on the market. Our vision

at Next-Gen Power Systems is to create reliable, stable, safe, affordable clean power for the RV industry. We currently manufacture two models, both fixed mounted RV on-board generators. Our generators use the most advanced technology available today and both models utilize inverter technology. This technology regulates power use based on demand and significantly increases fuel economy. (3051-Oral Testimony)

We partnered with Yamaha and used one of the cleanest most efficient gas-powered engines produced worldwide. With the understanding the world is becoming electrified, one of our stated goals is to reduce emissions by investing new technology. We know that the future is now. We have already allocated resources and time to develop and power systems to meet the rising demand for hybrid and ZEE options. We recognize the importance of taking care of the environment and standing behind policies that keep our skies and waterways healthy and clean. Our entire client base is develop -- is dependent on having beautiful clean national parks to visit and would be detrimental to our long-term success if this beauty was destroyed over time. We're currently working as quick as we can to find ways to meet the interim CARB emission standards for 2024 and ZEE alternative for 2028. However, the stated timelines for stricter standards and outright ban are not long enough to support an economically feasible, responsibly-priced product designed to meet and support the needs of the average RV client. (3051-Oral Testimony)

Therefore, we stand in opposition of this ban of the following reasons. RV generators are fixed, mounted, stationary, should not be considered portable. The ZEE technology for RV on-board generators does not currently exist. The ZEE alternative is not feasible for the vast majority of RVs at this time. RV generator emissions are a fraction of one percent of the overall SORE emissions. Currently, engines globally do not meet the proposed 2024 stricter standards. Potential for severe negative impact industry-wide resulting in job losses, bankruptcies, reduced revenue, and reduced business development investing into California. For the above reasons, we're asking for the Board to consider the following changes to the proposal. One, treat RV on-board generators as stationary thus exempt from the proposal. Two, eliminate the 2024 – *[end of oral testimony by Matt Spendlove*] (3051-Oral Testimony)

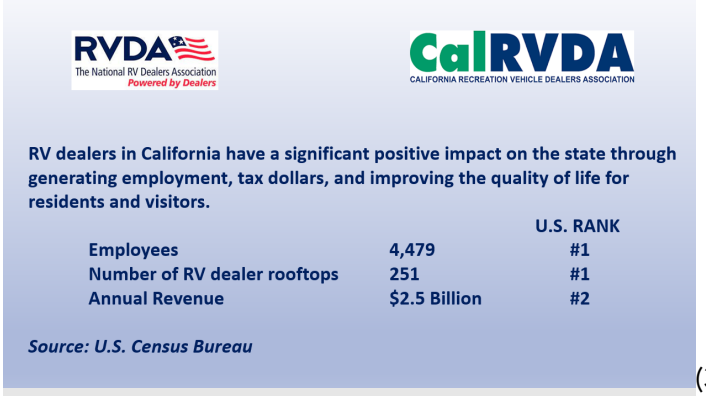
Comment: I just wanted to add my name to the other RV industry professionals, as well as marine that talked about the need to exempt on-board generators from this bill. My name is Donald Cochran, Chief Sales Officer for Northwood Manufacturing and Outdoors RV. And again, as already stated, you know, this will have a great effect on manufacturing in the state of California, as well as RVs that are sent into the state, as well as the many dealers that sell -- the thousands of dealers that sell RVs in the State of California. (3055-Oral Testimony)

The only other point that I want to bring up, along with all those other points that were talked about, is just the overall effect that it would have on demand for RVs in the state of California. This would have a long-term effect that would lower demand for RVs. If you RV in the state of California, you know that it's very tough, almost impossible, to find a great location that offers power, so then you're forced to use something else like an on-board generator that would be with that to enjoy the many great spots we have in the state of California. (3055-Oral Testimony)

Comment: As stated by Mark Rosenbaum from Mike Thompson's RV, the use of the generator on the RV is very minimal, although it does add to the overall experience. It enables our customers to use that generator, to use that -- the full RV in that experience. And because of that, when you look at alternate sources like solar power, inverters, lithium batteries, it almost doubled, sometimes even cost more than the RV itself, eliminating those who would be able to afford an alternate power option for their RV, if one was even available that could do what a generator does today. I ask the Board again just as they look at this bill to hold out the generators that are on board on RVs, that they are not part

of this bill, that they are considered stationary, so that we can continue to enjoy this great state and the RV sites that are available to us. (3055-Oral Testimony)

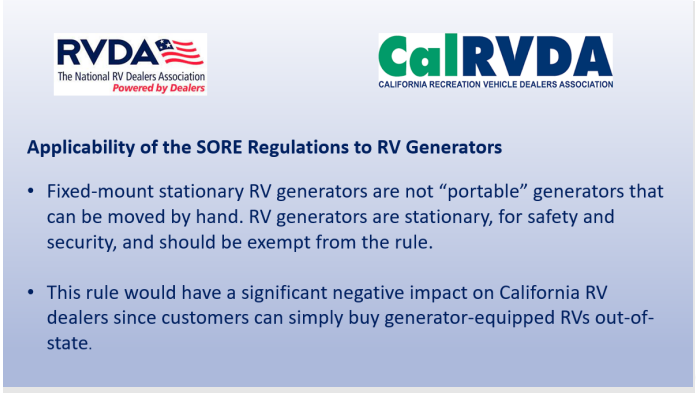
Comment: This first slide just talks about the number of employees that are working at RV dealerships in California and shows where they rank in the U.S. So California is a very high ranking state in a lot of economic categories. (3063-Oral Testimony)



(3063-Oral Testimony)

Slide 1 text: RV dealers in California have a significant positive impact on the state through generating employment, tax dollars, and improving the quality of life for residents and visitors. (3063-Oral Testimony)

Comment: And the next slide, please. We agree with the previous testimony regarding RV generators as being fixed mounts. But I did want to let you know too from a national perspective, I want to let the Board know that RVDA has observed that when State regulations impact RVs and the dealers that sell them in the state, consumers will travel to buy from out-of-state dealers. And this happens whether it's a tax break or, in this case, a regulation impacting RV generators. RV buyers will simply go across state lines to purchase the RV equipped with the components they need. So this will hurt California RV dealership, employees, their families, while not really getting to the core air quality issue when consumers can simply buy units out of state. (3063-Oral Testimony)



(3063-Oral Testimony)

Slide 2 text: Applicability of the SORE Regulations to RV Generators

- Fixed-mount stationary RV generators are not "portable" generators that can be moved by hand. RV generators are stationary, for safety and security, and should be exempt from the rule.
- This rule would have a significant negative impact on California RV dealers since customers can simply buy generator-equipped RVs out-of-state. (3063-Oral Testimony)

**Agency Response:**

These comments imply or suggest an alternative to the Proposed Amendments that would delay implementation of more stringent emission standards, delay implementation of emission standards of zero until MY 2035, or both, citing technical feasibility, potential economic impacts, the potential for some RV purchasers to travel to other states to purchase RVs with generators installed in them, potential timelines for electrification of RV chassis, the need to provide electricity for medical devices and air conditioning for pets, and other potential considerations. Commenters also include introductory remarks that describe the commenters' organizations. These comments include expressions of the commenters' opinions regarding the use of RV generators for backup power and the occurrence of power outages. Some of the commenters also state opinions regarding the amount of time RV generators are used or the settings in which they are used, such as when traveling. The Proposed Amendments do not prohibit the sale of CARB-certified SORE generators manufactured before the new generator emission standards take effect in MY 2024 for use in recreational vehicles (RV) in 2024 or at any other date. As described on page 3 of the ISOR, the manufacturing of new RV generators would be subject to more stringent emission standards for MYs 2024 through 2027 and emission standards of zero for MY 2028 and subsequent model years. The Proposed Amendments do not require anyone to stop using a SORE RV generator. For an explanation of the necessity for the current rulemaking and why CARB cannot discontinue the rulemaking or exempt some engines, such as RV generators, from the proposed emission standards or emissions durability periods, please refer to the Agency Response in section IV.A.2.2.1. CARB agrees that the upfront cost of zero-emission generators is often significantly higher than the upfront cost of SORE generators. As described in Chapter I.E.3.b. of the ISOR, the Proposed Amendments allow more time for generator engines to meet emission standards of zero because of the need for the zero-emission generator market to further develop. This extra time will also allow for costs to decrease as the market matures. CARB made no change based on these comments.

RVIA's Appendix A is a letter to CARB staff, titled "RE: RV Industry Association Input on CARB's Draft SORE Regulations," containing information on RVs and comments in response to the June 2020 pre-rulemaking workshop described in Chapter X of the ISOR. It is available on the CARB website: https://www.arb.ca.gov/lists/com-attach/922-sore2021-VScBcQFpADIDWgVm.pdf. The letter describes various types of RVs and the use of generators in them. It includes sales figures and California vehicle registration numbers for 2016-2019 by RV type, along with estimates of the number of generators installed in newly registered RVs in 2019. The letter describes the use of generators in RVs, RVIA's assessment of alternatives to SORE generators for use in RVs, and comments on the draft proposal discussed in the June 2020 pre-rulemaking workshop.

RVIA's Appendix B is a slide presentation, titled "High Energy Density Auxiliary Power Systems for Recreational Vehicles." It is available on the CARB website: https://www.arb.ca.gov/lists/com-attach/922-sore2021-VScBcQFpADIDWgVm.pdf. The presentation provides an introduction to RVs and discusses power requirements and sources, current RV electrical systems, paths forward, and an RV industry recommendation. The comments in RVIA's Appendices A and B were among those that staff considered when developing the ISOR Proposed Amendments.

As described on page 165 of the ISOR, "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[14]] lists ten MY 2020 engine families with HC + $NO_x$ certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-2 of the ISOR. Whether or not manufacturers installed engines from those engine families in MY 2020 generators, they might choose to install them in generators in the future. "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" lists 27 evaporative families with certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR. Manufacturers may use emission reduction credits to offset emissions from engines with emissions greater than the proposed MY 2024-2027 generator emission standards.

With regard specifically to generators designed for integration into a vehicle, CARB notes that under the Proposed Amendments, section 2766, subsection (c), is revised to read as follows:

"(c) Equipment Fueled by a Vehicle Fuel Tank – Generators that are fueled from the fuel tank of an on-road motor vehicle or marine vessel are exempt from the diurnal emission, hot soak plus diurnal emission, fuel tank permeation, and carbon canister design standards in section 2754. However, these generators must use fuel lines that meet the design standard specified in section 2754."

Generators that are fueled from the fuel tank of an on-road motor vehicle are already exempted from diurnal, carbon canister design, and fuel tank permeation standards in the current regulations, and the Proposed Amendments exempt them from the hot soak plus diurnal emission standards.

In response to comments regarding the RV industry's engagement in the rulemaking process prior to publication of the ISOR, including discussion of RVIA's Appendices A and B: These comments do not request a change to the Proposed Amendments. The commenters describe their actions prior to publication of the October 2021 45-Day Notice and between publication of the October 2021 45-Day Notice and the commenters' submission of these comments. CARB appreciates RVIA's participation in the rulemaking process, RVIA's submission of comments on draft regulatory text and meeting with CARB staff during development of the rulemaking proposal, and RVIA's submission of comments after publication of the ISOR. Chapter X of the ISOR discusses the public process for development of the Proposed Amendments and notes a meeting with RVIA on page 152. As described on page 148 of the ISOR, meetings with stakeholders provided staff with useful information that staff considered during development of the Proposed Amendments. The draft proposal released prior to the March 2021 workshop incorporated changes made based on feedback received from stakeholders, including RVIA, during and after the June 2020 workshop. CARB disagrees with the commenter's conclusions. The Proposed Amendments allow more time for generator engines to comply with emission standards of zero, as discussed in Chapter I.E.3.b. of the ISOR. CARB made no change based on this comment. California's Administrative Procedure Act (APA) does not require agencies to modify proposals between publication of the notice of an ISOR and the date of a public hearing to consider the proposal in response to industry input or public comments. APA allows for 15-day modifications, which CARB made in

[14] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

response to industry input and other public comments, as described in the March 2022 15-Day Notice. CARB staff provided ample opportunities to the public and stakeholders to participate in development of the Proposed Amendments, as described more fully in Chapter X of the ISOR, in compliance with Government Code section 11346.45.

In response to the statements, "Because fixed-mount stationary RV generators have nothing in common with portable generators, CARB cannot and should not attempt to use costs for portable generators when evaluating the economic impact of the rule on the RV community," and "Staff did not conduct a cost effectiveness study for RV generators. They conducted instead a study for portable generators, which have nothing in common with RV generators,": CARB disagrees with the commenters' assertions. RV SORE generators are powered by SORE the same as other SORE generators, whether or not a commenter considers one more portable than the other. In the case of generators that are fueled from the fuel tank of an on-road motor vehicle, no changes are expected with regard to the evaporative emission control system because they are exempt from the proposed hot soak plus diurnal emission standards. Therefore, no cost increase to comply with the proposed evaporative emission standards is expected, and the costs used in the economic analysis are conservative.

In response to the statement, "It is RVIA's understanding that while compliance with the proposed 3 g/kWh HC + $NO_x$ standard for 2023 engines ≥ 225 cc - < 825 cc may be technologically feasible, it is unlikely to be complied with by Cummins Onan given the cost of developing a compliant engines cannot be supported by the very small RV generator business in California,": Three of Cummins's current engine families with displacement greater than or equal to 225 cc have certification test levels less than or equal to the proposed HC + $NO_x$ emission standards [CARB, 2020[15], 2021a[16] and 2021b[17]], although Cummins has selected emissions durability periods shorter than 1,000 hours. Credits could be used to offset emissions above the proposed emission standards.

In response to the statement, "Again, please keep in mind that, more often than not, RVs today are operating already as electric vehicles (because most of the time they are parked at RV campgrounds where they are plugged into grid power). The SORE generator is only there for the limited use cases when the RV is operated off-grid. We have informed CARB that, on average, an RV generator is typically only run about 50 hours per year,": As discussed on page 24 of the ISOR, a zero-emission generator can be used to power a refrigerator for several days. An RV user who used an RV generator 50 hours per year could use a zero-emission generator instead for certain devices, such as a refrigerator. Such an RV user may not need a SORE RV generator. Evaporative emissions from SORE generators do not cease when the generator is not in use, whether they are fueled from the fuel tank of an on-road motor vehicle or not. Therefore, a lack of use of a SORE generator does not eliminate emissions from the generator. Greater emission reductions will be achieved with a zero-emission generator installed in an RV than with a SORE RV generator whether or not the SORE RV generator is used since evaporative emissions will continue during periods when a SORE RV generator is not in use.

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[15] CARB. 2020. Executive Order U-U-008-0316. Executed December 8, 2020.

[16] CARB. 2021a. Executive Order U-U-008-0312-1. Executed May 11, 2021.

[17] CARB. 2021b. Executive Order U-U-008-0314-1. Executed May 11, 2021.

In response to the statement, "In the case of a medium size RV that consumes just 4000 watts per hour, we estimate that you would need a 100-kwh battery to support operations for just 24 hours," and similar statements: The commenters describe their assessments of costs for zero-emission generators for RVs. The commenters do not provide evidence that medium size RVs consume 4,000 watts continuously and CARB has no evidence to support that claim. Moreover, RV industry professionals provided comments that most of the time RVs are plugged into grid power because they are parked at RV campgrounds which suggest that medium size RVs would rarely, if ever, consume 4000 watts per hour continuously for 24 hours.

In response to the statement, "If forced to be powered by batteries, the motorhomes would need to be designed to recharge the batteries using the diesel engine of the vehicle that is responsible for propelling the vehicle down the road," and similar statements: The current SORE regulations and the Proposed Amendments do not specify the purposes for which users may use SORE generators or motor vehicles. The commenters raise the possibility of using a motor vehicle engine to charge batteries or provide power or climate control in a recreational vehicle. Such use of a motor vehicle engine is not the goal of the Proposed Amendments and could result in avoidable emissions. The commenters do not demonstrate that such use would be prevalent or would significantly impact the emission reduction benefits of the Proposed Amendments. The comments imply that any use of a motor vehicle engine to charge batteries would indicate the Proposed Amendments were ineffective and should therefore be abandoned. CARB disagrees with that conclusion. A significant amount of SORE emissions are created by activities that are often recreational or discretionary, such as the use of an RV or landscape maintenance. The SORE regulations do not limit users' ability to engage in these activities. The Proposed Amendments would not prohibit the use of an RV as a primary or secondary home, nor would they prohibit enjoying nature up close.

In response to the statement, "Battery solutions for RVs will only make sense when the motorhome is electrified for propulsion," and similar statements: These comments are expressions of the commenters' opinions. Zero-emission generators can be used with RVs. Zero-emission RVs, both motorhomes and towable RVs, have been announced [Winnebago, 2022[18], ERV, 2022[19]]. The commenters do not provide evidence that additional zero-emission power solutions for RVs will not exist before more motorhome propulsion power sources are zero emission. Requirements for motor vehicle propulsion engines are beyond the scope of this rulemaking.

In response to the statement, "For these reasons, we believe that staff's zero emission standards proposal should be modified to exclude SI engines used in RV generators. We believe that, rather than mandating a zero emission solution for the RV sector, you could incentivize the development and adoption of zero emission solutions in our sector by finding a way to give credits to suppliers of zero emission systems which they could in turn sell to suppliers of conventional systems that are subject to the zero emission standard": This comment suggests incentives for RV generator manufacturers in the form of credits. CARB made no change based on this comment. As described on pages 31-40 of the ISOR, the Proposed Amendments do include a new zero-emission generator credit program to

[18] Winnebago Industries. 2022. Electric Concept Motorhome. Available at: https://www.winnebagoind.com/electric. Last accessed: May 13, 2022.

[19] ERV. 2022. ERV – The World's 1st Fully Electric Caravan. Available at: https://www.e-rv.com/. Last accessed: May 13, 2022.

incentivize development of the zero-emission generator market. Credits earned in this program can be used to offset emissions from SORE generators, including RV generators.

In response to statements regarding power or energy density requirements for generators: These statements include commenters' opinions. The commenters do not provide evidence to support their claims and conclusions. For example, while the power or energy density of batteries for zero-emission generators may differ from the power or energy density of fuels for SORE, commenters don't provide evidence that a difference in power or energy density precludes the use of zero-emission generators for similar tasks to those for which SORE generators are used. The extra time for generators to meet emission standards of zero under the Proposed Amendments will allow the zero-emission generator market to develop further. Please refer to Chapter I.E of the ISOR and the Agency Responses in section IV.A.35 of this FSOR for additional discussion of the technological feasibility of the Proposed Amendments, and Chapter VII of the ISOR and the Agency Responses in sections IV.A.13 and IV.A.35 of this FSOR for additional discussion of the cost-effectiveness of the Proposed Amendments.

Please refer to the Agency Responses in sections IV.A.2.2.1 and IV.A.2.6.2 for additional discussion of the necessity of this rulemaking and EMA's AIR analysis, respectively.

Please refer to section IV.A.2.3.3 for a discussion of a suggested definition of "stationary generator."

In response to comments regarding out-of-state sales of RVs with SORE generators: CARB presumes full compliance with the SORE regulations. A person who imports SORE for introduction into commerce in California that is not CARB-certified violates CARB's regulations. (Title 13, California Code of Regulations (CCR), sections 2400, 2751l(a)(3)). Equally, a person who sells uncertified SORE equipment to someone who will use or operate the uncertified SORE equipment in California also violates CARB's regulations. (Title 13, CCR, sections 2400, 2751(a)(3).) Therefore, CARB does not expect sales of RVs with SORE generators that are not CARB-certified to occur in California or outside of California if those uncertified SORE generators will be used or operated in California. Please refer to the Agency Responses in sections IV.A.14.1 and IV.A.15 for discussion of out-of-state sales of SORE equipment ("leakage").

Please refer to the Agency Response in section IV.A.13.1.1 for discussion of comments related to potential loss of businesses or jobs.

### A.2.3.3. Adopt new definitions and exempt RV generators

Comment: Staff's proposed amendments to the SORE regulation exempt stationary generators from the regulation for good reason (mainly because they are of critically important tools to ensure life-sustaining equipment when power from the electricity grid is not available). In its proposal, however, staff has not provided a definition for "stationary generator." There is only a note in the ISOR stating that stationary generators are "not moved for equipment operation or storage." SORE-powered generators used in RV applications are bolted into the RV. They are not moved for operation, nor storage. They are permanently affixed in a storage enclosure as an integral component of the vehicle, and typically only accessed for maintenance. (531-Docket)

Though some within CARB may wrongly consider RV generators to be portable, and thus subject to the regulation, they are not. While the proposed regulation does not provide a definition for portable generator, CARB staff informed RVIA that portable generators are "those moved by hand and not bolted to concrete pad or other permanent build surface." Staff is clearly mistaken given that RV

generators are bolted into the RV as an installed component and thus have no ability to be moved by hand. For reasons unknown, CARB staff has attempted to lump fixed-mount stationary RV generators into the same category with free-standing portable generators. As shown in the table below, fixed-mount stationary RV generators have absolutely NOTHING in common with portable generators and EVERYTHING in common with exempt stationary generators. (531-Docket)

| Generators Characteristic | Generator Type | | |
|---|---|---|---|
| | Stationary | RV Fixed-Mount Stationary Generator | Portable Generator |
| Subject to ZEE SORE Requirement? | | X | X |
| Not moved for equipment operation or storage? | X | X | |
| Not moveable by hand? | X | X | |
| Bolted to permanent surface? | X | X | |
| Rarely refueled? | X | X | |
| Routinely powering very large electrical loads (whole house; 4000 watts/hrs. or more)? | X | X | |
| Would the battery needed for powering the generator for just one day be twice the size of a Tesla battery and cost > $20,000? | X | X | |
| Is the generator routinely required to run multiple days at a time without being refueled? | X | X | |
| Never tilted? | X | X | |
| Routinely powering air conditioning to prevent heatstroke? | X | X | |
| Routinely powering refrigerating units to keep food from spoiling? | X | X | |
| Annual hours of use are extremely low? | X | X | |

(531-Docket) (2004-Docket)

For the reasons discussed above, RVIA considers fixed-mount stationary RV generators to be exempt from the SORE regulation until such time that the regulation is amended to indicate otherwise. (531-Docket)

Comment: Regarding the more stringent engine emissions standards that are proposed for the years leading up to the proposed zero emissions generator ban in 2028, we note that, when asked by RVIA, engine suppliers have no idea how they will comply or what will be the cost impact born by RV manufacturers and ultimately by consumers. They "think" they might be able to comply, but simply have yet to engineer or cost out compliant solutions. CARB itself has conducted no research specific to RV generators and has no cost numbers specific to our products. Because fixed-mount stationary RV generators have nothing in common with portable generators, CARB cannot and should not attempt to use costs for portable generators when evaluating the economic impact of the rule on the RV community. This is yet another reason for concluding that RV fixed-mount generators should be deemed stationary and thus exempt from the regulation as we believe to be the case. (531-Docket)

Comment: **Subject: SORE reg and RV generators**
I am still supporting RVIA in addressing the regulation relative to generators used in motorhomes and travel trailers. Are you allowed to answer questions by phone or email that I might have regarding:
1) the reference in the ISOR to stationary engines being exempt (but no definition in the reg), and
2) lack of any mention of RVs in the ISOR? The ISOR explains that the rule is not applicable to stationary generators which are described as being generators which are not moved for equipment operation or storage. I think one could describe an RV generator the same way given the generator is bolted into the RV. (566-Email)

Comment: RVIA's Request that the Board Direct Staff to Modify the Proposed SORE Amendments at the Hearing on December 9, 2021 - RV Industry Association (RVIA) Meeting with CARB Board Vice Chair Sandra Berg [slide 1] (2004-Docket)

Introductions and Background on RVIA, Meeting Agenda [slides 2-5]
About RVIA - RVIA is a national trade association representing the manufacturers and suppliers of

America's family camping vehicles, including motorhomes, travel trailers, fifth-wheel trailers, truck campers and park models, collectively referred to as Recreation Vehicles or RVs. (2004-Docket)

Background on RVs [slides 6-7]

- RVs include motorhomes and towable RVs
- RVs are equipped with AC units, heating, cooking refrigeration, lights and other pieces of equipment that use electricity.
- The equipment on board an RV (especially air conditioning and heating) is critical to sustaining life when the unit is operated in hot and cold environments.
- Most of the time, an RV operates like an electrified home (when plugged into grid power at a campground or park)
- When an RV is used in remote locations where grid power is not available, the air conditioner and other appliances get their electricity via a fixed-mount stationary generator powered by a SORE.
- On average, RVs are used only 22 days per year. The generator is operated only a small fraction of this time.
- RV generator emissions are a very tiny fraction of overall SORE emissions (2004-Docket)

Staff's SORE amendments and their applicability to RVs [slides 8-11]

- Staff is exempting stationary generators but does not include fixed-mount stationary RV generators in this group of exempt stationary generators.
- RV generators have nothing in common with portable generators and everything in common with exempt stationary generators.
- Neither stationary generators nor portable generators are defined in the proposed regulation.
- Staff considers portable generators to be "those moved by hand and not bolted to concrete pad or other permanent build surface."
- Staff considers stationary generators to be those "not moved for equipment operation or storage."
- RVIA will consider fixed-mount stationary RV generators to be stationary generators and thus exempt from the SORE regulation until such time that the regulation is amended to indicate otherwise.
- We request that you direct the Staff to modify the rule to clarify how it intends to regulate generators used in RVs. (2004-Docket)

Comment: RVIA's request of the Board to direct staff to modify the proposal [slides 19-20]
RVIA requests the Board direct staff to modify the proposed regulation to either:

1. Confirm that RV fixed-mount generators will be deemed "stationary" or otherwise exempt or
2. Defer application of the ZEE standards for RV generators to 2035. (2004-Docket)

Comment: For these reasons, I would ask that you amend your definition of small off-road engines to exempt those generators used to power recreational vehicles. (3010-Oral Testimony)

Comment: RVers are in the exact same type of circumstance as homeowners. The RVs are mobile. They're not stationary, but the houses and the relationship between the house part of the RV and the generator is stationary as the relationship between a home and a generator. (3014-Oral Testimony)

Comment: So we see this as a very important initiative for the future, but we also see this as it relates to RVs, which are very similar to homes. We see this as the sit -- a situation where the generators are stationary to the house part of the RV. And it would be essential for RVers to be excluded from the rule. (3014-Oral Testimony)

Comment: My name is Jeff Burian and I am the Operations Manager for Forest River, which manufacturers RVs in the state of California. To the point of many that spoke today, I can say that we recently designed and tested an RV that was built with the maximum number of solar panels allowable by RVIA codes and standards. The RV was equipped with large -- four large solar batteries that used up all the storage space we could utilize in an RV and an inverter capable of handling the electrical demands of the average RV. This test was conducted in mild weather conditions where demands on the heating and air conditioning systems were minimal. We also asked end users of our products to participate in the testing. What our test revealed was that the solar paneled unit -- powered unit did not meet the expectation of the average RV owner and would leave them without back-up power under normal operating conditions. Upon revealing the cost to the consumer of $20,000 or more than the cost of an RV built with a fix-mounted generator, the customers surveyed stated they would not purchase the RV. (3022-Oral Testimony)

As an employer of over 500 employees in the state of California, I'm concerned with how the new regulation could affect our industry with regards to loss of sales, jobs, customer satisfaction, and the safety of RVs in the state of California. It will ultimately have a ripple effect that will travel well beyond the RV industry and its dealerships. Although we could stop the sales of gas-powered generators in the state, there will still be generators out there for consumers to get their hands on, whether those generators are new, rebuilt, or outdated, or on their last leg, they will acquire them and attempt to install them on their own. Generators that are designed and installed at the factory level meet the most stringent codes to ensure they meet CARB as well as safety standards. Generators to -- consumer-installed generators do not. For these reasons, I request fix-mounted generators be exempt from the proposed amendment or given more time to comply. (3022-Oral Testimony)

Comment: My name is Ronnie Raddigan. I've been employed in the RV industry for over 26 years and serve on the California RVDA Board. I wanted to share my knowledge, thoughts, and impact of this bill to our industry. The aspect I am speaking on today is CARB including what they're defining as portable generators and the financial impact of this definition. The definition in this bill should not apply to RV homes. Although they do not meet the requirement set forth of 19 kilowatts, they are far from affordable. They do not have wheels or a carry handle. And the smallest RV mounted generators weigh in the minimum of 175 pounds. (3023-Oral Testimony)

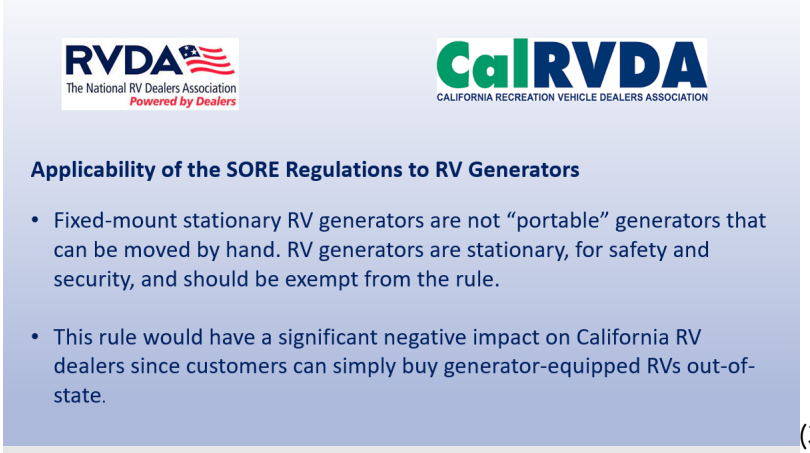
Comment: No matter what you decide on Bill 1346, unless it becomes a nationwide effort, it will not prevent the use of mounted generators on RVs in the State of California. Therefore, including them will have no impact on emissions in 2028. Please exclude on-board generators as part of this bill and better define portable. (3023-Oral Testimony)

Comment: This is Chad Reece. I can't hear you, but I will continue on. Industry veteran of 34 years and avid RV enthusiast, but wanted to speak on a couple of points that have been brought up very briefly. But the stationary application definition here we think is key. And the decision that the Board we're hoping will make in excluding RV generation in this process, and that they are used in more of a

stationary application. If you look at the definition, they are tied to the living unit, specifically are not portable in that sense. (3030-Oral Testimony)

Comment: Based on this information, we request that staff revisit our product category and reclassify the RV fixed-mount generator product consistent with the requests of previous RV stakeholders who have spoken at today's Board meeting. (3049-Oral Testimony)

Comment: And the next slide, please. We agree with the previous testimony regarding RV generators as being fixed mounts. (3063-Oral Testimony)



(3063-Oral Testimony)

Slide 2 text: Applicability of the SORE Regulations to RV Generators

- Fixed-mount stationary RV generators are not "portable" generators that can be moved by hand. RV generators are stationary, for safety and security, and should be exempt from the rule.
- This rule would have a significant negative impact on California RV dealers since customers can simply buy generator-equipped RVs out-of-state. (3063-Oral Testimony)

**Agency Response:**

These comments request that CARB add definitions to the Proposed Amendments for "stationary generator" and "fixed-mount generator" and that CARB exempt RV generators from the SORE regulations. Commenters also include introductory remarks that describe the commenters' organizations and provide background information about RVs. CARB did not add a definition for stationary generator to the SORE regulations because it is not necessary given current and CARB-proposed definitions provide the information necessary to conclude that stationary generators are not subject to the SORE regulations:

> "Generator" means off-road equipment that exclusively produces electric power. *(definition in Proposed Amendments, ISOR Attachment A, new subsection (30) in § 2401(a))*
>
> "Off-road vehicle" or "Off-road equipment" means any non-stationary device, powered by an internal combustion engine or motor, used primarily off the highways to propel, move, or draw persons or property including any device propelled, moved, or drawn exclusively by human power, and used in, but not limited to, any of the following applications: Marine Vessels, Construction/Farm Equipment, Locomotives, Small Off-Road Engines, Off-Road

Motorcycles, and Off-Highway Recreational Vehicles.
*(definition in current SORE regulations, CCR § 2401(a))*

In addition, generators that are fueled from the fuel tank of an on-road motor vehicle are already exempted from diurnal, carbon canister design, and fuel tank permeation standards in the current regulations, and the Proposed Amendments exempt them from the hot soak plus diurnal emission standards. Further, as described in the ISOR on pages ES-7 to ES-8, 24-26, and 31-35, and in the Purpose and Rationale statements for individual provisions of the Proposed Amendments on pages 160-171 and 223-229, CARB recognizes that generators in general need more time to transition to zero-emission technology, and the Proposed Amendments allow more time for generators to meet emission standards of zero. A new definition for "fixed-mount generator" and a new exemption for generators installed in vehicles or similar mobile applications are beyond the scope of the Proposed Amendments. For these reasons, CARB made no changes based on this comment.

These comments are similar to other comments that request CARB define "stationary generator" or "fixed-mount generator." Please refer to Agency Response 3 in Attachment A to this FSOR and Agency Responses B-3 and B-28(b) in Attachment B to this FSOR.

In response to the comment, "For the reasons discussed above, RVIA considers fixed-mount stationary RV generators to be exempt from the SORE regulation until such time that the regulation is amended to indicate otherwise,": CARB disagrees with the commenter's statements and conclusions. SORE generators used in RVs are subject to the SORE regulations and have been certified under the SORE regulations since 1995. The generators the commenter describes, other than those powered by compression-ignition engines produced during the 2000 and later model years, are subject to the SORE regulations.

The commenter's conclusory statements regarding the commenter's opinions about differences between some SORE generators and other SORE generators (those used in RVs) do not demonstrate that RV generators are exempt from the SORE regulations and do not constitute a valid method to determine whether an engine is subject to the SORE regulations. CARB disagrees that RV generators are not moved; they move along with the RVs in which they are used. CARB disagrees that RV generators are not moveable by hand; they may be heavy, and other SORE generators may be heavy. Whether or not an RV generator is moved within an RV or removed from an RV after its initial installation, it is subject to the SORE regulations if it is powered by a small off-road engine. The commenter does not provide supporting evidence for its statement regarding the difference in frequency that RV generators and other SORE generators are refueled; CARB disagrees that refueling frequency can be used to determine whether an engine is subject to the SORE regulations. The commenter does not provide supporting evidence for its statements regarding routine electrical loads and battery size and cost; CARB disagrees that routine power loads of 4,000 watts or greater, battery costs greater than $20,000, or use of a generator to power air conditioning or a refrigerator can be used to determine whether an engine is subject to the SORE regulations. CARB disagrees that RV generators are never tilted. The commenter does not provide supporting evidence for its statement; for such a statement to be true, RVs would have to be operated exclusively on perfectly level roads. Driving into or out of a driveway or parking on the side of a road are examples of actions that would tilt an RV generator along with the rest of the RV. The commenter does not provide supporting evidence for its statement that annual hours of use are extremely low for RV generators. It is true that some RV generators and other SORE generators may not be used frequently; the commenter does not demonstrate a difference in the use time for RV generators versus other SORE generators.

Regarding the comment, "Regarding the more stringent engine emissions standards that are proposed for the years leading up to the proposed zero emissions generator ban in 2028, we note that, when asked by RVIA, engine suppliers have no idea how they will comply or what will be the cost impact born by RV manufacturers and ultimately by consumers…," and other comments related to the technical feasibility of zero-emission RV generators, please refer to the discussion specific to ZEE feasibility and RV generators in the Agency Responses in sections IV.A.2.3.2.

In response to the comment, "Are you allowed to answer questions by phone or email that I might have regarding …," CARB staff sent a response that explained that the SORE regulations apply to generators installed in motor vehicles and trailers because they are less than or equal to 19 kw (25 hp) and are considered portable generators because they can be moved by hand and are not bolted to a concrete pad or other permanent building surface (i.e., roof). Staff's response also noted that there is an exception to the diurnal standard in title 13, California Code of Regulations, section 2766 (c) for generators fueled from the fuel tank of an on-road motor vehicle or marine vessel, however these generators must use fuel lines that meet the design standard specified in title 13, California Code of Regulations, section 2754.

In response to RVIA's comment, "RV generator emissions are a very tiny fraction of overall SORE emissions,": The commenter's statement is subjective, and the commenter does not provide evidence to support its claim. As described on page 199 of the ISOR, generators accounted for approximately 14 percent of the total population of SORE equipment and 19 percent of all ROG and $NO_x$ emissions from SORE in 2020. SORE RV generators are included with other SORE generators in the SORE2020 emissions inventory. Based on sales of SORE RV generators of more than 9,000 units per year according to RVIA's other comments, emissions from SORE RV generators are a significant fraction of overall emissions from SORE generators. The commenter's belief that RV generator emissions are a tiny fraction of overall SORE emissions is not sufficient evidence to exempt them from the proposed emission standards. Such an exemption would fail to maximize emission reductions from SORE as required by Health and Safety Code section 43018.

For a discussion of RVIA's comment, "RVIA requests the Board direct staff to modify the proposed regulation to … Defer application of the ZEE standards for RV generators to 2035," other comments that request delayed implementation of emissions standards of zero, and comments regarding complying with MY 2024 through 2027 emission standards, please refer to the Agency Response in section IV.A.2.3.2.

In response to the statement, "we recently designed and tested an RV that was built with the maximum number of solar panels allowable by RVIA codes and standards…What our test revealed was that the solar paneled unit -- powered unit did not meet the expectation of the average RV owner and would leave them without back-up power under normal operating conditions," and similar statements: The commenter does not state what the maximum number of solar panels allowable by RVIA codes and standards is or why RVIA codes and standards limit the number of solar panels on an RV. The commenter does not specify the size of the RV or the capacity of the batteries installed on the RV. The commenter does not explain what the expectations of the average RV owner are or discuss why the average RV owner has those expectations. The commenter does not specify what portion of the cost to the consumer represents markups or profit for the manufacturer, dealer, or any other party. The commenter does not provide information or data regarding its statement that consumers would not purchase the RV with solar panels. CARB cannot evaluate the commenter's claims because of the lack of supporting information for the comment. A zero-emission generator such as the

Goal Zero Yeti 6000X with 4 Nomad 200 Solar Kits cost $7,350.52, as described on page 25 of the ISOR.[20,21] As discussed on page 24 of the ISOR, a zero-emission generator such as the Goal Zero Yeti 6000X can be used to power a refrigerator for several days. The cost of this zero-emission generator is significantly less than the system the commenter mentions. A zero-emission generator with more energy storage or more solar energy generating potential could likely be used to provide significant power for an RV in addition to running a refrigerator and still cost less than the example in the comment.

Regarding the comment, "No matter what you decide on Bill 1346, unless it becomes a nationwide effort, it will not prevent the use of mounted generators on RVs in the State of California. Therefore, including them will have no impact on emissions in 2028,": CARB did not make any decision to approve or disapprove AB 1346. The California Legislature voted to approve AB 1346, and the Governor signed it. Nationwide efforts are beyond the scope of this rulemaking. The Proposed Amendments would require new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce to meet more stringent emission standards and other requirements. The Proposed Amendments do not require anyone to stop using RV generators or other SORE. CARB recognizes that generators used in RVs registered in California and other states are operated in California. CARB disagrees that including more stringent emission standards for RV generators in the Proposed Amendments will have no impact on emissions in 2028. Implementation of more stringent emission standards starting in MY 2024 will result in emission reductions, as described in Chapter IV of the ISOR.

In response to comments regarding out-of-state sales of RVs with SORE generators: CARB presumes full compliance with the SORE regulations. A person who imports SORE for introduction into commerce in California that is not CARB-certified violates CARB's regulations. (Title 13, California Code of Regulations (CCR), sections 2400, 2751I(a)(3)). Equally, a person who sells uncertified SORE equipment to someone who will use or operate the uncertified SORE equipment in California also violates CARB's regulations. (Title 13, CCR, sections 2400, 2751(a)(3).) Therefore, CARB does not expect sales of RVs with SORE generators that are not CARB-certified to occur in California or outside of California if those uncertified SORE generators will be used or operated in California. Please refer to the Agency Responses in sections IV.A.14.1 and IV.A.15 for discussion of out-of-state sales of SORE equipment ("leakage").

Please refer to the Agency Response in section IV.A.13.1.1 for discussion of comments related to potential loss of businesses or jobs.

### A.2.3.4. Make proposed emission standards less stringent for RV generators

Comment: As the leading manufacturer of RV generator EVAP fuel systems, and Director of Compliance and Standards for our company, I must voice my concerns about the upcoming proposals that are being considered for 2024. Currently, when testing to EVAP standards, a formula is used to

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[20] Goal Zero. 2021b. Portable Solar Generator Kits. (Web link: https://www.goalzero.com/shop/solar-kits/solar-generator-kits/. Last accessed: May 5, 2021.)

[21] Goal Zero. 2021d. Goal Zero Yeti 6000X Portable Power Station. (Web link: https://www.goalzero.com/shop/portable-power/goal-zero-yeti-6000x-portable-power-station/. Last accessed May 5, 2021.)

consider the gram per day limit. This formula considers the size of the fuel tank. Using this formula, on average, ECI comes in around 83% under the daily limit across our six (6) EVAP families. We have been EVAP testing for CARB certifications for 15 years and of the 27 tests we have conducted, only 1 of the tests could come anywhere near the new .7g/day emissions limits that are being proposed. Each of these previous tests took into consideration the size of the tank. (544-Docket)

***ECI asks the board to consider any change in the emissions limit to take into account the size of the fuel tank based on the intended application.*** (544-Docket)

CARB wishes to re-designate the grams per day limit for ≥225cc to 0.7g/day regardless of the tank size. Not only are they suggesting lowering the standard without considering the size of the tank, they wish to add the hot soak testing results into the diurnal test results. Please see attached page 35 of Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions Staff Report: Initial Statement of Reasons Date of Release: October 12, 2021 Scheduled for Consideration: December 9, 2021 for newly suggested grams per day limit. (544-Docket)

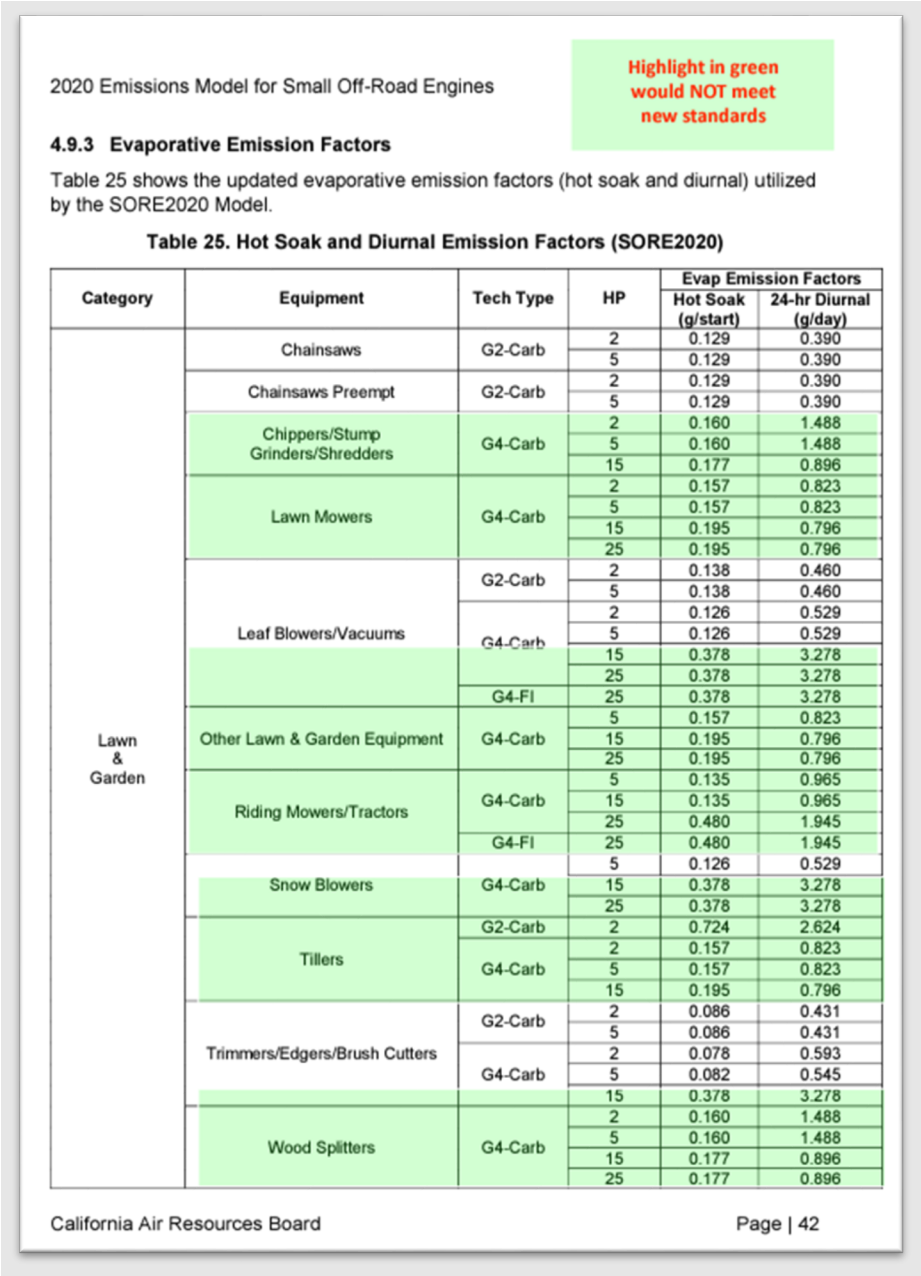
When asked how the .7g/day limit was reached, CARB staff directed us to an ISOR document (2020 Emissions Model or Small Off-Road Engines – SORE2020) that stated their research found that most EVAP applications could reach this new daily standard. Upon further research, I found in their own document mentioned above (page 42, attached), that during their validation studies only a select few of the smaller applications could ever reach this new daily emissions standard. Please see highlighted attachments. (544-Docket)

New Standards without taking tank size into account

Table II-2. Current SORE evaporative emission standards and evaporative emission standards under the Proposed Amendments.

| Displacement category | Current diurnal emission standard (g·day$^{-1}$) | Proposed hot soak plus diurnal emission standard[i] for MY 2024-2027 generators (g·test$^{-1}$) | Proposed hot soak plus diurnal emission standard for all other SORE for MYs 2024 and later (g·test$^{-1}$) |
|---|---|---|---|
| ≤ 80 cc | N/A | 0.50 | 0.00 |
| > 80 cc - < 225 cc except walk-behind mowers | 0.95 + 0.056 × nominal capacity (liters) | 0.60 | 0.00 |
| > 80 cc - < 225 cc walk-behind mowers | 1.0 | N/A | 0.00 |
| ≥ 225 cc | 1.20 + 0.056 × nominal capacity (liters) | 0.70 | 0.00 |

(544-Docket) *(Commenter added pink highlighting to an excerpt from a CARB document.)*



2020 Emissions Model for Small Off-Road Engines

Highlight in green would NOT meet new standards

**4.9.3 Evaporative Emission Factors**

Table 25 shows the updated evaporative emission factors (hot soak and diurnal) utilized by the SORE2020 Model.

**Table 25. Hot Soak and Diurnal Emission Factors (SORE2020)**

| Category | Equipment | Tech Type | HP | Evap Emission Factors | |
|---|---|---|---|---|---|
| | | | | Hot Soak (g/start) | 24-hr Diurnal (g/day) |
| Lawn & Garden | Chainsaws | G2-Carb | 2 | 0.129 | 0.390 |
| | | | 5 | 0.129 | 0.390 |
| | Chainsaws Preempt | G2-Carb | 2 | 0.129 | 0.390 |
| | | | 5 | 0.129 | 0.390 |
| | Chippers/Stump Grinders/Shredders | G4-Carb | 2 | 0.160 | 1.488 |
| | | | 5 | 0.160 | 1.488 |
| | | | 15 | 0.177 | 0.896 |
| | Lawn Mowers | G4-Carb | 2 | 0.157 | 0.823 |
| | | | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | | | 25 | 0.195 | 0.796 |
| | Leaf Blowers/Vacuums | G2-Carb | 2 | 0.138 | 0.460 |
| | | | 5 | 0.138 | 0.460 |
| | | G4-Carb | 2 | 0.126 | 0.529 |
| | | | 5 | 0.126 | 0.529 |
| | | | 15 | 0.378 | 3.278 |
| | | | 25 | 0.378 | 3.278 |
| | | G4-FI | 25 | 0.378 | 3.278 |
| | Other Lawn & Garden Equipment | G4-Carb | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | | | 25 | 0.195 | 0.796 |
| | Riding Mowers/Tractors | G4-Carb | 5 | 0.135 | 0.965 |
| | | | 15 | 0.135 | 0.965 |
| | | | 25 | 0.480 | 1.945 |
| | | G4-FI | 25 | 0.480 | 1.945 |
| | Snow Blowers | G4-Carb | 5 | 0.126 | 0.529 |
| | | | 15 | 0.378 | 3.278 |
| | | | 25 | 0.378 | 3.278 |
| | Tillers | G2-Carb | 2 | 0.724 | 2.624 |
| | | G4-Carb | 2 | 0.157 | 0.823 |
| | | | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | Trimmers/Edgers/Brush Cutters | G2-Carb | 2 | 0.086 | 0.431 |
| | | | 5 | 0.086 | 0.431 |
| | | G4-Carb | 2 | 0.078 | 0.593 |
| | | | 5 | 0.082 | 0.545 |
| | | | 15 | 0.378 | 3.278 |
| | Wood Splitters | G4-Carb | 2 | 0.160 | 1.488 |
| | | | 5 | 0.160 | 1.488 |
| | | | 15 | 0.177 | 0.896 |
| | | | 25 | 0.177 | 0.896 |

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(544-Docket) *(Commenter added green highlighting to an excerpt from a CARB document.)*

**Agency Response:**

These comments raise concerns and request changes related to emission standards for generators designed for integration into a vehicle, such as an RV. CARB made no changes based on these comments.

The commenter expresses opinions regarding the current diurnal emission standards, which depend in part on the nominal capacity of the fuel tank, and the proposed hot soak plus diurnal emission standards, which do not depend on the nominal capacity of the fuel tank.

CARB is required to adopt standards that achieve the maximum degree of technologically feasible, cost-effective emissions reductions from SORE by the earliest practicable date. Chapters II.A and XI.B of the ISOR explain the necessity of and justification for including hot soak emissions in the evaporative emission standards. There are engines that are capable of

achieving the adopted evaporative emission standards, and less stringent standards would result in fewer emission reductions. As described on page 165 of the ISOR, "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[22]] lists 27 evaporative families with certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR. However, as described on pages ES-7 to ES-8, 24-26, 31-35, 160-171 and 223-229 of the ISOR, CARB recognizes that generators in general need more time to transition to zero-emission technology, and the Proposed Amendments allow more time for generators to meet emission standards of zero. The commenter does not provide evidence, and CARB data do not suggest, that hot soak plus diurnal emission standards must be less stringent for engines with larger fuel tanks than for engines with smaller fuel tanks. The proposed evaporative emission standards for larger displacement categories are less stringent than those for smaller displacement categories.

With regard specifically to generators designed for integration into a vehicle, section 2766, subsection (c), is revised under the Proposed Amendments to read as follows:

"(c) Equipment Fueled by a Vehicle Fuel Tank – Generators that are fueled from the fuel tank of an on-road motor vehicle or marine vessel are exempt from the diurnal emission, hot soak plus diurnal emission, fuel tank permeation, and carbon canister design standards in section 2754. However, these generators must use fuel lines that meet the design standard specified in section 2754."

Generators that are fueled from the fuel tank of an on-road motor vehicle are already exempted from diurnal, carbon canister design, and fuel tank permeation standards in the current regulations, and the Proposed Amendments exempt them from the hot soak plus diurnal emission standards.

### A.2.3.5. Exempt or delay compliance dates for portable generators

Comment: Please exclude generators for areas where PG&E loses power, areas such as Santa Cruz County. I am disabled and need power 100% of the time. I currently use a Honda 5000ex to power the refrigerator/freezer to store my perishable prescriptions and heat. If it weren't for the generator I don't know how I could exist at my home of 21 years. I cannot afford a Tesla wall battery and solar, which wouldn't last as long as needed up here in the mountains anyway. After the CZU fire we were out of power for weeks. I doubt battery generators that will last with the same energy and time usage by 2022 (maybe by 2035). Don't cut off our lifeline. (4-Docket)

Comment: Third: 2024 is too soon to eliminate the sale of gas powered generators. Besides PSPS, the power goes out frequently in rural areas. Winter storms, dead trees or limbs falling on lines any time of year, and many other issues often caused unplanned outages. Many households have medical needs, and cannot be without power due to oxygen, or medications needed to be kept cool etc. etc. I strongly urge the Board to extend the time frame on the generator portion of this regulation until there are other solutions. According to CARB, wildfires emitted more than 100 million metric tons of CO2 last year. Let's not set ourselves up for even larger and worse fires in the future causing loss of property and life. Also, the board seems to have forgotten that trees produce oxygen and clean

[22] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

carbon dioxide out of the air we breathe. Without trees, life could not continue. Trees have also proved to remove airborne particles from the air and reduce smog, thereby improving the air we breathe, and therefore, our respiratory health. Please consider this in your decisions. (12-Docket)

Comment: I'm concerned about the pending regulations of off road engines, specifically generators used for back up power. I live in the Santa Cruz mountains, and 4 years ago removed my wood stove, replacing it with a electric heat pump. This was done to reduce air pollution, save energy, and improve air quality in my house. I did this knowing I would have to increase the size of the generator I use to provide back up power in the winter. We have many power outages in my area every winter. Solar panels/battery back up is not possible due to the surrounding redwood forest. Battery back up using the power grid is of limited use when some outages are 3-7 days. The battery capacity to power a heating system would be huge and very expensive. Removing our ability to use generators for backup power would make life very difficult for my family and many others in similar areas during power outages. Please consider an exemption for generators in areas where there are no alternatives. (29-Docket)

Comment: I am writing in opposition to the proposed rule. I have over 30 years experience in the field of safety/emergency preparedness. The proposed rule is infeasible especially in the area of gasoline and diesel emergency generators which are critical during the frequent power outages California experiences. This will impact me both at home where I depend on an emergency generator for personal medical equipment during power outages and professionally as organizations depend on emergency generators for critical power needs during outages. All emergency generators should be exempt from this proposed regulation, period. (485-Docket)

Comment: I have a small business that use 18HP generators to operate Cutting & drilling Equipment on remote or Unpowered job sites i have not seen any ways in the public sector that will accomplish the power needed to operate these types of tools unless we start towing large generators which are very expensive and cause more pollutants not to mention the problems with getting them to locations where work is required any answers would be greatly appreciated as i try to stay informed on these issues and spread that information to other contractors in our area - thank you (486-Docket)

Comment: **II. A Review of Whether Comparable Technologies Exists Should Be Conducted Prior to The 2028 Phase Out of Portable Generators.**
Transfer Flow, Inc. appreciates that CARB has recognized our concerns regarding a lack of comparable technologies to portable generators, especially for use in emergency situations, and in connection with possible life-saving medical equipment. Transfer Flow is located less than 20 miles from the historically devastating 2018 Campfire that decimated the town of Paradise, California as well as within 40 miles of the Dixie Fire so for Transfer Flow, Inc. preserving the use of portable generators is personally concerning. Current zero-emission portable generators are inadequate and unrealistic for emergency backup power. For many vulnerable people who require life-sustaining medical equipment such as nebulizers, oxygen machines, or electric wheelchairs, a power outage that lasts for an extended period such as several days can come with considerable fear, safety risks, and could be a life-or-death situation without adequate backup power due to the lack of affordable alternatives. For these vulnerable populations, banning the sale of spark-ignited internal combustion engine-powered portable generators could be putting their lives at risk. (487-Docket)

Transfer Flow asserts that zero-emission portable generator products do not offer consumers anywhere near the same utility as spark-ignited internal combustion engine-powered portable generators. Transfer Flow asserts that before banning the sale of spark-ignited internal combustion engine-powered portable generators, CARB should conduct a review as to whether ZEE technologies

have advanced enough to provide a feasible alternative to the use of portable generators for both emergency situations as well as for power outages. (487-Docket)

Spark ignited, internal combustion, engine-powered portable generators are ideal for providing affordable emergency backup power during a natural disaster or a power outage. Spark-ignited, internal combustion, engine-powered portable generators can provide continuous affordable backup power as long as there is a supply of fuel for the portable generator. Obtaining fuel to run a portable generator is very feasible. (487-Docket)

While the price of a portable generator can range from a couple hundred to a few thousand dollars, stationary generators cost at least $2,000, with an installation price tag that can cost $10,000. The large initial investment is prohibitive to many people who cannot afford the upfront costs associated with these options as low-income residents simply cannot afford any extra expenses. (487-Docket)

Prior to banning the sale of new spark-ignited internal combustion engine-powered portable generators, CARB should conduct a study of available alternative technologies and ensure an adequate replacement technology has been developed and is indeed available to the average household that could previously have used a portable generator. Therefore, for the reasons stated above, Transfer Flow requests CARB reevaluate comparable technologies to portable generators prior to the ban of sales of new portable generators in 2028. To do otherwise could be potentially harmful and dangerous to California residents. (487-Docket)

Comment: On behalf of the Portable Generators Manufacturers' Association ("PGMA"), we appreciate the opportunity to submit these comments on the California Air Resources Board ("CARB") Proposed Amendments to the Small Off-Road Engine Regulations ("Proposed Amendments") and accompanying Initial Statement of Reasons ("ISOR"), released October 12, 2021. These comments supplement comments previously submitted by PGMA.[1] [Footnote 1: PGMA submitted comments on this Rulemaking to CARB on April 7, 2021.] PGMA is a trade association of portable generator manufacturers in the United States. Since our members include the major industry manufacturers of portable generators sold in North America and a significant majority of the industry, we are the recognized voice of the portable generator industry. Our full member companies include: (515-Docket)

- American Honda Motor Co., Inc.
- Briggs & Stratton Corporation
- Champion Power Equipment
- DuroMax Power Equipment
- Firman Power Equipment
- Generac Power Systems
- Harbor Freight Tools USA, Inc.
- Yamaha Motor Corporation USA (515-Docket)

PGMA has many material concerns related to the Proposed Amendments, most of which have been previously expressed in PGMA's prior comment letter and those of other industry stakeholders, and in our meetings with CARB staff. (515-Docket)

PGMA supports CARB's efforts to reduce emissions from small off-road engine ("SORE") equipment and is willing to work with CARB to develop a solution that accomplishes that goal.[2] [Footnote 2: See

Section VIII, infra.] But as CARB staff made clear in the ISOR, "[g]enerators are fundamentally different from other SORE equipment."[3] [Footnote 3: ISOR, at p. 24.] And yet, the Proposed Amendments do not treat generators fundamentally differently than other SORE equipment. Instead, the Proposed Amendments ignore the technological infeasibility and high costs of transitioning portable generators to zero-emissions in the timeframe required. (515-Docket)

Our concerns with the Proposed Amendments, which are explained more fully in Attachment 1, are as follows. (515-Docket)

First, the Proposed Amendments do not fully appreciate the fact that spark-ignited portable generators are a unique product, used primarily for emergency home backup power, unlike other SORE equipment and zero emission generators, which are used primarily for discretionary activities. (515-Docket)

Second, the Proposed Amendments are premised on faulty data that overestimates both the population of spark-ignited portable generators in California and their associated emissions. (515-Docket)

Third, the Proposed Amendments are neither technologically feasible nor cost-effective because zero emission generators do not perform the same functions as spark-ignited portable generators and are also orders of magnitude more expensive. (515-Docket)

Fourth, the two-step phase out of spark-ignited portable generators will hamper the transition to zero-emission portable generators because it may divert the resources needed to develop effective and affordable zero emission technology. (515-Docket)

Fifth, the credit provisions are unlikely to be effective because there will likely not be enough zero emissions generators sold to generate a significant number of credits. (515-Docket)

Sixth, CARB's reliance on the 2016 Environmental Assessment for the State Implementation Plan is not supported because CARB has a significant amount of new, specific information it needs to analyze to support the broad conclusions in that document.

Seventh, the Proposed Amendments do not meet the Environmental Protection Agency's criteria for a waiver from the Clean Air Act. (515-Docket)

PGMA's proposed solution, which focuses on the statutorily mandated requirements of technological feasibility and cost effectiveness, will ensure that California consumers will continue to have access to portable generator solutions that provide the function required during emergencies at reasonable price points. (515-Docket)

Comment: As described more fully below in Section III.A, zero emission portable generators are not suitable home backup power solutions. Other options for home backup power that the ISOR identifies such as stationary generators that run on natural gas or propane are very expensive and cannot be installed on demand. Thus, if CARB adopts the Proposed Amendments, a majority of California consumers who face an imminent emergency situation will be unable to find a solution to adequately provide backup power in the face of grid failure. (515-Docket)

Comment: This data underscores a fundamental problem with the Proposed Amendments. The Proposed Amendments treat portable generators like any other type of SORE equipment. But this is just not the case. Portable generators save lives. Portable generators provide comfort in incredibly

trying times. If there was a feasible path for portable generators to fulfill these functions while having zero emissions, PGMA and its member organizations would not have a problem being treated like every other SORE equipment in California. But the basic fact of the matter is that in 2028, there is very little chance that zero-emission alternatives will function at anywhere near the level of spark-ignited generators do today and not at the varied price points available to consumers today. (515-Docket)

Comment: B. Lawn and Garden Equipment Are Discretionary Tools Whereas Portable Generators Are Not
As described above, the majority of California consumers who purchase portable generators do so for the purpose of home backup power. Aside from planned maintenance power outages, consumers use portable generators at unexpected times. This contrasts with lawn and garden equipment which is discretionary in the sense that an operator can freely choose when to use the equipment. (515-Docket)

Similarly, there is flexibility on the timing of recharging the batteries of zero-emission equipment ("ZEE") lawn and garden equipment. This is not the case for portable generators in emergency backup power applications. Users cannot easily recharge ZEE portable generators during a power outage.[7] [Footnote 7: This comment letter refers to battery power stations as "ZEE generators" but as discussed in Section I.C, that term is a misnomer for such battery power stations as they do not generate electricity like a spark-ignited portable generator does.] Strategies for extended usage of a ZEE portable generator during a power outage include buying multiple generators or a solar- or wind-powered charger. These strategies not only significantly increase the price of the ZEE portable generator to the consumer, but also are insufficient solutions as we will explain in more detail in our comments below. (515-Docket)

Comment: C. Spark-Ignited Portable Generators Create Power While ZEE Generators Simply Store It
ZEE "generators" are not truly "generators" so much as they are "power stations." The distinction is key because a spark-ignited portable generator generates electricity at the point of use. A ZEE power station simply stores electricity that was already created.[8] [Footnote 8: The exception to this general rule are portable power stations equipped with solar panels or wind turbines that create electricity at the point of use. That said, those accessories to a power station are often sold separately, cost additional hundreds of dollars, and typically do not generate enough power to recharge the power station in a reasonable amount of time during a power outage.] (515-Docket)

As described more fully in Section III, spark-ignited portable generators can serve a wide variety of potential consumer needs because of their ability to generate electricity. For example, spark-ignited portable generators are ideal for providing emergency power during power outages and power at construction sites—both uses that by their nature lack access to the grid. Spark-ignited portable generators can provide power continuously for many hours or many days if needed, as long as there is a supply of fuel such as gasoline. Having enough fuel on hand to run a spark-ignited portable generator continuously for a few days is very feasible. (515-Docket)

In contrast, ZEE portable generators are not suitable for providing emergency backup power during power outages and are not powerful enough to power the types of tools commonly seen on construction sites. While a ZEE portable generator may be an acceptable replacement for certain short-duration uses of spark-ignited portable generators such as tailgating, the inability for a ZEE portable generator to generate electricity makes them fundamentally unsuitable for their most critical uses. (515-Docket)

Comment: In Supporting the Proposed Amendments, the ISOR Treats Portable Generators the Same as All Other SORE Equipment

As described throughout this Section I, portable generators serve a fundamentally different purpose than other SORE equipment covered by the Proposed Amendments. Despite that CARB recognizes this at points throughout the ISOR, the ISOR also makes broad sweeping statements of general applicability that do not apply to portable generators. Any reliance on these statements to support the Proposed Amendment as they relate to portable generators is arbitrary and capricious. Below is a non-exhaustive list of statements that the ISOR makes that purport to be inclusive of portable generators but that are verifiably untrue of portable generators:

1. "The small off-road equipment market is well prepared for electrification."[9] [Footnote 9: ISOR, at p. ES-5.] As evidenced even by the Proposed Amendments extra time for portable generators, the current off-road equipment market is not well prepared for the electrification of portable generators. (515-Docket)

2. "The wide availability of ZEE equivalents for SORE equipment suggests that replacing SORE equipment with ZEE is feasible."[10] [Footnote 10: Id. at p. ES-7.] This is not true for ZEE generators. There is not current wide availability of ZEE equivalents to SORE equipment today. For that reason, this statement cannot support a finding that replacing spark-ignited generators with ZEE is feasible. (515-Docket)

3. "While adoption rates for ZEE among professional landscapers are lower than for residential users, there is substantial evidence that all new small off-road equipment can be zero-emission."[11] [Footnote 11: ISOR at p. ES-7.] The ISOR does not provide any evidence that all new portable generators can be zero-emission. (515-Docket)

4. "Electric small off-road equipment have been available for decades." [Footnote 12: ISOR at p. 3.] ZEE generators have not been available to the average consumer for decades. (515-Docket)

5. "ZEE on the market today have a broad range of both capability and price."[13] [Footnote 13: ISOR at p. 3.] ZEE generators are both limited in terms of capability (low capability) and price (high price). (515-Docket)

6. "For the most common types of SORE equipment, there are ZEE equivalents available in the market with similar or better performance characteristics and lifetime."[14] [Footnote 14: Id. at p. 13.] As explained in depth in Section III, infra, there are no ZEE equivalents on the market today that have similar or better performance characteristics as equivalently priced spark-ignited generators. (515-Docket)

7. "The SORE equipment and ZEE evaluated may have different runtimes, but the runtime of the ZEE can always be extended through the use of additional batteries."[15] [Footnote 15: Id. at p. 15.] The vast majority of ZEE generators are not set up to have interchangeable, separately chargeable batteries. Therefore, because most ZEE generators are effectively batteries themselves, the only way to efficiently extend the runtime of a ZEE generator is to buy a second ZEE generator. (515-Docket)

8. "Many districts offer incentives on residential equipment, as well."[16] [Footnote 16: Id. at p. 27.] The ISOR includes no citation to this statement and PGMA is unaware of any air districts offering incentives to purchase ZEE portable generators.[17] [Footnote 17: It does appear that air districts like the South Coast Air Quality Management District offer incentives for ZEE lawn and

garden equipment but not ZEE generators, underscoring that other regulators treat these types of equipment differently. "Equipment available through this program includes handheld trimmers, chainsaws, pruners, backpack and handheld blowers and ride-on, stand-on, walk-behind and robotic lawn mowers."
http://www.aqmd.gov/home/programs/community/community-detail?title=lawn-equipment] (515-Docket)

Comment: The two-step phase out of spark-ignited generators will hamper the transition to zero-emissions (515-Docket)

Comment: The ISOR notes that the "proposed MY 2024-2027 emission standards are approximately 40 to 90 percent lower than current emission standards for generators. Engines currently certified for sale or lease for use or operation in California exhibit emissions below the proposed MY 2024-2027 emission standards. These engines demonstrate the feasibility of the proposed emission standards."[36] [Footnote 36: 6 ISOR, at p. ES-8.] But the ISOR does not discuss the cost-effectiveness of mandating that all portable generators for sale between 2024 and 2027 meet these more stringent standards. (515-Docket)

Comment: The majority of available portable generators do not meet the proposed dramatically reduced California emissions standards for 2024 through 2027 and would therefore need to be redesigned and resubmitted for exhaust and evaporative emissions approval. The research and development time plus expenses associated with this process may not be warranted for portable generators that would only be available for sale in California within a four-year window. This may impact the availability of reasonably priced portable generators for emergency backup and other uses and would conflict with California Executive Order N-79-20 Section 2, which stated that "CARB shall act consistently with technological feasibility and cost-effectiveness" and AB 1346 which also require the regulations to be cost-effective and technologically feasible. (515-Docket)

Comment: **The Credit Provisions are Unlikely to be Effective**
It is not clear at this time how beneficial the proposed zero-emission generator credit provisions will be for manufacturers because it is not clear if California consumers will buy ZEE generators in significant volume to generate needed credits. As described extensively above, ZEE portable generators are much more expensive and offer much lower utility than spark- ignited portable generators. Level 3 and Level 4 ZEE generators would likely not be portable, because of the size and weight of the batteries. What's more, there would likely be challenges with shipping and storing products with such large batteries because of U.S. Department of Transportation regulations. (515-Docket)

Comment: As described throughout this letter, the Proposed Amendments are neither technologically feasible nor cost-effective when it comes to portable generators. And portable generators serve a function that is too important to risk not having capable products on the market. With that in mind, PGMA and its member organizations are proposing the following framework for new SORE regulations that will meet the requirements of the California consumer as well as CARB's statutory authority. This proposal is in response to CARB staff's request of PGMA to offer a proposed solution in its November 17, 2021 meeting. (515-Docket)

Comment: First, the amendments to the SORE regulations should require reduced emissions in portable generators starting in 2026. There are currently no identified methods where evaporative emissions can be reduced to the proposed levels. Therefore, the proposed reduction in evaporative emissions is challenging and manufacturers will need more time to comply. Although page 33 of the ISOR claims "Currently-certified engines meet these emission standards, including the hot soak.

Several evaporative families in each displacement category meet the proposed emission standards", no data was provided to support this claim. It would be helpful if CARB would identify which engines and evaporative families in each displacement category meet the proposed evaporative emission standards. Another reason for extending the date for reduced emissions from 2024 to 2026 is due to ongoing supply chain issues in the industry. Travel restrictions inhibit the speed of new development programs for components that will be required in order to comply with the proposed reduced exhaust and evaporative emission standards, along with the proposed increase in the emissions durability period. (515-Docket)

Comment: Second, amend the proposed HC + $NO_x$ emission standard for 225-825 cc generators MY 2026 and later to 6.0 g/kWh to harmonize all generators 825 cc and below. The 225-825 cc category of generators is the most popular for emergency home backup and the technical changes required to meet a 3.0 g/kWh standard would likely make the generator cost too much for the average consumer to afford. This would risk consumers not having acceptable backup power during non-discretionary, emergency situations. Setting an emissions standard of 6.0g/kWh for 225-825 cc generators will result in reduced emissions compared to current standards while ensuring that these important products remain available to consumers when they need them most. (515-Docket)

Third, mandate zero emission portable generators when they are cost effective and technologically feasible, but not earlier than 2031 or later than 2035. This would provide for a minimum 5-year sales window for reduced emission portable generators, allowing manufacturers more time to obtain a return on the investment needed to develop these products. For purposes of a finding that ZEE portable generators are "cost-effective", CARB must establish that the average purchase price to consumers of ZEE portable generators is within 20% of conventional gasoline units, for the same kilowatt-hours available from the latter, before recharging is needed, versus a tank of gasoline. (515-Docket)

Comment: As discussed in detail in the comments by the Portable Generator Manufacturers Association (PGMA), the Proposed SORE Amendments will compel portable generator engine and equipment manufacturers to exit the California market, since CARB staff have incorrectly assumed that portable generator manufacturers will continue to sell generators into the California market after MY2024 based on the current availability of marine generators, which are very different products that are subject to different federal regulations that account for how and where those generators are used. (521-Docket)

Comment: **Technological Limitations -** As a major manufacturer of energy products Generac is in a unique position to have insight on the status of the available alternate technologies proposed to achieve a Zero Emissions (ZE) portable generator. Current ZE product offerings are not able to provide the power requirements demanded in power outage situations, nor are they able to meet the high load demands for extended use. Additionally, solar recharge times of battery-based units will severely restrict the practical energy support capabilities called for during extended power outages. (527-Docket)

Similarly, of the few current spark-ignited engines meeting the proposed emission regulations none would be scalable for portable generators with sufficient size to support power requirements. The time and expense required to develop compliant engines only to have them obsoleted with the full ZE requirements in 2028 is prohibitive. Further, the concept of fuel cell products presented during the workshop as a potential technological solution is not viable. Although there are some very limited offerings on the global market (e.g. EFOY Pro 2400 Duo) these are stationary (i.e. not portable) which cost >10,000 USD and are limited to 12/24 volt output. Based on the weight and size requirements of fuel-cell technology the transition to a portable generator format is highly unlikely in the near future.

Given the current and foreseeable state of applicable technology, Generac feels the proposed regulations do not align with California Executive Order N-79-20 Section 2, which clearly states, "CARB shall act consistently with technological feasibility and cost-effectiveness". (527-Docket)

Comment: **Conclusion -** Given the stated reasons, Generac requests the exemption of portable generators from the proposed amendments to the SORE emissions regulations. Failure to do so will severely limit the availability of adequate emergency stand-by power in California and cause potential harm to its residents. (527-Docket)

Comment: Requiring ZE portable generators would unnecessarily burden the residents of California and drastically reduce their ability to access adequate cost-effective emergency backup power. (539-Docket)

Comment: As acknowledged in the ISOR, the current supply of existing zero-emission generators may not meet the market demand.[10] [Footnote 10: ISOR, page 25.] We caution against proceeding with the MY 2028 phase-in until manufacturers can demonstrate it is technologically feasible and CARB can analyze whether it is comparatively affordable to both purchase and keep zero-emission generators charged.[11] [Footnote 11: ISOR, page 25 discusses costly, non-grid recharging options for zero-emission generators.]. (548-Docket)

Comment: FWEDA Reference **6) PGMA**: spark-ignited portable generators are used primarily for emergency home backup power, unlike other SORE equipment and zero emission generators, which are used primarily for discretionary activities. The proposed amendments are not technologically feasible nor cost- effective because zero emission generators do not perform the same functions as spark-ignited portable generators and are more expensive. The two-step phase out of spark-ignited portable generators will hamper the transition to zero-emission portable generators because it could divert the resources needed to develop effective and affordable zero emission technology. (2001-Docket)

Comment: From the information provided, it appears the majority of portable generator emission reductions are from those in the small 0-2 hp category. Generators in that category are largely used for recreational purposes and not backup residential and construction site power. Replacing these small generators with battery power is far more practical than trying to replace those in the 3-25 hp category. A good compromise might be to only include a sale prohibition on the 0-2 hp generators in the SORE amendments proposed at this time. (2014-Email)

Comment: Batteries are now and for the foreseeable future will be cost prohibitive. They will not perform sufficiently and the supply will be inadequate. Prohibiting portable generator sales will result in a negative public health impact that will significantly be greater than the environmental health air quality benefit for rural California residents. (3028-Oral Testimony)

Comment: So I respectfully request that if your Board does vote to approve SORE amendments, that those amendments do not include a portable generator sale prohibition. Short of that, I request a surgical compromise that limits the sale prohibition to only those generators that are two horsepower and smaller. From the information provided by CARB staff last night, it appears that the majority of portable generator emissions are from those in the zero to two horsepower category. Generators in that category are largely used for recreational purposes, not back-up residential power. Placing these small generators with battery power is far more practical than trying to replace those in the 3 to 25 horsepower category. This would greatly help rural residents in the regions you represent and throughout the state, while reasonably achieving emission reductions. (3028-Oral Testimony)

Comment: The current proposed amendments are neither technologically feasible nor cost effective, because zero-emission generators do not perform the same functions as spark-ignitable portable generators and are also orders of magnitude more expensive. (3044-Oral Testimony)

Comment: While Harbor Freight is very supportive of efforts to work toward a zero-emissions goal when that technology is developed and generally available to Californians regardless of income level. We are many years from that point with respect to portable generators. Today, a zero-emissions alternative to portable generators is over 700 percent more expensive and is far less usable for power outages lasting more than a few hours. If electricity is unavailable during a power outage, there is no way to recharge zero-emissions portable generators unless very expensive solar arrays or back-up batteries are also purchased. And solar arrays do not work during cloudy days. It is not equitable to impose this requirement at this time. It is incumbent upon this Board to protect and represent the interests of all Californians, regardless of income level. (3057-Oral Testimony)

Comment: PGMA has proposed an alternative to staff proposal that will address the needs of the California consumer and meet CARB's mandate to reduce emissions. The PGMA proposal would substantially reduce emissions from all portable generators by 2026 and require zero-emission generators as early as 2031, and no later than 2035. We urge the Board to adopt the PGMA proposal. (3058-Oral Testimony)

**Agency Response:**

These comments imply or suggest alternatives to the Proposed Amendments that would exempt or delay implementation of emission standards of zero for some or all portable generators, citing technological feasibility, potential economic impacts, the need to provide electricity during extended power outages for heat, medical devices, and refrigeration for medication, regional challenges with wildfires and electric service, the use of portable generators on job sites, and other potential considerations. Commenters also include introductory remarks that describe the commenters, their experience and expertise, and their organizations. Commenters state their opinions regarding the Proposed Amendments and the use of portable generators but do not provide evidence to support their conclusions. The Proposed Amendments do not prohibit the sale of CARB-certified SORE generators in 2024 or at any other date. As described on page 3 of the ISOR, under the Proposed Amendments new generators would be subject to more stringent emission standards for MYs 2024 through 2027 and emission standards of zero for MY 2028 and subsequent model years. The Proposed Amendments do not require anyone to stop using a SORE generator they already own.

As described in Chapter I.E.3.b. of the ISOR, the Proposed Amendments allow more time for generator engines to meet emission standards of zero because of the need for the zero-emission generator market to further develop. Manufacturers may also use emission reduction credits to offset emissions from generators with emissions above the proposed emission standards. CARB made no change based on these comments. CARB Resolution 21-28, dated December 9, 2021, states, in part, "Be it further resolved that the Board directs CARB staff to review annually the status of the implementation of the proposed amendments and to conduct a technological review in the 2025 to 2026 timeframe to assess the progress towards the MY 2028 zero-emission standards for portable generators and any other engine or equipment category that may be newly subject to the MY 2028 zero-emission standards." Such technological review is beyond the scope of the Proposed Amendments to the SORE regulations for this rulemaking. However, it will be an important component of implementing the Proposed Amendments.

Regarding the comment, "Second, amend the proposed HC + $NO_x$ emission standard for 225-825 cc generators MY 2026 and later to 6.0 g/kWh to harmonize all generators 825 cc and below…": This comment suggests an alternative to the Proposed Amendments which would set less stringent emission standards than the Proposed Amendments and delay implementation of those emission standards versus the schedule in the Proposed Amendments. The commenter does not provide evidence to support the claim that generators meeting the proposed emission standards for MYs 2024-2027 would cost too much for an average consumer to afford. CARB disagrees with the commenter's conclusions. CARB made no change based on this comment. As discussed on pages 160-168 of the ISOR and in this Agency Response, there are already generators available that are able to meet the proposed 3.0 g/kWh HC + $NO_x$ emission standards. CARB is required to adopt standards that achieve the maximum degree of technologically feasible, cost-effective emissions reductions from SORE by the earliest practicable date. Setting a higher than necessary standard for generators would not result in the maximum emissions reductions. Currently, generators are responsible for nearly 20 percent of $NO_x$ and ROG emissions from the SORE category, so it is important to control those emissions.

In response to the comments related to "the two-step phase out of spark-ignited portable generators will hamper the transition to zero-emission portable generators because it may divert the resources needed to develop effective and affordable zero emission technology": As discussed on page 165 of the ISOR, the proposed emission standards for generator engines for MYs 2024 through 2027 are based on engines already certified for sale or lease for use in California. As discussed on page 3 of the ISOR, emission reduction credits could be used to offset emissions from generator engines. No manufacturer would be required to devote resources to reducing emissions from generator engines. As discussed on page 39 of the ISOR, the proposed zero-emission generator credit program would allow manufacturers to offset emissions from SORE generators with emission levels above the proposed emission standards by using credits earned from certifying zero-emission generators. A manufacturer could devote its resources to developing zero-emission generators. Please refer to the Agency Responses in sections IV.A.10, IV.A.14, IV.A.15, IV.A.27, and IV.A.35.2 for discussion of additional comments in the list of concerns in PGMA's comments, which are included in this section for context.

In response to the statement, "Below is a non-exhaustive list of statements that the ISOR makes that purport to be inclusive of portable generators but that are verifiably untrue of portable generators" and similar statements: The commenter states its opinion that certain statements in the ISOR are not true. The commenter states further opinions and assessments but does not provide evidence to support its statements. The commenter mischaracterizes statements in the ISOR in stating its disagreement with statements in the ISOR. For example, the statement, "Electric small off-road equipment have been available for decades," appears on page 3 of the ISOR. The commenter's response to that statement is "ZEE generators have not been available to the average consumer for decades." The commenter's response does not directly address the statement on page 3 of the ISOR, which, if read in context, includes corded small off-road equipment that has been around for decades. The commenter does not explain its statement or provide an alternative statement supported by evidence. Please refer to Chapter I.E of the ISOR and the Agency Responses in section IV.A.35 of this FSOR for additional discussion of the technological feasibility of the Proposed Amendments, and Chapter VII of the ISOR and the Agency Responses in sections IV.A.13 and IV.A.35 of this FSOR for additional discussion of the cost-effectiveness of the Proposed Amendments. Please refer to the Agency Response in section IV.A.10 for discussion of comments claiming the Proposed Amendments are arbitrary and capricious.

In response to the statement, “PGMA is unaware of any air districts offering incentives to purchase ZEE portable generators,”: This comment does not request a change to the Proposed Amendments. CARB made no change in response to this comment. CARB is also not aware of an air district program providing incentives to purchase zero-emission portable generators.

In response to the statement, “The majority of available portable generators do not meet the proposed dramatically reduced California emissions standards for 2024 through 2027 and would therefore need to be redesigned and resubmitted for exhaust and evaporative emissions approval. The research and development time plus expenses associated with this process may not be warranted for portable generators that would only be available for sale in California within a four-year window,” and similar statements: CARB disagrees with the commenter’s conclusion that all portable generators would need to be redesigned. Manufacturers may use emission reduction credits to offset emissions from generators with emissions above the proposed emission standards. The comment speculates about whether potential expenses would be warranted. The effective use of credits could enable continued certification of generator engines beyond MY 2027. Lower-emitting engines would require fewer credits than higher-emitting engines, so more lower-emitting engines could be certified. Manufacturers could choose to sell their generator engines in markets other than California, potentially enabling them to spread their costs and simplify distribution.

In response to the comments that "the credit provisions are unlikely to be effective because there will likely not be enough zero emissions generators sold to generate a significant number of credits," and similar statements: These comments reflect the commenter's opinion, and the commenter does not provide information to support their conclusion. The benefits of the proposed zero-emission generator credit program are described on pages ES-4, 26, 32, 115, and 199-209 of the ISOR. The zero-emission generator credit program provides manufacturers flexibility and sends a market signal to encourage growth in the zero-emission generator market. CARB anticipates the proposed zero-emission generator credit program will accelerate the production of more, and a greater variety of, zero-emission generators. CARB agrees that generators are fundamentally different from other SORE equipment because their purpose is to generate electricity. As further described on pages 24-26 of the ISOR, CARB agrees the zero-emission generator market needs more time to mature to better meet demand for backup power supply. CARB expects a decrease in the cost of energy storage will both decrease the average cost of a zero-emission generator and increase energy storage, as described on page 12 of the ISOR. Whether or not the zero-emission credit program is successful is subjective. Manufacturers may choose to use the program to earn credits they may use to continue to certify SORE generators. If manufacturers don't certify zero-emission generators or sell few certified zero-emission generators and therefore earn few zero-emission generator credits, fewer SORE generators may be sold in California than if manufacturers earn more zero-emission generator credits. For these reasons, CARB made no changes based on this comment.

Some commenters mention generators fueled with diesel fuel. Engines fueled with diesel fuel are compression-ignition engines. Per section 2401(a)(45) of the Proposed Amendments, “Small off-road engine” means any engine that produces a gross horsepower less than 25 horsepower (at or below 19 kilowatts for 2005 and later model year), or is designed (e.g., through fuel feed, valve timing, etc.) to produce less than 25 horsepower (at or below 19 kilowatts for 2005 and later model year), that is not used to propel a licensed on-road motor vehicle, an off-road motorcycle, an all-terrain vehicle, a marine vessel, a snowmobile, a model airplane, a model car, or a model boat. […] Any compression-ignition engine, as

defined in Section 2421, produced during the 2000 and later model years shall not be defined as a small off-road engine.

As compression-ignition engines produced during the 2000 and later model years are explicitly excluded from the definition of SORE, the Proposed Amendments would not apply to any compression-ignition engine, regardless of rated power or application. However, other CARB regulations may apply to these engines.

Some commenters suggest a technical review before implementation of emission standards of zero for generator engines and pressure washer engines with displacement greater than or equal to 225 cc beginning with MY 2028. Although such technological review is beyond the scope of the Proposed Amendments to the SORE regulations for this rulemaking, CARB Resolution 21-28, dated December 9, 2021, states, in part, "Be it further resolved that the Board directs CARB staff to review annually the status of the implementation of the proposed amendments and to conduct a technological review in the 2025 to 2026 timeframe to assess the progress towards the MY 2028 zero-emission standards for portable generators and any other engine or equipment category that may be newly subject to the MY 2028 zero-emission standards." The technological review will be an important component of implementing the Proposed Amendments.

In response to the statement, "Level 3 and Level 4 ZEE generators would likely not be portable, because of the size and weight of the batteries. What's more, there would likely be challenges with shipping and storing products with such large batteries because of U.S. Department of Transportation regulations,": This comment includes expressions of the commenter's opinions and speculations regarding portability and transportation of zero-emission generators. The comment does not request a change to the Proposed Amendments. CARB made no change based on this comment. The commenter did not provide information to support its statements. As described on pages 199-209 of the ISOR, the zero-emission generator credit program is voluntary. No manufacturer is required to participate in the zero-emission generator credit program.

Regarding the comment, "Further, the concept of fuel cell products presented during the workshop as a potential technological solution is not viable. Although there are some very limited offerings on the global market (e.g., EFOY Pro 2400 Duo) these are stationary (i.e. not portable) which cost >10,000 USD and are limited to 12/24 volt output. Based on the weight and size requirements of fuel-cell technology the transition to a portable generator format is highly unlikely in the near future": This comment consists of the commenter's assessments and opinions regarding fuel cell generators and does not request a change to the Proposed Amendments. CARB made no changes based on the comment. CARB recognizes that the cost of a fuel cell can be significant, as discussed in Chapter I.E.3.b. of the ISOR. However, hydrogen fuel cells are not the only option for zero-emission generators. Chapter II.A.1. of the ISOR describes that generators can use batteries to store energy or be able to generate electricity through use of solar energy, wind energy, or a fuel cell.

In response to the statement, "Given the current and foreseeable state of applicable technology, Generac feels the proposed regulations do not align with California Executive Order N-79-20 Section 2": This comment includes an expression of the commenter's feelings and does not demonstrate that the Proposed Amendments do not align with the goals of EO N-79-20. The technological feasibility of the Proposed Amendments is discussed in Chapter I.E of the ISOR and in response to comments in section IV.A.35 of this FSOR. Cost-effectiveness of the Proposed Amendments is discussed in Chapter VII of the ISOR and in response to comments in sections IV.A.13 and IV.A.35 of this FSOR.

Please refer to the Agency Response in section IV.A.32.3 for discussion of evaporative families with hot soak plus diurnal certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR.

Please refer to the Agency Response in section IV.A.2.4.2 for discussion about why more time is not needed for implementation of emission standards of zero for SORE equipment used by professional landscapers.

Some comments request to delay implementation due to supply chain issues and challenges with developing technology because of the COVID-19 pandemic. ISOR section VII.B.1 explains that the economic modeling was adjusted to reflect the impacts of COVID-19. Please refer to the Agency Response in section IV.A.28.2 for additional discussion of supply chain concerns. Commenters do not provide evidence that it will not be possible to comply with the proposed emission standards due to travel restrictions. As described on page 165 of the ISOR, "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[23]] lists 27 evaporative families with certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR. Emissions from engines that don't meet the proposed emission standards may be offset with emission reduction credits.

In response to the comment:

> "According to CARB, wildfires emitted more than 100 million metric tons of $CO_2$ last year. Let's not set ourselves up for even larger and worse fires in the future causing loss of property and life. Also, the board seems to have forgotten that trees produce oxygen and clean carbon dioxide out of the air we breathe. Without trees, life could not continue. Trees have also proved to remove airborne particles from the air and reduce smog, thereby improving the air we breathe, and therefore, our respiratory health. Please consider this in your decisions."

This comment provides no evidence that the Proposed Amendments would cause worse fires and greater loss of property and life.

As discussed in sections IV.A.2.5.1, IV.A.29.1, and IV.A.33, CARB does not anticipate that the availability of suitable chainsaws and other equipment necessary for fuel mitigation and firefighting applications will be adversely affected by this rulemaking. In addition to the preemption of chainsaws powered by engines with displacement 45 cc and above, blade-capable brush cutters and clearing saws powered by engines with displacement 40 cc and above, and pumps powered by engines with displacement 40 cc and above primarily used in firefighting and fire prevention efforts as discussed in the aforementioned sections, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision.

[23] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

Please refer to the Agency Response in section IV.A.2.5.3 for discussion of comments related to the needs of rural communities.

Please refer to the Agency Responses in sections IV.A.13 and IV.A.35 for discussion of comments related to the technological feasibility and cost-effectiveness of the Proposed Amendments and claims that manufacturers will stop certifying SORE in California in MY 2024. For additional discussion of the technological feasibility and cost-effectiveness of the Proposed Amendments, please refer to Chapters I.E and VII of the ISOR.

### A.2.3.6. Modify generator definition and/or exclude portable generators from SORE regulations

Comment: **Applicability of SORE Regulation -** It is Generac's position that emission regulation of portable generators better aligns with stationary emergency products, such as home-stand-by generators, which are exempt from CARB regulation rather than with Outdoor Power Equipment SORE products. (527-Docket)

Comment: **Proposed Regulation Shortcomings -** Generac has reviewed the proposed SORE regulations and has the following suggestions if the rule is to go forward. The "Generator" definition in the Small Off-Road Engine Exhaust Emission Regulations needs to be changed. A generator is not limited to Off-Road applications, generators are commonly a stationary product. The definition in the proposed regulations needs to be updated to prevent confusion on what generators the rule regulates. (527-Docket)

Comment: Generac suggests the following definition to clearly define the applicable product. This will also correspond to the rationale provided in the Initial Statement of Reasons and Standardized Regulatory Impact Assessment, where stationary generators are clearly excluded from the scope of this rule. (527-Docket)

Comment: "Generator" means off-road equipment that exclusively produces electric power. This definition excludes "stationary generators" which remain or will remain at a location for more than 12 consecutive months or a shorter period of time for an engine located at a seasonal source. "Stationary generators" are not portable or transportable, meaning they are not designed to be carried or moved from one location to another. lndicia of transportability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform. (527-Docket)

Comment: Another suggestion is to change the term "Generator" to "Portable Generator'', as the latter clearly meets the definition of an Off-Road piece of equipment. However, Generac understands this term would need to be updated throughout the proposed regulation material and therefore, we suggest the definition change to exclude stationary generators. (527-Docket)

Comment: Finally, we've heard staff say many times throughout the process that the SORE regulation does not apply to stationary engines, such as those fueled with propane at a home for back-up power. However, there does not seem to be a definition anywhere in the regulation that specifies what constitutes stationary equipment versus portable. We reached out to staff last week, but unfortunately did not hear back, so clarification -- if clarification could be provided today, that would be much appreciated. With all the previous-stated reasons above, WPGA respectfully requests that CARB provide these specifications for stationary versus portable and provide true consideration for the alternative proposals submitted a PGMA, EMA, OPEI, and other industry stakeholders. (3044-Oral Testimony)

**Agency Response:**

These comments request an alternative definition of SORE "generator" in the SORE regulations, a new definition for "stationary generator," and an exemption of SORE generators from the SORE regulations. The commenters' recommendations are beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comments. The scope of the rulemaking described in the October 2021 45-Day Notice does not include making changes related to stationary generators, nor does it include making SORE generators no longer subject to the SORE regulations. Stationary generators are not subject to the standards in the SORE regulations, therefore a definition stating that is not necessary. Current and CARB-proposed definitions provide the information necessary to conclude that stationary generators are not subject to the SORE regulations:

> "Generator" means off-road equipment that exclusively produces electric power.
> *(definition in Proposed Amendments, ISOR Attachment A, new subsection (30) in § 2401(a))*

> "Off-road vehicle" or "Off-road equipment" means any non-stationary device, powered by an internal combustion engine or motor, used primarily off the highways to propel, move, or draw persons or property including any device propelled, moved, or drawn exclusively by human power, and used in, but not limited to, any of the following applications: Marine Vessels, Construction/Farm Equipment, Locomotives, Small Off-Road Engines, Off-Road Motorcycles, and Off-Highway Recreational Vehicles.
> *(definition in current SORE regulations, CCR § 2401(a))*

These comments are similar to other comments that request CARB define "stationary generator" or "fixed-mount generator" and exempt RV generators. Please refer to Agency Response 3 in Attachment A to this FSOR, Agency Responses B-3 and B-28(b) in Attachment B to this FSOR, and the Agency Response in section IV.A.2.3.3 in this chapter.

### A.2.3.7. Raise 2028 HC + $NO_x$ emission standards for generators to accommodate hydrogen fueled generators

Comment: **Hydrogen Fueled Generators -** The Initial Statement of Reasons includes hydrogen powered generators as an alternative to current gasoline generators (pg 54) but the proposed regulations don't appear to accommodate or make them a feasible option. Generac would like CARB to consider raising the 2028 HC+ $NO_x$ emission standards for generators to accommodate hydrogen fueled generators. All engines will have some level of oil consumption to account for, therefore some level of hydrocarbon emissions needs to be allowed. Similarly, some level of $NO_x$ creation is to be expected from in-cylinder combustion temperatures. (527-Docket)

Comment: This is Eric Woodruff calling from Generac Power Systems. Well, we have many concerns with the proposed amendments. They have pretty well been reiterated here today and covered in a lot of the written comments. Our primary concern at this point in the process is with regards to some forward-looking technology solutions. The Initial Statement of Reasons includes hydrogen-powered generators as an alternative to current gas -- gasoline generators. But the proposed regulations don't appear to accommodate or make the most feasible option. Generac strongly recommends CARB consider raising the 2028 HC plus $NO_x$ emissions standards for generators to accommodate hydrogen fuel generators. All engines will have a certain level of oil consumption to account for and therefore some level of hydrocarbon emissions needs to be allowed. Similarly, some level of $NO_x$ creation is to be expected from in-cylinder combustion temperatures. Without these considerations and based on

the current proposed emissions levels, hydrogen-powered generators will likely not be a viable option to fulfill the requirements of emergency portable generators in the future. (3061-Oral Testimony)

**Agency Response:**

These comments seem to discuss the possibility of portable generators powered by SORE fueled with hydrogen. CARB made no changes in response to these comments. In response to the statement, "But the proposed regulations don't appear to accommodate or make the most feasible option. Generac strongly recommends CARB consider raising the 2028 HC plus $NO_x$ emission standards for generators to accommodate hydrogen fuel generators.": The Proposed Amendments do not preclude the use of SORE fueled with hydrogen. The Proposed Amendments are technologically neutral with respect to how manufacturers meet the proposed emission standards. Any emissions from SORE fueled with hydrogen could be offset with emission reduction credits. The ISOR discusses the use of hydrogen fuel cells in sections I.E.3.b and II.A.1. Hydrogen fuel cells do not produce HC or $NO_x$ emissions.

### *A.2.4. Requests to exempt or delay implementation for some or all SORE*

#### A.2.4.1. Exempt or delay compliance dates for pressure washers used by professionals

Comment: I am an industrial supplier to commercial cleaner / small business owner operating a commercial cleaning business servicing Caltrans, City of Stockton Parks and Rec, City of Stockton Graffiti embayment, KFC, Taco Bell, San Joaquin County Sheriffs Department Correctional (municipalities / office parks / retail /residential customers) in the greater Northern California area for the past 33 years. I proudly come from the Stockton community located in San Joaquin County. I employ 10 workers and we take great pride in the service we provide the community. For the last 30 years, we partnered with Caltrans, City Of Stockton, Unified School Districts of Lodi Stockton Linden, Manteca, San Joaquin County Sherriff's Department and many other city and county officials to clean roads, walk ways, jails, restaurants, and malls and the (main / most efficient) tool they use is an internal combustion powered pressure washer. Beyond this we have 77 of crews working daily. The mandate of no internal combustion engines being considered would eliminate the jobs of nearly all of our staff and their staff. We care deeply about a clean environment for both the health of our neighbors and beauty of our community. In Stockton and surrounding communities. We have participated in water recovery / water treatment as well as propane burner usage in accordance with all state and local regulations. (10-Docket)

Comment: I am an industrial supplier to commercial cleaner / small business owner servicing (municipalities / office parks / retail /residential customers) as well as military, state, county and city interests in the Inland Empire area for the last 27 years. I employ 5 workers and we take great pride in the service we provide the community. Throughout the covid19 pandemic pressure washers with internal combustion engines were one of the front lines of defense. The mandate of no internal combustion engines being considered would eliminate the jobs of all of our staff and ultimately make us close our business. We care deeply about a clean environment for both the health of our neighbors and beauty of our community but without a viable alternative we need to stop this bill now. (11-Docket)

Comment: I have been in the pressure washer industry for decades specifically the business to business segment. Industrial equipment generally with 10 HP to 25 HP engines. Those pressure washers are able to conserve water over smaller equipment. Many types of cleaning happen over night and in places where higher power to run electric units is not available. These applications are real and very difficult, if not completely impossible to manage with battery technology. A small part

could be replaced with higher voltage (230V Single or 3 Phase), however hooking up to these power sources for a contractor poses many safety risks to the public and contractor in the small of amount of places that would work. Pressure washers use a great deal of energy in order to conserve water and labor, in a way that cannot be done with battery technology. How much extra water will be required if the gas engine units and the performance they offer isn't available? I think a delay of implementation of the SORE rules for Pressure Washers, especially industrial, should be delayed. (13-Docket)

Comment: I encourage you to delay the Pressure Washer engine requirement until at least 2028 for the sake of CO2 emissions alone, but also because pressure washers serve needed functions that provide water savings and health benefits and offer employment to many, especially in the minority communities. I also think that many SORE will be eliminated for residential users because the big box stores will trend towards battery powered. Those are not commercial and won't meet the needs of many applications, but many SORE will be eliminated. Also and for reasons we all probably understand stationery pressure washers that are used in factories and other places that could use electricity for supplying power already are. Thank you again for reading this and answering if it would be best to wait until over all power generation was lower in CO2 output than a gasoline engine per KWH, if a water analysis has been done on this, including waste water recover technology that often requires the higher HP of large SORE engines, if minorities would be effected more by these changes in regards to contract cleaner owners, operators and employees. (13-Docket)

Comment: I have been in the pressure washer industry since 1983, specifically the sales and service of pressure washers in the business to business segment. We primarily deal with industrial equipment generally with 10HP to 25 HP engines. Those pressure washers are able to conserve water over smaller equipment. Many types of cleaning happen overnight and in places where higher electrical power to run electric units is not available. These applications are real and can be very difficult, if not completely impossible to manage with battery technology. A small part could be replaced with higher voltage (230V Single or 3 Phase), however hooking up to these power sources for a contractor poses many safety risks to the public and contractor in the small of amount of places that they could possibly work. Pressure washers use a great deal of energy in order to conserve water and labor, in a way that cannot be done with current battery technology. How much extra water will be required if the gas engine units and the performance they offer isn't available? Consider the fact that an average garden hose produces 10 gallons per minute while an average pressure washer consumes 4 gallon per minute. Another aspect of water use is the recovery operation of the water in an outside cleaning environment. All mobile water recovery systems use small gas engines, how will this affect that operation? I believe a delay of implementation of the SORE rules for Pressure Washers, especially industrial, should be delayed. (14-Docket)

Comment: I would encourage you to delay the Pressure Washer engine requirement until at least 2028 for the sake of CO2 emissions alone, but also because pressure washers serve needed functions that provide water savings and health benefits and offer employment to many, especially in the minority communities. This will also allow the battery technology to catch up with the larger power requirement needed for the industrial pressure washers. I also think that many SORE will be eliminated for residential users because the big box stores will trend towards battery powered equipment. Those are not commercial units and won't meet the needs of many applications, but many SORE will be eliminated. Also stationery pressure washers that are used in factories and other places that could use electricity for supplying power are already in use. (14-Docket)

Comment: I'm writing in behalf of professional mobile cleaning contractors, (pressure cleaning companies). This group of professionals helps maintain sanitation, keeps our streets and facilities cleaned and safe. I fear your proposal will harm this industry worldwide. We already have a challenging supply demand with engines in this size being on back order. With this change there will

surely be large companies buying mass amounts of engines prior to 2024 making it nearly impossible for smaller companies to maintain their business's, by completely stopping their ability to get the equipment needed. This will only lead to poor sanitation, increased slip hazards and simply a dirtier place to call home. Restaurants require hood cleaning, which with fewer contractors may increase fire hazards and deaths. Think about your children playing at a dirty unsanitary playground because there's not enough contractors to maintain cleanliness. I ask you to please don't take this group of professionals for granted. We all live in, work at and visit a place that needs ongoing cleaning. In addition pressure washers reduce water consumption, which water use will surly increase drastically. (16-Docket)

Comment: The ban on small motors will affect the cleaning industry since there is no alternative in the market. We will struggle to find a way to keep the streets and homes clean in this state. (18-Docket)

Comment: I am a commercial pressure washing company located in San Diego and been in business over 20yrs. The equipment I use (small gas engines) are imperative to keeping areas clean and sanitized as well as for water reclaiming. There is no electric equipment strong enough or efficient enough to handle these tasks. As a commercial business my families livelihood depends on this equipment not to mention keeping areas like shopping centers and municipalities clean. Not being able to use this equipment will cause a build up of rodents and diseases as we use hot water also. This will be a public safety concern. (20-Docket)

(20-Docket)

Comment: In the industry I serve (commercial cleaning, pressure washing), the majority of the (equipment) end user customers are small businesses (dis-proportionally minority owned or/and operated) who may or may not have financial means to upgrade their equipment even if comparable technology and infrastructure to support it readily existed. (21-Docket)

Comment: I started Carters Precision Pressure Washing to do two things. Make a living and help the surrounding communities. I am not against programs that help to heal the environment. I believe this measure is too harsh on the people that rely on the engines to make a living. There is currently no technology to replace the small off road engines. (23-Docket)

Comment: Our city needs the small businesses to clean the dirt and grime that accumulates on our streets, sidewalks and structures. These businesses help in many ways past the pollution that is created by the engines that run the equipment. We manage water usage while cleaning and when reclaiming used waste water. It is not only for the beautification but helps to sanitize. I hope those in power take the time to look at an alternative to the hard line set to stop sales of the small off road engines. How it effects those doing business in the state of California. (23-Docket)

Comment: Below are 5 primary reasons why I think you should reconsider your timeline and conditions with AB-1346. Please take these items into account, I am a concerned pressure washing contractor in this lovely state who use to live on the street 11 years ago and this industry has helped me create a life for myself and my employees that we are forever thankful for.

1.) Health and Safety - Power washing is a very efficient way to keep sidewalks slip-free to OSHA standards, sanitized and clean, which reduces the spread of infectious diseases, rodents, and pests.

2.) Power Washing is a green method of cleaning. It tremendously reduces the usages of water and dangerous chemicals being used while cleaning. Maintenance cleanings and restoration processes provide an extended lifespan to surfaces and building materials which reduces the carbon footprint of replacements.

3.) Gas-powered reclaim systems are paramount in controlling wash water so contractors can obey the Clean Water Act(1972). It's important to keep our waterways pollution-free.

4.) Directly affects minority and low-income individuals - Pressure washing is a lower barrier of entry providing a gateway out of poverty. A power washing technician can make a living wage with benefits in the state of California and provide for their families.

5.) There is current cost-efficient technology that can dramatically reduce emissions put off from small engines up to 90%+. Moving to zero emissions this fast with the current best available technology is inadequate, and will force businesses to close, cut staff, and/or raise the cost of services significantly. (26-Docket)

Comment: I am concerned about a clean environment; HOWEVER this bill is misguided, and does not address the many workers who need commercial pressure washers, as my family does for their income. Please consider an exception for commercial pressure washers with ICE. (88-Docket)

Comment: PSI is a small local business that has been an authorized dealer of industrial cleaning equipment for about 40 years. We specialize in selling and repairing pressure washers and steam cleaners, 2 pieces of equipment that are targeted for removal from the market by AB1346. This bill would without a doubt quickly put our company, as well as most of our customers, out of business. While we understand the idea behind the bill is valid and will lead to a reduction in pollution, it will also lead to the destruction of the cleaning industry as we know it. Schools, hospitals, food processing facilities, municipalities, sports facilities and more: all rely on the power of pressure washers and steam cleaners to clean effectively and thoroughly. Currently there is no technology available to transition to battery-operated or electrical hot water pressure washers or steam cleaners. The batteries required to run our equipment do not exist, and the demand on the existing electrical grid to run our machinery would be overwhelming. (474-Docket)

Comment: Please delay the implementation of this bill for industrial users of this equipment. The unintended consequences of this bill will be detrimental to not only the sellers of the equipment, but also the users. Landscapers, car detailers, building maintenance personnel, large venues personnel and many more will need to spend a great deal of money to comply or close their business. (474-Docket)

Comment: Pressure Washers have proven to be essential in California with epidemics such as Hepatitis A by allowing cleaning in remote areas preventing the spread. Therefore, improving the quality of life for all Californians. SORE Pressure Washers allow exterior cleaning where the proper

electricity is not readily available. Battery powered Commercial Pressure Washers are not currently available in the market place. Therefore, we ask Pressure Washers be preempt until battery power Pressure Washers are readily available, proven and cost feasible. This will allow California to remain Clean and Safe for residents and tourists. (483-Docket)

Comment: The Cleaning Equipment Trade Association (CETA) is an international non-profit trade association made up of manufacturers, suppliers, distributors, contractors/end users, and associates. All these members coordinate efforts to promote public awareness, professionalism, industry-wide safety standards, and education for the advancement of the powered cleaning equipment industry. Environmental regulations and lobby efforts are not inside CETA's regular scope of work, but we strive to educate our members to promote best practices across the industry. (483-Docket)

From that perspective, we have been working to understand the Proposed Amendments related to Small Off-Road Equipment (SORE Amendments or Amendments). We appreciate the opportunity to meet and discuss the Amendments, as without a doubt, they will be incorporated to our industry's best practices. CETA members are committed to environmental improvement and societal benefit. Many of our members in the State of California are engaged in and empowering contractors to control the spread of disease, combat aquatic invasive species (AIS), lower water usage, and extend the life of materials and structures in corrosive or oxidizing environments. CETA members in the State of California also adhere to state and municipal regulations for the propane burners often used with commercial pressure washers and water reclamation in accordance with the Clean Water Act. From a societal benefit standpoint, CETA members create jobs, supply an extremely low barrier to entrepreneurship, and beautify through cleaning the countless retail, recreation, and tourist attractions for which the State of California is world renowned. The main tool for a mobile, commercial, cleaning contractor (mobile cleaner) is currently a high- pressure washer. In majority, these tools for these contractors are powered by an internal combustion engine between 225cc to 825cc, and often having a combustion heating element (burner) to increase the cleaning efficiency of the high-pressure stream of water. Comparable to commercial landscapers, mobile cleaners use this tool as a full-time job, typically 6 hours per workday and 200 days per annum. (483-Docket)

Comment: In contrast to commercial landscapers, the number of mobile cleaners is significantly fewer and many commercial cleaners in California work at night. Many users enter the industry by buying a pressure washer powered by an internal combustion engine smaller than 225cc. The reason mobile cleaners select tools of this description is, high pressure increases the cleaning efficiency, lowers the time and water used, and there is high mobility from the equipment being light weight and compact. The higher the pressure of water, the more efficiently a contaminant is lifted from a surface, or an adhesion is broken requiring less water to loosen the contaminant without chemicals or solvents. From industry member data, the higher flow rates commonly shown in gallons per minute disproportionately lowers the amount of time it takes to clean. The net effect of this is not just increased productivity for the contractor, but also lower water usage. A simple example of this from industry data is that with all other factors being equal 2 GPM flow takes 15 minutes to clean a surface while a 4 GPM flow will take 5 min resulting in a 33% lower water consumption. As an industry best practice, commercial cleaners find the increased efficiency and choose pressure washers greater than 3000 PSI and with flows greater than 3 GPM. The vast majority of units used by mobile cleaners is actually closer to 4000 PSI and 4 GPM, but for the sake of illustration, the 3000 PSI at 3 GPM product will be discussed in more detail. As an example of this difference, a common usage for high pressure washers by municipalities in California is to remove graffiti. This is done whether the municipality buys the pressure washer or contracts with a mobile cleaner. Industry experience shows 4000 PSI will remove graffiti, but 3000 PSI will not. (483-Docket)

As said previously, CETA is committed to environmental improvement. Our members' focus on meeting local propane consumption requirements proves our dedication to improved air quality. While reviewing the Initial Statement of Reasons (ISOR) for the proposed amendments, our membership has expressed detailed concerns which CETA would like to discuss. We look forward to some solution to continue helping the society of California. About the Proposed Amendments, the main concern is the inability for mobile cleaners to source the main tool used by themselves, their employees, and businesses from 2024. Considering no efficiency loss and not considering the common industry practice those engines should be used at 85% of maximum capacity or less, a 3000 PSI and 3.0 GPM pressure washer needs an input of 5.25 Hp. This converts to 3.9kW which will help illustrate the issue for electric pressure washers. (483-Docket)

Common outlets for 120V power at residences or businesses are 15a and sometimes 20a. An Alternating Current Pressure Washer consuming 3.9kW of electricity from a residential outlet would require 32.5a continuously. This explains the phenomenon that all ACPW in the US are roughly half the output of what industry would consider even a residential pressure washer. The conversion of mobile cleaners to ACPW would require adoption of 220V single phase or 3 phase electricity to be common in residences and businesses to maintain the current levels of water conservation and cleaning efficiency provided by higher pressures. In the case of disease control in major CA metropolitan areas, AIS abatement, and disaster clean up, readily available access to these electrical requirements cannot be assumed. Compounding this issue is the common commercial usage of cleaning outside of normal business hours specifically at office parks and retail locations. Beyond this, the in-rush current or starting amperage of electric motors are significantly higher than the operating current further limiting the ability of ACPW to be adopted for commercial use. (483-Docket)

When considering Direct Current Pressure Washers, larger current flow is needed to compensate for the lower (battery) voltages compared with ACPW. Energy requirements of the battery eliminate any kind of mobility. Commercially, there are no DCPW's over 3000 PSI that exist. (483-Docket)

CARB's published data reflects that the vast majority (1.86M) of residential pressure washers are already ZEE. The estimated data also reveals that non lawn & garden business ownership of pressure washers accounts for 1.3% of gas-powered equipment in California. Most self-identified Commercial Pressure Washers in California's SORE2020 model are used for fewer than 128 hours per annum. Considering the high usage hours of the mobile commercial cleaners that CETA represents (6hrs / day & 200 days / year), this indicates the average usage hours of businesses who buy a commercial pressure washer are much smaller than 128 hours per annum. Conversely, this also indicates the mobile cleaners discussed here are a fractional part of the pressure washer population in the state of California. Further to this, CETA estimates the population of truly commercial pressure washers to be less than 10% of SORE powered pressure washers in the SORE 2020 model. (483-Docket)

As is the case with generators, today there is no viable option for replacement of SORE in what would be considered a professional pressure washer. Pressure washers are as indicated above are a vital tool contributing to small business, health, and well-being of the state of California. CETA respectfully requests to work with CARB towards a proposal of mutual benefit and looks forward to a partnership resulting in a cleaner tomorrow. (483-Docket)

Comment: For the purposes of the Proposed Amendments and the SORE Regulations, our comments reflect the perspective and product scope of Royce Industries L.C. and Custom Industries ("Royce") which distributes, among other items, certain Industrial Pressure Washer equipment that contains small gas-powered engines of less than 25 horsepower (432cc). Royce has been serving the 11 Western States for nearly 38 years with current brick and mortar operations in Utah, Nevada, Idaho, and Colorado. Furthermore, with goals of expanding our operations into California. Royce is

encouraged by CARB's leadership and supports the goal of reducing SORE equipment emissions. We strongly believe that "as goes California so goes the Country". (516-Docket)

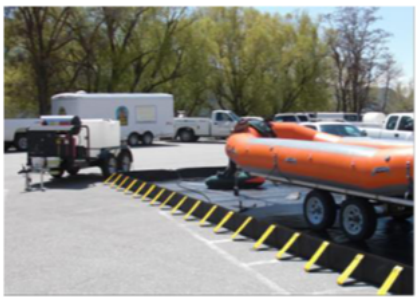
However, mandating the use of Zero-Emission Equipment especially Industrial Pressure Washer's for model year 2024 and all subsequent model years is unreasonable. Industrial Pressure Washers (generally with horsepower of 10HP - 25HP) require a great deal of energy to conserve water and labor which cannot be done with battery technology. A small part of Industrial Pressure Washers could be replaced with higher voltage (230 Volt, Single or 3 Phase), however hooking up to these power sources for a contractor poses many safety risks to the contractor and the public in the limited number of places that options would work. The majority of Industrial Pressure Washers are used in applications and remote locations where high voltage is simply not available. Therefore, we respectfully request that Industrial Pressure Washers be EXEMPTED from the Consideration for Inclusion in the Proposed Regulatory Amendments dated October 15, 2021. (516-Docket)

PS: To further demonstrate "The majority of Industrial Pressure Washers are used in applications and remote locations where high voltage is simply not available", let me share with you on the following pages some specifics for your consideration. (516-Docket)

Fire Management - Invasive Plant Mitigation requires the use of Industrial Pressure Washers:

(516-Docket)

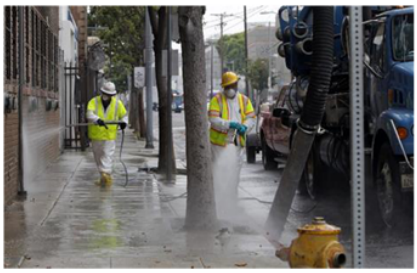
Aquatic Invasive Species ("AIS") Watercraft Inspection and Decontamination requires the use of Industrial Pressure Washers:





(516-Docket)

Cleaning-Up Homeless Encampments requires the use of Industrial Pressure Washers:

(516-Docket)

Railroad related cleaning needs require the use of Industrial Pressure Washers:

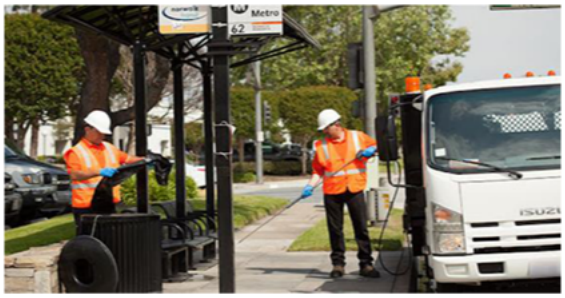


(516-Docket)

Cleaning and Disinfecting Parks and Public Areas requires the use of Industrial Pressure Washers:







(516-Docket)

Solar Farm cleaning needs require the use of Industrial Pressure Washers:



(516-Docket)

Graffiti Removal and Abatement requires the use of Industrial Pressure Washers:




(516-Docket)

Construction related cleaning needs require the use of Industrial Pressure Washers: (516-Docket)

- Bulldozers
- Cranes
- Tracked Equipment
- Trenchers
- Trash Containers
- Drains and Pipes
- Rock Haulers
- Cement Mixers
- Backhoes
- Fences
- Cooling Towers
- Air Handlers
- Kilns
- Driveways
- Brick Mfg.
- Paint Preparation
- Parking Lots
- Concrete Forms
- Machinery
- Holding Tanks
- Floors
- Safety Equipment
- Forklifts
- Radiators
- Front-End Loaders
- Cargo Holds
- Land Movers
- Drilling Equipment
- Asphalt Equipment
- Scaffolding
- Hole Boring
- Landscaping
- Hydraulic Leak Detection


(516-Docket)

Fleet cleaning needs require the use of Industrial Pressure Washers: (516-Docket)

- Aluminum Trailers
- Wheels
- Tires
- Radiator Grill
- Hydraulic Lever
- Windows, Mirrors
- Fifth Wheel
- Undercarriage
- Engine Block
- Trailer Interior
- Lamps and Lights
- Refrigeration Units
- Trailer Floor
- Tractor Cab
- Paint Preparation
- Cement Mixer Tub
- Washouts
- Trash Receptacle
- Chrome Trim
- Vehicle signage
- Fuel Tanks

- Cargo Hold
- Exhaust Stack
- Bucket Trucks
- Asphalt Removal
- Lift Gates
- Tow Equipment
- Tool, Saddle Boxes
- Ladders, Racks
- Booms, Cranes
- Power Hitches
- Sleeper Cabs

(516-Docket)

Agriculture related cleaning needs require the use of Industrial Pressure Washers: (516-Docket)

- Milking Parlors
- Milk Stone
- Barns
- Tractors
- Plows
- Gutters
- Gleaners
- 8.Trucks
- Walkways
- Decks
- Cattle Pens
- Fences
- Pick-Ups
- Tanks
- Roofs
- Vents
- Driveways
- Silos
- Wagons
- Shed Floors
- Harvesters
- Greenhouses
- Machinery
- Service Areas
- Dumpsters
- Fans & Ducts
- Railings
- Storage Bins
- Farmhouse
- Out Buildings

(516-Docket)

Mining & Drilling related cleaning needs require the use of Industrial Pressure Washers: (516-Docket)

1. Mixing Augers
2. Shotcrete Machines
3. Drill Pipes
4. Scoop Trams
5. Trans Mixers
6. Muckers
7. Shovel Loaders
8. Blocks, Hooks
9. Frac Tanks
10. Crew Houses
11. Elevator Links
12. Rocker Shovel
13. Drill Rigs
14. Mucking Machines
15. Haul Trailers
16. Drill Cases
17. Buckets, Forks
18. Wheels, Axles
19. Generators
20. Excavators
21. Belt Crawlers
22. Storage Containers
23. Mine Hoists
24. Winches, Tuggers
25. Well Booms
26. Drills, Bits
27. Crushers, Mills
28. Rotary Tables, Tongs
29. Engines, Radiators
30. Heavy Equipment
31. Down Hole Tools
32. Drawworks


(516-Docket)

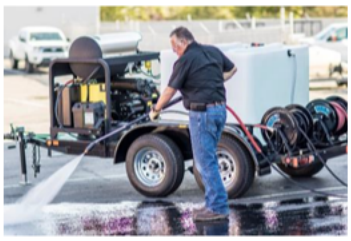
Contract Cleaning Companies require the use of Industrial Pressure Washers: (516-Docket)

- Swimming Pools
- Outdoor Furniture
- Dumpsters
- Docks
- Trash Containers
- Vehicles
- Exterior Walls
- Hoods and Vents
- Wheelchairs
- Fences
- Vats, Mixers
- Air Handlers
- Paint Removal
- Driveways
- Windows
- Service Areas
- Parking Lots
- Concrete Barriers
- Machinery
- Holding Tanks
- Floors
- Walkways
- Roof and Gutters
- Food Products
- Drains and Pipes
- Cargo Holds
- Fans and Ducts
- Trays and carts
- Turf Equipment
- Decks and Railings





(516-Docket)



(516-Docket)

Comment: Mi-T-M is one of the largest and oldest manufacturers of industrial pressure washers, air compressors and generators in North America. We produce over 600 units a day and serve the domestic and international markets. The state of California is a very important market segment of our business. We manufacture product for several Californian markets including Rental, Equipment, Paint, Hardware, Dealers, Distributors, Agricultural, OEM and Government. Mi-T-M also manufactures product under a private label brand exclusively for STIHL, John Deere, Sherwin-Williams, Grainger and 35 other well-known and respected Californian companies. Our engineering team has been working diligently on a battery bank option however, the industrial segment does not have the same requirements as the residential. The technology to power industrial equipment is not yet available. If the zero emission CARB standard passes without an available battery bank resource for the industrial market, a huge void will be created and several businesses that rely on the California industrial market will be left with no available business option. I respectfully request the California Air Resources Board members to reconsider the timeline of their Transition to Zero Emissions until the technology for a viable battery bank can be developed and tested. This standard cannot meet the necessary requirements for powering industrial equipment at this time. (518-Docket)

Comment: I am speaking as a sales manager for a distributor of high pressure washers located in Central California. I have many concerns regarding the passage of AB 1346 pertaining to the phasing out of the sale of small off-road engines, but I will provide comments on a few in particular. I am certain that the negative economic and water conservation impacts as well as the negative impact to the public health of the communities that we serve would greatly outweigh the perceived benefits of phasing out the sale of small off-road engines. (530-Docket)

Socio-economic impact:
One of the biggest opportunities for aspiring entrepreneurs is to get into the pressure washing sanitation business due to the relatively low barriers to entry in terms of cost and the (currently) limitless opportunities and needs for sanitation. The majority of these businesses require small off-road engines to run their pressure washer equipment due to their portability and versatility. With the

passage of this legislation, we are essentially eliminating tens of thousands of California jobs, many of which are held by minorities. This legislation would be very regressive and further expand the socio-economic gap. (530-Docket)

Health impact:
Considering we are in the midst of a global pandemic which has already claimed over 750,000 American lives; I would think that protecting one of the key means of public sanitation would be a top priority. This legislation would cripple the efforts of our customers who provide commercial and public sanitation services. (530-Docket)

Water conservation impact:
As we all know, we are in the middle of a drought in California. Pressure washers use less water than other cleaning methods, including a standard hose. While the water in a pressure washer spews out with greater force, it uses about 50% to 70% less water. A typical hose puts out between six to ten gallons per minute (GPM), while a conventional pressure washer uses between two and five GPM. (530-Docket)

I have full faith in American innovation and I assume that there will be battery-powered pressure washers at some point in the future which will be able to replace existing small, off-road engine pressure washers, but the technology isn't available yet, and it almost certainly won't be available by January 2024. We need to be strategic and ensure that we don't create a massive gap in our public health response, drive ourselves into a deeper hole with respect to the drought, and destroy the livelihood of tens of thousands of small businesses before we have a viable alternative technology for providing necessary sanitation services. (530-Docket)

Comment: As a dealer of pressure cleaning equipment for over 37 years and the current president of CETA I appreciate the opportunity to submit comments on the proposed regulation and any possible amendments. I agree with the CARB board in their resolve to improve the air quality and reduce greenhouse gases. I also believe that small engines and their lack of emission control advancements have a detrimental effect to air quality. I also realize that ZEE tools are the direction of the future. So while I agree on these things I also believe that the negative societal and economic impact from banning small engines on commercial (not residential) pressure washers will outweigh the incremental increase in air quality and reduced emissions. The main reason for this is that the technology for ZEE type industrial pressure washers is non existent and not feasible. Having experience in the pressure pump industry from a supplier standpoint I understand the torque and power requirements for industrial pressure washers and there is no feasible size or feasible cost for a battery powered industrial pressure washer. (536-Docket)

Most commercial pressure washing equipment uses 8 to 20 electric brake horsepower at full load to do their job. By jobs I am referring to graffitee abatement, cleaning city sidewalks and downtown areas, cleaning parks, cleaning and sanitizing playground equipment, cleaning invasive species off of boats, also many types of industrial and commercial and agricultural cleaning that are a necessity not a luxury or for aesthetic reasons. So I propose that the board amend the regulation to exempt industrial pressure washing equipment with engines above 250CC until 2028 like generators or until feasible technology exists whichever comes sooner. (536-Docket)

Comment: this proposal to ban all small gas engines under 25hp is dangerous and should never be passed. there is no alternative at this point. how can you provide cleaning service to the windmills that produce power? you cant pressure wash for 8 hours in the middle of the dessert at night without a gas generator. california doesnt have the power grid to run the citizens A/C units at home after

4pm without having grid shut downs. SDGE shuts down peoples power during high winds for days at a time how will rural counties keep food? i agree to regulate some but its not possible to do all. (540-Docket)

Comment: I am writing today as a small business owner in opposition to AB1346. If this were to pass, I along with hundreds, if not thousands, of other small businesses throughout CA would cease to exist. We are in the business of selling commercial pressure washers, which help keep our cities clean. We sell both gas powered and electric powered units and most of our clients (small businesses like us) opt for gas powered units for obvious reasons. Electric powered units are no match compared to gas powered units. We are just not at a place where electric powered units will be as effective. Not to mention more water will have to be used, longer cleaning times, financial burden of purchasing all new equipment, multiple batteries required to complete a job, all existing users having to charge batteries every night and day, the toxic chemicals inside batteries (doesn't this also affect the environment?) etc. The loss of hundreds or thousands of small businesses will result in higher un-employment rates and higher rates of people on government assisted programs to get by due to loss of income. Please reconsider. (541-Docket)

Comment: My name is Greg Sprunk and I am the President of Superior Cleaning Equipment. I have owned this company for 30 years. 25 years we have been in Southern CA in San Diego. We sell and service pressure washers, aqueous parts washers, wash water recycling systems as well as service, parts and accessories for the above items. We primarily deal with industrial cleaning equipment generally with 10HP to 25 HP engines. Those pressure washers are able to conserve water over a standard water hose, sometimes as much as 3-4 times. It was inconceivable to me that much thought went into these regulations in regards to the industrial applications that they are going to be affecting. There is no battery technology that will allow a user to clean anything above 1500 psi at this current time. Pressure washers use a tremendous amount of energy but also conserve a great amount of water as mentioned above. Any outside surface that is currently being cleaned from your civic centers to restaurants to ships to boardwalks to hotels to entertainment venues such as Legoland, Sea World all use over 3000 psi. There are no replacements for that. A water hose is not going to cut it. Let me give you just one example out of 1000. Cleaning the hulls of military ships. Most contractors use 5000 psi or more. In order to power that you need to have a very large 460V highly charged cord which is not very safe and now you have the water factor as well. Ever try removing chewing gum from your driveway with a water hose? I guess you could get out there with a chisel but you still won't have a clean surface. (543-Docket)

Comment: In the Pressure Washer Business we rely on a gas engines to provide quality & powerful equipment. In our experience with electric pressure washers they aren't effective for industrial, commercial & other vast application of other jobs. Plus a lot of the jobs pressure washer are used for are not near a power source. Our business is selling, maintaining & repairing pressure washers along with other cleaning equipment. Just since the start of this bill, things are negative of where businesses would go. Not only ours but our customers business's. We believe a delay or abolishment in implementing this bill would help a lot of small business stay in business & make the economy better. (546-Docket)

Comment: My name is Jamie Schmidt and I'm the founder of the Professional Worldwide Mobile Cleaning Association. We are an association of mobile cleaning contractors that train cleaning contractors throughout the country. This ban on small engines will directly hurt contractors abilities to keep exterior surfaces clean. Keeping exterior surfaces clean is an important part in our public safety by sanitizing and also reducing slip and falls on flat surfaces. (547-Docket)

Comment: Thank you for giving us a platform to express our concerns. I've been in the pressure washer industry for 30-years, first building them then repairing them, teaching our dealer network how to repair them and now I sell them to our dealers in the NW territory. While most pressure washers we manufacture are between 5-horsepower and somewhere under 25-horsepower, I don't believe our industry will have a feasible non-emission alternative before January 2024. (549-Docket)

Comment: These pressure washers (both hot and cold water) are used in many industries throughout my territory (including Northern California) for many applications. Some of the more notable uses which CARB and the state of California should take interest in are:

Invasive species (quagga / zebra muscle) decontamination to keep our waterways clean and invasive species free / Clean-up and sanitizing of dismantled homeless camps / Graffiti removal / Cleaning of equipment at farms and dairies to prevent cross-contamination / Environmental clean-up such as the efforts right now at Huntington Beach / General cleaning and sanitation of outdoor areas / Washing of solar panels to optimize output.

While these are just a few uses for pressure washers, I'm glad to have a chance to voice my thoughts. (549-Docket)

Comment: I am an industrial supplier to commercial cleaning industry (pressure washers, floor scrubbers, detergents, sanitizers, disinfectants servicing (municipalities / office parks / retail /residential customers) in the greater Los Angeles area for the last 20 years. I proudly come from the Anaheim community located in Orange and Riverside county. I employ 12 workers and we take great pride in the service we provide the community. Within the last year, we partnered with County of Orange, CALTRANS, City of LA, multiple municipalities, food plants, construction companies, transportation, transit, etc, to provide gas powered pressure washers to clean and sanitize everything from schools, food plants, transit buses, bus stops, homeless encampments, CalTrans vehicles, public property, and the most efficient tool we use is an internal combustion powered pressure washer. Beyond this we have x of crews working daily. The mandate of no internal combustion engines being considered would eliminate the jobs of nearly all of our staff. We care deeply about a clean environment for both the health of our neighbors and beauty of our community. (where applicable) We have participated in water recovery / water treatment as well as propane burner usage in accordance with all state and local regulations. (552-Docket)

Comment: Elimination of these cleaning devices will decrease public safety, decrease the ability to clean and sanitize, and keep California as the jewel of a state we all love. Banning these small engines eliminates any acceptable solution for portable pressure washing. Thousands of cleaning companies, municipal staffs, transit workers, port workers, state employees will be left with no cleaning solution for hard to clean surfaces away from a major electrical source. There is no battery to run a pressure washer. That technology may come some day, but in the meantime, you have put the horse behind the buggy. You are cutting off your nose to spite yourself. Do you want excess dirt and bacteria filling the outside areas of restaurants? Do you want- sidewalks crusted with spoiled food and bacteria at public event centers such as a football or baseball stadium? Do you want the building you work at to have uncleaned entrances? Please, take a moment and ask yourself if this is the right thing to do. You are creating a human health and economic crisis with this ruling. I beg you to use just a bit of common sense. It is easy to hand down decisions from the halls of government. Call your state agencies and municipalities. Call the schools. Call the event centers. Call the universities. Call the churches. Ask if they can keep their employees, students, visitors, and fans safe without the gas powered pressure washer. I know the answer. Do you? (552-Docket)

Comment: I write to you regarding the proposal to eliminate Small Off-Road Engines beginning January 1, 2024 and about the severe impact that it will have on various aspects of the lives of the citizens of our wonderful state. My wife and I we both born and raised in the beautiful state of California, and love raising our children here. I am employed by a company that manufactures pressure washers in Redlands, California. This manufacturing facility employs more than 50 people at this Redlands facility who build pressure washers and support this Californian manufacturing facility. These pressure washers are sold to distributors, many of which are Californian small businesses for whom a significant portion of their livelihood is made by reselling these gas powered pressure washers to local municipalities and Californian entrepreneurs who use this equipment to keep our communities safe and clean. This regulation of Small Off-Road Engines would effectively eliminate most of the pressure washing products and the services that we provide to our California customers which would impact our livelihoods as well as theirs. (553-Docket)

A pressure washer is used in order to quickly and effectively clean and sanitize in a way no other product can. It is a highly effective piece of equipment that is ideal for a drought susceptible climate since it uses a fraction of the water used by a garden hose. If gas powered pressure washers are not available, there is no current available battery or electric technology to take its place. The other option of cleaning that will be employed will be with a garden hose which will lead to less effective cleaning and significantly more water wasted or in some cases not cleaning at all. One unique application of pressure washers is by using hot water. A hot water pressure washer is an industrial piece of equipment that is the core of our business. It is similar to using hot water for cleaning your dishes rather than just cold water. It quickly removes grease, oil, algae, road film and other grime. It cleans much faster and in many applications completely eliminates the need to use chemicals. If this product is not available then the alternative may be to try to use caustic chemicals to perform the same function which will have a detrimental effect to our environment. Also, there are some applications like gum and graffiti removal where a gas powered hot water pressure washer is the absolute best tool for the job. A hot water pressure washer can remove a piece of gum from the concrete in the matter of seconds where there is no other product that can do this as quickly and effectively. By having gas power, you can effectively clean anywhere including remote areas such as agricultural and construction sites. (553-Docket)

The state and local municipalities use pressure washers to keep our state beautiful and safe. Almost every downtown and historic district is cleaned with pressure washers at night after street fairs and market nights. Our amusement parks, stadiums, schools where our children play are cleaned with gas powered pressure washers. Train, subway and bus stations are all cleaned with pressure washers. Hot water pressure washers are employed to clean and sanitize homeless encampments and prevent to spread of deadly diseases. Our state uses pressure washers to kill zebra and quagga mussle larvae in boats to prevent the spread of Aquatic Invasive Species from the Colorado River into our other lakes and streams which would harm the natural eco systems. Hot water pressure washers are employed for disaster cleanup after floods, fires, and oil spills. (553-Docket)

Many of the systems that we make, help contractors and municipalities comply with the Clean Water Act by employing onboard generators to power a Recovery and Recycle systems. This system not only picks up the wash water preventing any contaminated wastewater from entering our streams, lakes, and oceans; it also recycles the water for reuse conserving even more water which is one of our states most precious natural resources. Battery and electric power are currently not an option. We produce commercial/ industrial products that are not capable of being run on the standard power grid. The battery technology currently available is not a feasible or affordable option for this application of industrial/ commercial cleaning. I ask you to please reconsider your decisions and to make commercial and industrial pressure washing equipment preempt from this proposal due to its

heavy use by agriculture and construction industries that depend on it, as well as the various other essential cleaning tasks that I have explained. There are many unseen benefits that these small engine powered products contribute to our every day lives and the quality of life in keeping our beautiful state clean and safe. (553-Docket)

Comment: Always Under Pressure is a small business in the Bay Area selling and servicing commercial power washing equipment. A large portion of our business is 13 - 25 horsepower gas engines powering 3000 4000 psi hot water, high pressure machines. Some of this equipment goes to school districts, hospitals, construction companies, food processing equipment and facilities and many types of transportation including buses, trains, and airplanes. Most cities, counties, and districts, for example Golden Gate Bridge and BART use this equipment. We also service the mobile cleaner industry. Some of these companies have as many as four or five wash crews that go out every weeknight and some of them hire and train the homeless and disadvantaged. They mostly work at night and the general public never sees them and are unaware of the work they do. They wash buildings, city sidewalks including urine and feces area where the homeless are living They wash restaurant entries and walkways, garbage dumpster areas and many public spaces we all use. (555-Docket)

While we understand the intent of reducing emissions, at this time there is no alternative equipment available to substitute for this type of cleaning. The intent of this cleaning is to improve healthy living conditions and quality of life. Check out these Bay Area news articles regarding the use of hot water pressure washers.

> https://nypost.com/2019/12/04/sf-neighborhood-will-pay-to-power-wash-fecesoffsidewalks/#:~:text=San%20Francisco's%20Tenderloin%20District%20kicked,animal%20feces%20littering%20the%20streets.
>
> https://abc7news.com/kivia-oakland-ex-con-opportunities-for-ex-cons/4463428/
>
> https://www.bizjournals.com/sanfrancisco/news/2021/07/14/sf-streets-businesscleanup-initiative-shine.html

Please allow the continued use of this equipment until additional technology can be developed. (555-Docket)

Comment: In my entire 50 year career I have been part of the industrial/commercial manufacturing segment of producing an environmentally safe, high efficient, water & labor saving industrial/commercial cleaning systems with wastewater capture and reuse options. I am an active past president of the Cleaning Equipment Trade Association better known as CETA https://ceta.org/ that represents most major manufacturers, vendors, distributors/dealers and affiliate members such as contract cleaners that perform their services mobile or on site. I also currently continue to hold a senior executive position with a major manufacturer of the systems in question dealing with every industry category from manufacturing said product to delivering and educating the end user. With this comment I am as simply attempting to shed some light on a subject very dear to tens of thousands of operators and operator owners in the state of California using industrial/commercial cleaning systems or better known as pressure washers. I have not read the entire list of comments that have been submitted electronically but it seems fair to say that the majority seem to be in favor of the elimination of gasoline powered lawn care or hand held devices such as the noisy leaf blower. A person would have to really search to find a negative comment on a pressure washer industrial/commercial or even referencing the consumer products. (559-Docket)

The information I am referencing below is found on this link produced by CARB (May 15, 2019) https://ww3.arb.ca.gov/msprog/offroad/sore/AbstractExecutiveSummary.pdf. This survey as gathered by CARB is an in-depth analysis of what we would classify as the consumer based product well under 9.7KW and not a clear pictorial view of the industrial applications we serve. Below is the final outline used to categorize all pressure washers.

- The last page of the report states a total of "2,398,713 pressure washers" (1,048,803 for engine powered).
- If you take into consideration that residential products on average are owned for 5 years with an estimated annual usage of 30 hours and the industrial/commercial gas engine driven (GED) pressure washers 1 to 2 years.
- A single cylinder 9.7KW style engine's estimated usage is 1,800 to 2,000 hours and V-Twins @ 18.6KW 4,000 hours annually.
- CARB estimates 250,000 total pressure washers sold each year in which <50,000 or 20% are industrial commercial units sold into the CA market place annually between the 13 HP (9.7 KW) to 25 HP (18.6 KW).
- Life expectancy of 2 years equals a total <100,000 industrial/commercial pressure washers utilizing 9.7 KW – 18.6 KW engines in service at any given time or 9.5% of the 1,048,803 assessed. (559-Docket)

We would like to suggest segmenting our industry into a separate category with a phase in approach to zero emissions due to the health and wellbeing of the infrastructure support our industry offers vs. tools under 2.5KW that we are currently partnered with. The benefits are not just limited to agriculture, transportation, schools, construction, municipalities, counties and state facilities that use our products to clean, sanitize and maintain everything that moves from public transportation, over the road delivery vehicles such as FedEx and UPS to the US Postal service every seaport dock and port of entry that uses commercial freight carrier semi-trucks who's safety is controlled by the Department of Transportation as well as airports, tarmac and aircraft maintenance facilities. Even things that can't move require inspections and regular maintenance such as bridges, public and private buildings, grocery stores, city streets, state and Federal highways, walkways & sidewalks, shopping malls inside and out, homeless encampments, removing graffiti as well as sanitizing, tractors and conveyer belts used in agriculture, fruit, produce and wine production operations, as well as in poultry, beef and pork raising & process facilities. You name it and it is probably washed and or sanitized with a system similar to what we produce. (559-Docket)

We feel as an industry leader a great responsibility to be a good steward of the environment and agree that a cleaner source of power with zero emissions should be the desired outcome and are currently designing alternative battery pack sources. This project will take at least 2-3 years to get the initial design and cost down as well as the safety and training protocols of storing and transporting multiple 10-20 KW lithium ion batteries as well as maintaining and disposing of them properly. (559-Docket)

- The current zero emission initial investment is not practical due to the continual high level of energy required and financial limitation boundaries of current technologies available. (559-Docket)
- The current unit purchased today at $2,450.00 end user price equipped with a 13HP (9.7KW) gas engine drive (GED) that operates @ 4 GPM @ 3000 PSI or 12,000 units of cleaning power (GPM x PSI= UCP). Unit is a water saver (the average public utility garden hose is

approximately 10 GPM @ 60- 80 PSI) The equivalent electrical operated system would be a 10HP unit that would operate for approximately 1 hour 15 minutes on a 10 KW battery pack with a full charge at a consumer cost of approximately $21,750.00. The average operator utilizes a single cylinder unit such as the 9.7 KW GED approximately 5 hours a day or a total investment of 4 additional 10KW batteries @ $17,500.00 consumer price each for a total investment cost of $91,750.00 vs $2,450.00 or 37.5 times the cost of the current 9.7KW gas engine drive unit. (559-Docket)

Comment: **Subject: Small CARB compliant engine for pressure washer?**
I am wondering who I might be able to speak to at CARB concerning a list of CARB approved small engines (5 – 6.5hp) which we can use for an OEM pressure washing system called the Ecoblaster. See https://www.graffitiremovalinc.com/products/ecoblaster We have been informed by Mi-T-M (our current supplier of pressure washers that the honda GC190 and GC 160 engines can no longer be shipped to us in Los Angeles. I am also wondering if the new legislation banning combustion engines from 2024 for leaf blowers and generators will also apply to small pressure washers like this one? Unfortunately there are no electric options that I am aware of that can put out 2.5 gpm at 2500 psi. (576-Email)

Comment: I am an industrial supplier to commercial cleaner / small business owner operating a commercial cleaning business) servicing (municipalities / office parks / retail /residential customers) in the greater Southern CA area for the last 21 years. I proudly come from the Anaheim community located in Orange county. I employ 11 workers and we take great pride in the service we provide the community. Within the last year, we partnered with Orange County Conservation Corps, multiple municipalities, fire department, LA County Fire, OC Parks, multiple school districts including OCUSD, Anaheim, Perris, Tustin. The list goes on and on. Our equipment is used to clean and sanitize schools, food venues, municipal areas, parks, bus stops, Gas engine pressure washers are used to clean and the (main / most efficient) tool we use is an internal combustion powered pressure washer. There is no replacement for pressure washers on the horizon in an electrical unit. Beyond this, all of these companies, institutions, or organizations have crews working daily. The mandate of no internal combustion engines being considered would eliminate the jobs of nearly all of our staff. The level of cleanliness in outdoor areas will fall to dangerous levels if cleaning by pressure washer is eliminated. We care deeply about a clean environment for both the health of our neighbors and beauty of our community. (where applicable) We have participated in water recovery / water treatment as well as propane burner usage in accordance with all state and local regulations. Thank you for your consideration. Let's keep America Clean and Safe. (Form Letter C-Docket)

Comment: I work for an industrial supplier to commercial cleaner, small business owner operating a commercial cleaning business, municipalities, office parks, retail, schools, food manufacturing, etc, in the greater Southern CA area for the last 5 years. I proudly come from the Inland Empire community located in Riverside county. There are 10 employees where I work and we take great pride in the service and pressure washer equipment we provide the community. Within the last year, we partnered with Orange County Conservation Corps, multiple municipalities, fire department, LA County Fire, OC Parks, multiple school districts including OCUSD, Anaheim, Perris, Tustin. The list goes on and on. Our equipment is used to clean and sanitize schools, food venues, municipal areas, parks, bus stops. Gas engine pressure washers are used to clean and the main/most efficient tool we use is an internal combustion powered pressure washer. There is no replacement for pressure washers on the horizon in an electrical unit. Beyond this, all of these companies, institutions, or organizations have crews employed working daily to clean and sanitize their surroundings. The mandate of no internal combustion engines being considered would eliminate the jobs of nearly all our staff. The level of cleanliness in outdoor areas and in our manufacturing facilities, schools and public buildings

will fall to dangerous levels if cleaning by pressure washer is eliminated. We care deeply about a clean environment for both the health of our neighbors and beauty of our community. Pressure washers are necessary to so many to provide a clean and sanitized area. Pressure washers also help to reduce water usage because they actually use less water to clean than cleaning with a hose and clean more efficiently and in less time than other methods. Thank you for your consideration. Let's keep America Clean and Safe. (Form Letter D-Docket)

Comment: I am R. Calvin Rasmussen; I am the CEO of Royce Industries L.C. with operations in Nevada, Idaho, Utah, and Colorado with plans of expanding brick and mortar operations into California. We started our company 38 years ago as a Contract Cleaner, in other words we would take our industrial pressure washers to wherever the work was, including very remote locations that most times require the use of 25HP and less engines. We are very interested in Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions since it potentially has a devastating impact on businesses just like ours. We strongly believe that "as goes California so goes the Country". I have more detailed comments found within the "Board Meeting Comments Log", Comment #516. I appreciate the opportunity to further comment here today. On page 44 of Proposed Amendments ISOR, it is acknowledged there are no battery powered pressure washers for professional use. It is also acknowledged that 67% of residential pressure washers are already Zero Emission Equipment aka. ZEE. The Cleaning Equipment Trade Association comments can be referred to for additional details for why ZEE is not suitable for the commercial, industrial, professional use segment. Those can be found within the "Board Meeting Comments Log", Comment #483. (2008-Docket)

Today my Company distributes Industrial Pressure Washers to the private sector as well as local, county, state, and federal agencies. These agencies use Industrial Pressure Washers to CLEAN, DISINFECT and SANITZE everything from Homeless Encampments to Playground Equipment, from Graffiti Removal to Disaster Clean-Up Sites. Although there are numerous other critical applications for Industrial Pressure Washers, with the short time I have left let me please emphasize one. Aquatic Invasive Species. Specifically, Zebra & Quagga Mussels. All California Lakes, Rivers, Streams and Aquifers are at risk of mussel infestations. As a result, many California agencies such as The Los Angeles Department of Water & Power are required to use portable trailer mounted Industrial Pressure Washers located at remote boat launch ramps and other inspection sites to aid in the Watercraft Inspection and Decontamination process which has been required by California State Law† with the goal of preventing the spread of these invasive species. [Footnote †: https://wildlife.ca.gov/Conservation/Invasives/Regulations] I respectfully ask the Board to refer the Proposed Amendments back to staff to read "Cleaners: High pressure" back to the Pre-Emption list and specifying high pressure washers in this definition to continue the societal benefit the state of California receives from this industry. (2008-Docket)

Comment: I am Dan Pearson and I represent Karcher North America INC. On page 44 of Proposed Amendments ISOR, it is acknowledged there are no battery-powered pressure washers for professional use. It is also acknowledged that 67% of residential pressure washers are already Zero Emission Equipment (ZEE). The Cleaning Equipment Trade Association comments can be referred to for additional details for why ZEE is not suitable for the commercial, industrial, professional use segment. We ask the Board to refer the Proposed Amendments back to staff to read "Cleaners: High pressure" back to the Pre-Emption list and specify high-pressure washers in this definition to continue the societal benefit the state of California receives from this industry. (2009-Docket)

Some examples of this societal benefit are as follows:

- A high-pressure washer reduces water washer consumption during cleaning. Important during droughts
- Fire Management - Invasive Plant Mitigation (Cal Fire)
- Aquatic Invasive Species ("AIS") Watercraft Inspection and Decontamination
- Cleaning-Up Homeless Encampments
- Railroad Related Cleaning Needs (Derailments, Spills, etc.)
- Cleaning and Disinfecting Parks and Public Areas (Playground Equipment etc.)
- Solar Panel Farms
- Wind Turbine Fields
- Graffiti Removal and Abatement
- Public Event Centers (Stadiums)
- Municipalities (Numerous examples)
- Disaster Clean-Up Response
- Most CONTRACT CLEANER's Projects and Applications
- Honorable Mention Industries:
    - Agricultural
    - Construction
    - Mining & Drilling
    - Fleet & Transportation (2009-Docket)

For these applications to be zero-emission would require access to high voltage electricity which is not available and unsafe to the contractor and the public. Battery, Solar, and Wind power are bulky and are not portable in power required to run a high-pressure washer. (2009-Docket)

Comment: I'm Calvin Rasmussen, CEO of Royce Industries with operations in Nevada, Idaho, Utah, and Colorado, and plans of expanding with brick and mortar operations into California. We started our company 38 years ago as a contract cleaner. In other words, we take our industrial pressure washers to wherever the work was, including very remote locations that most time require the use of 25 horsepower or less engines. We are very interested in the proposed amendments to the small off-road engine regulation, since it potentially has a devastating impact on our business, just like ours. We strongly believe that as goes California, so goes the country. On page 44 of proposed amendments, ISOR, it is acknowledged that there are no battery-powered pressure washers for professional use. It is also acknowledged that 67 percent of residential pressure washers are already zero-emission equipment. The Cleaning Equipment Trade Association comments can be referred to for additional details for why ZEE is not suitable for the commercial, industrial, and professional segments. (3004-Oral Testimony)

Today, my company distributes industrial pressure washers to the private sector, as well as local, county, State, and federal agencies. These agencies use industrial pressure washers to clean, disinfect, and sanitize everything from homeless encampments to playground equipment, from graffiti removal to disaster cleanup. Although, there are numerous other app -- critical applications for industrial pressure washers, with the short time I have left, let me emphasize on one, aquatic invasive species, specifically zebra and quagga mussels. All California lakes, rivers, streams, and aquifers are at risk of mussel infestation. As a result, many California agencies, such as the Los Angeles Department

of Water and Power are required to use portable trailer-mounted pressure washers located in remote boat launch ramps and other inspection sites to aid in the watercraft inspection and decontamination of these invasive species. I respectfully ask the Board to refer all -- the proposed amendments back to staff to read, "cleaners, high pressure", back to the preemption list and specify high pressure washers in this definition to continue the societal benefit to the state of California. (3004-Oral Testimony)

Comment: I'm speaking in representing the Cleaning Equipment Trade Association, also known as CETA, also referencing back to what R. Calvin Rasmussen was saying for other information. We fully agree that cleaning and water -- as well as water are essential. We all desire clean -- cleanliness, especially during this current COVID-19 pandemic, where everyone has created what some call the new clean. We don't go out to eat at certain restaurants, because we may not feel they're clean. We want a clean environment. Pressure washers provide this. And our professional cleaning contractors do all types of work. A lot of the work is done at nighttime. You don't even see it, so -- but when you go into your store that day, your place of business, you see a clean environment. (3008-Oral Testimony)

Pressure washers have been used to clean not only the buildings -- the government buildings in California, infrastructure, in California for many applications, sometimes, like I say, at nighttime, when you don't even see it, but you benefit from it the next day. We've also been beneficial in helping in cleaning up with the homeless encampments, where we had to get rid of hepatitis A and we could go in and clean. Now, the other thing to remember is we also recover that water. That's where the water savings comes in with us. So we have to use engines, because we do not have power sources available as we move down the streets cleaning, or we're cleaning on bridges and, stuff or any type of infrastructure, but this benefits California. And what we want to do -- we want to thank -- I do want to thank staff for working with us and listening to our concerns, comments, and questions, and making the revision to include us like they do for generators with some extended date to allow our manufacturers to come up with feasible dates to produce product that works for our industry. This will allow our industry to continue providing the social benefits the State of California currently receives from our industry. (3008-Oral Testimony)

Comment: My name is Michael Ricketts. I'm the owner of Hotsy of Southern California for the past 22 years. I'm also an active member of the Cleaning Equipment Trade Association. During my 22 years in the industry, I've had the pleasure of watching the industry evolve equipment to meet air quality standards for the great state of California. The industry has worked hand in hand with CARB, AQMD, and other agencies to reduce emissions and help California achieve its air quality goals. On page 44 of the proposed amended ISOR, it's acknowledged that there are no battery-powered pressure washers for professional use. I commend staff for the recommendations on the exempt status for commercial pressure washers. We ask the Board to refer to the proposed amendments back to staff to read, "cleaners, high pressure", back to preemption list and specifying high pressure washers in California. (3019-Oral Testimony)

As we're all aware, the introduction of SARS-CoV-2 in the -- late '99 has dramatically affected the well-being of residents in the state of California with 5.14 million cases and 75,279 deaths so far. We've living in a different world than anytime in the state's history. Billions of dollars are being spent by the federal government, State of California, school districts, and private industry to mitigate the damages and loss of life by bolstering the cleaning capacity of State agencies, schools, churches, restaurants, and municipalities, event centers, and private industry. We have partnered with many of these entities to provide efficient cleaning systems to help ensure the facility was clean and properly sanitized to ensure safety to the public. Everyone at this hearing has been positively affected by these projects, whether you're in contact with handrails at public transportation, sitting in seats at a major

sporting event, parking in an underground parking lot at work or State facilities. These areas have been protected by the use of portable gas engine pressure washers. I appreciate the time to speak out about this and I hope that the Board will take under great consideration the need for this product in keeping our state safe. (3019-Oral Testimony)

Comment: My name is Jim O'Connell. I am a business owner in California. I own a company called Hotsy Pacific, as well as a representative for the Cleaning Equipment Trade Association. Our main concern here is that over the last number of years we've -- well, actually 30 years, we've provided service and support with pressure washers throughout the valley and the greater Bay Area. We have also in the last two years partnered with many contract cleaning companies who go out to clean these buildings, sidewalks, homeless encampments, et cetera, to maintain a clean environment in our world. And if you walk through any stores or down the city streets, you can see that the -- there's a lot of work to be done and the small gas engine pressure washers do the bulk of the work due to the remoteness of their application. We also have helped many small disadvantaged and minority-owned businesses stay in business and start businesses due to the low cost of getting into this kind of an industry. And so we would feel that you're going to see some businesses have to leave the state or close their doors permanently because of this. (3025-Oral Testimony)

Again, I'd like to thank the CARB staff for listening to our comments and actually considering a moving of the date for the pressure washers out to 2028. I'd also like them to reconsider the preempt status for pressure washers. So my ask would be to have the Board kick back to staff and see if we can move on that. And we'd be more than willing to have conversations and help them with that process. On page 44, the proposed amendments, ISOR, it's acknowledged that there are no battery-powered pressure washers for professional use at this time. It is also acknowledged that 67 percent of residential pressure washers are already ZEE. So I'll speed this up to get it out of here, but again what we're asking is let's go back to a preempt status for pressure washers, until we get to such a point as technology catches up with us. Again, thank you for your time and I appreciate all your efforts. (3025-Oral Testimony)

Comment: My name is Casey Meelker. I am the product manager for Hydro Tek, which is a company that manufacturers industrial pressure washers in Southern California. I appreciate your consideration already made, but ask the Board to refer the proposed amendments back to the staff to add professional high pressure washers back to the preemption list, until technology is available to support the professional industrial applications that pressure washers are used for today. Mainly three reasons I want to bring to your attention. The manufacturing facility that I'm employed at employs more than 50 people, who build and support this California manufacturing facility. These pressure washers are sold to distributors which are California small businesses who, in turn, sell these gas-powered pressure washers to local municipalities and California entrepreneurs. This regulation would effectively eliminate most the pressure washing products and services that we provide to our California customers, which would impact our livelihoods as well as theirs. (3029-Oral Testimony)

Secondly, pressure washers save water. A pressure washer is used to quickly and effectively clean and sanitize in a way no other product can. It's important for our drought-susceptible climate, since it uses a fraction of the water used by a garden hose. If gas-powered washers are not available, the other options of cleaning that will be employed will be with a garden hose, which will lead to less effective cleaning and significantly more water wasted. Finally, it reduces pollution. Hot water pressure washers are industrial equipment that are the core of our business. It's similar to using hot water for cleaning your dishes. It quickly gets rid of oil, algae, road film, and grease and other grime, and in many applications completely eliminates the re -- the use of caustic chemicals. So if we eliminate this product, more caustic chemicals will be used that will pollute the environment. Also, part of our

system is a wastewater recovery system that picks up the water, recycles it, reuses it, saves more water, and keeps the polluted water out of our lakes, streams, and oceans. (3029-Oral Testimony)

Comment: My name is Alan Bonifas. The name of my company is All Spray and my company is a distributor of pressure washers. I've been in the business or the industry for over 37 years. I'm also the president of CETA for 21-22, the Cleaning Equipment Trade Association, but my written comments for our organization are number 483 with our organization's public comments coming from Jimmy Welch. My comments are my own and my written comments were number 536. I feel that the societal benefits of small engine-driven industrial commercial pressure washers far outweighs the limited increase in emissions from the small category of engine-powered equipment. With estimates of industrial pressure washers in tens of thousands compared to what Kim Alexander referred to in the number of engines for lawn and landscape industry at over 10 million. (3036-Oral Testimony)

And the technology does not exist, as been mentioned, to have feasible ZEE-powered pressure washers at this time. I'm impressed with the ZEE demonstration trailer for the landscaping industry, but I did notice there was no equipment there as far as pressure washing equipment and duly noted that it just does not exist. And I believe this was recognized by the staff and appreciate the recent recommendations backing up the recommendation for pressure washers to 2028. But we still ask the Board to refer to the posed -- the proposed amendment back to staff to read, "Cleaners, high pressure", back to the preemption list and specifying high-pressure washers with this definition to continue the societal benefit that's been mentioned in lots of different examples, that the State of California receive from this industry. So thank you very much for your time and really appreciate everything the CARB Board is doing. (3036-Oral Testimony)

Comment: My name is Eric Tower and I am a power washing contractor based out of Fullerton, California. It's pleasure to have the opportunity to speak with you today and express our concerns about AB 1346. Now, I say "our", because I am speaking for the end user, the contractor, the men and the women in the trenches. I am not a manufacturer or a distributor, strictly a mobile contract cleaner. My company focuses on health, safety, and fire prevention cleaning services for the commercial market throughout Southern California. We remove fuel from commercial kitchen exhaust systems to prevent fires, which is required by federal law. Check out the NFPA 96. Our -- we power wash sidewalks to keep the walkways and dumpster areas slip resistant per OSHA guidelines, not to mention sanitize, which reduce odor, pests, and rodents. We reclaim all of our wash water, so we're not contaminating our waterways to obey with the Clean Water Act, which is another federal law. I believe there's great benefits to our industry to the State of California. (3054-Oral Testimony)

Most mobile contract cleaners operate over the night, which I'm not sure you're aware of. We need this equipment to keep California a safer and cleaner environment. With all the knowledge that I have, I can assure you, with your current ambitions, which I applaud you for, by the way, I am a man of science, ethics, and providing a better quality of life for all, but I know this would directly affect the end user, which is most -- which mostly is primary -- or is primarily made up of minority groups and low-income individuals. On Page 44 of the proposed amendments of ISOR, it is acknowledged that there's no battery-operated pressure washer for professional use, which I completely agree with this assessment on, because there's truly nothing currently or in foreseeable future available or feasible in the marketplace for ZEE. Please reconsider the professional -- profession -- I'm sorry, professional pressure washing industry for your conditions and time lines with AB 1346. Thank you so much for your time. (3054-Oral Testimony)

Comment: My written comment, number 559, is posted on the CARB website. Again, my name is Gregg Brodsky representing the Cleaning Equipment Trade Association as past President and active

manufacturing member. I am a 50-year veteran that understands the technical environmentally driven mandate under review and can assure CARB that we want to be part of the solution not the problem. And again, I'm referencing back to something that's been mentioned numerous times, but the solar -- or the aforesaid SRA amendment dated 9/20 of '21, "CARB staff is not aware" - and again I'm quoting - "CARB staff is not aware of any cordless professional grade pressure washer available for sale at the time of this writing. The analysis assumes some users of professional grade power washers would use zero-emission generators with a power professional grade corded pressure washers". The problem with the ZEE here is that the majority of it is going to have to go low voltage. And that's the one thing that we're mandate by safety regulations in the country to no longer then 36-foot extension cords, but most of these would be 220 volt, three-phase power, which enhances the possibility of electrocution immensely. (3056-Oral Testimony)

We appreciate -- we appreciate CARB's staff openness to meet with our group to discuss our issues and the mutual understanding for the need of milestones, technically-driven adjustments, and/or amendments, and to be cost effective. We've got power units that are available now that would be in the 5 kW category. In order to be comparable to these same pieces of equipment that we're using in a gas engine drive today that would be Comparable to a 9.7 horse or -- excuse me, a 9.7 kilowatt, or 13 horse, would be 50,000 watts that would be required. That unit is hitting the field today at 2,350 to the end user. (3056-Oral Testimony)

A comparable product like that, which again we as a manufacturer it would be both, but with a 10 percent margin, would be over $91,000 to the consumer. So we're pleased to hear the staff is recommending the extended time to 2028 to treat 225 cc and larger gas engine drive pressure washers the same as ZEE. In April 2014, pressure washers were removed from the preempt application list, even though most of the equipment that remains on the list as of today is remotely cleaned by our products. We are asking staff to review and submit back to the Board to reinstate pressure washers above 250 cc as a preempt till technologies can evolve. I want to just briefly discuss – (3056-Oral Testimony)

**Agency Response:**

These comments include requests to exempt or delay implementation of emission standards of zero for pressure washers used by professional users. Some commenters describe their organizations, businesses, backgrounds, or operations, and some include images depicting the use of pressure washers in various settings. In response to these comments, CARB made several modifications to §§ 2403(b)(1) and 2754(a)(3) and added new subsections 2754(a)(7) and 2754(a)(8), as described in sections II.A.1.e and II.A.2.d of this FSOR. Chapter I of the ISOR discusses technological feasibility of the Proposed Amendments and potential challenges for professional zero-emission pressure washer deployment. A transition to ZEE is technologically feasible, as discussed in the ISOR. As described in the ISOR Appendix I Standardized Regulatory Impact Assessment (SRIA) (pages 44-45), there are challenges with zero-emission pressure washers, including a lack of availability of cordless zero-emission pressure washers. CARB understands the initial proposal would significantly impact the ability of professional cleaners to provide sanitation in public areas because they often use pressure washers in places where outlets are not available to plug in a corded unit, and the pressure washers they use have high power demands. Pressure washers with engine displacement category of 225 cc and larger have greater pressure ratings and water flow rates that are used in professional cleaning work. As a result of these features, pressure washers with engine displacement greater than or equal to 225 cc cost significantly more to purchase than pressure washers with engine displacement less than 225 cc. The cost and size of pressure washers with

engine displacement greater than or equal to 225 cc make them less practical for users other than professional cleaning services, so users such as residential users are less likely to purchase or use them. The unique features of pressure washers with engine displacement greater than or equal to 225 cc and the high cost of professional zero-emission pressure washers set them apart from other equipment types and necessitate this proposed change. Emission standards of zero would apply to pressure washers with engine displacements less than 225 cc for MYs 2024 and later, consistent with the requirements under the Proposed Amendments described in the ISOR for all other SORE equipment except generators. Such pressure washers are more likely to be used by users other than professional cleaning services. Therefore, CARB made modifications to allow more time for pressure washers with engine displacement 225 cc and larger to transition to zero emissions.

In response to comments that express opinions regarding AB 1346: The Proposed Amendments are not AB 1346 and are not a bill to be considered by the Legislature. The Legislature passed AB 1346, and the Governor signed it. The Proposed Amendments meet the requirements of AB 1346.

Some comments express concern about water conservation due to the lack of availability of industrial, commercial or professional pressure washers and impacts to minority-owned businesses and disadvantaged communities. These concerns are addressed by CARB's modification to allow more time for the pressure washer market to mature, as described above. As described on pages 95-97 of the ISOR, the Proposed Amendments would reduce statewide SORE emissions of $NO_x$ and ROG by about half in 2031, compared to the Baseline Scenario, which would benefit all communities, including disadvantaged low-income communities and communities of color. CARB expects emission benefits will be greatest in areas with the highest emissions, which are likely to include disadvantaged communities where equipment users may have the oldest and highest-emitting equipment. Upfront costs for zero-emission pressure washers are expected to decrease as the ZEE market matures. As discussed in Appendix I SRIA sections C.1.c.iv and C.1.c.v, it is likely that the cost of zero-emission pressure washers will decrease over the next several years due to continued innovation and a shift in the market towards ZEE, which would create economies of scale for the sector. For these reasons, industrial, commercial and professional pressure washers are expected to be available, minority-owned businesses' operations are not expected to be impacted, and disadvantaged communities are expected to benefit from the Proposed Amendments including 15-day modifications.

Regarding the comment that at least 2-3 years are needed to design alternative battery pack sources, and to get cost down as well as safety and training protocols: The implementation schedule summarized in section II of this FSOR and detailed in §§ 2403 and 2754 for pressure washers using engines with displacement of 225 cc or larger provides the time necessary for these actions to take place. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. Residents and businesses can continue to use and repair their current SORE equipment including pressure washers until the end of its life. People can also purchase CARB-certified engines of any displacement for pressure washers, including those produced during MY 2023 or earlier model years, as long as they are available. This allows a more gradual phase-in of new zero-emission pressure washers and associated training procedures.

Comments regarding equipment that has been determined to be preempt and requests to determine whether pressure washers are preempt under Section 209 of the Clean Air Act are

beyond the scope of this rulemaking. In response to the comment regarding steam cleaners: steam, sewer, and barn cleaners have been determined to be preempt under Section 209 of the Clean Air Act. Please refer to the Agency Responses in section IV.A.29 for additional discussion of preempt equipment.

Comments regarding water recovery systems and the use of SORE pumps for recycling water are similar to other comments regarding the use of SORE pumps. Please refer to the Agency Response in section IV.A.29.1.3 for discussion of preempt water pumps.

In response to the statement, "We have been informed by Mi-T-M (our current supplier of pressure washers that the honda *[sic]* GC190 and GC 160 engines can no longer be shipped to us in Los Angeles": This statement is not related to the Proposed Amendments. Questions regarding the availability of CARB-certified engines in 2021 are beyond the scope of this rulemaking.

Statements comparing the use of pressure washers and garden hoses are beyond the scope of this rulemaking. Statements regarding the use of water heated using external combustion heaters are beyond the scope of this rulemaking. External combustion heaters are not SORE. Statements regarding the use of caustic chemicals for cleaning are beyond the scope of this rulemaking.

In response to the statement, "I encourage you to delay the Pressure Washer engine requirement until at least 2028 for the sake of CO2 emissions alone, but also because pressure washers serve needed functions that provide water savings and health benefits and offer employment to many, especially in the minority communities. I also think that many SORE will be eliminated for residential users because the big box stores will trend towards battery powered…Thank you again for reading this and answering if it would be best to wait until over all power generation was lower in CO2 output than a gasoline engine per KWH," and other statements regarding the California energy grid: The commenter does not provide evidence to suggest that the California energy grid produces more carbon dioxide emissions per kilowatt-hour of energy than SORE. While the Proposed Amendments would reduce greenhouse gas emissions and petroleum use, they are specifically designed to achieve the expected NOx and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20, and would reduce emissions of pollutants that have multiple known adverse health effects. Please refer to the Agency Response in sections IV.A.6.3 and IV.A.6.4 for additional discussion of emissions from electricity generation and statewide demand for electricity. The Proposed Amendments would not require anyone to stop using SORE equipment and would not prohibit the sale of CARB-certified SORE. As described in ISOR section I.E, the level of performance, number of brands, and number of equipment options among ZEE for both residential and professional use have increased greatly and continue to do so today.

In response to the statement, "Also stationery pressure washers that are used in factories and other places that could use electricity for supplying power are already in use,": The commenter appears to refer to stationary pressure washers. Stationary equipment is not subject to the SORE regulations. This comment is beyond the scope of this rulemaking.

In response to the statement, "I fear your proposal will harm this industry worldwide. We already have a challenging supply demand with engines in this size being on back order. With this change there will surely be large companies buying mass amounts of engines prior to 2024 making it nearly impossible for smaller companies to maintain their business's *[sic]*, by completely stopping their ability to get the equipment needed" and similar statements: The

commenters do not provide evidence to support the claim that the Proposed Amendments could harm the professional mobile cleaning industry worldwide. The commenters do not explain the nature or cause of supply challenges that have resulted in engines being on back order. The commenters do not provide evidence that smaller companies would not be able to obtain engines or maintain their businesses. Please refer to the Agency Response in section IV.A.28.2 for discussion of supply chain concerns. CARB agrees that existing technology can be used to reduce emissions from SORE. As described on page 165 of the ISOR, "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[24]] lists ten MY 2020 engine families with HC + NOx certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-2 of the ISOR. Whether or not manufacturers installed engines from those engine families in pressure washers, they could choose to install them in pressure washers in the future. "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" lists 27 evaporative families with certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR. Manufacturers may certify engines that use low-emission technologies under the Proposed Amendments.

Please refer to the Agency Response in section IV.A.13.1.1 for additional discussion of comments related to potential loss of businesses or jobs.

### A.2.4.2. Exempt or delay compliance dates for SORE equipment used by landscapers and other professionals for technological and cost-based reasons

Comment: I urge you to delay implementation of this action to at least 2030. As a licensed landscape contractor and small business owner, earlier implementation will lead to economic hardship and potential loss of business. While these efforts are to be applauded, current replacement of small gas engines with battery power is not reliably viable with current technology. Some issues with this technology are as follows:

-charge capacity too small to run all day

-discharge rate anxiety by professional users (run down time highly variable depending upon use)

-reduced battery lifespans due to constant or frequent use

-insufficient torque/power (i.e. more power = less run time)

-higher price point to purchase

-no to little standardization in battery design

-issues with California's electrical grid including PSPS

-difficulty and or extra costs associated with the need for charging stations or carrying multiple extra batteries during work day (2-Docket)

[24] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

In general, the landscape industry is beginning to use some battery technologies such as portable power equipment (drills, Saws, chainsaws, small lawn mowers). If battery technology was equal to small gas engines in power and price, I can assure you, many contractors would begin to make the switch. If nothing else we are a practical industry. (2-Docket)

Comment: A battery-powered string trimmer only lasts roughly 20-30 minutes before needing several hours of recharge, and the cutting is much slower than with a gas-powered device. An extension cord for an electric trimmer will only go so far, and can throw sparks into dry grass where cords plug together. (6-Docket)

Comment: AB1346 may be a lofty goal but there is a distinction between a weekend warrior and commercial/agency application that should be understood and supported. The "one size fits all" approach is unrealistic and unsustainable and should be tailored to address what is happening in the State. The State of California is a fire zone and an energy challenged area that requires all hands on deck from the commercial/agency to the homeowner in defending and maintaining property with equipment that is designed to get the job done. Endless batteries, charging stations, and an extension cord scenario isn't the way to go as batteryoperated equipment is slower in performance and isn’t designed to address emergency or unscheduled work. (8-Docket)

Comment: AB1346 should be limited to a select number of products that are geared for the homeowner or weekend warrior. This approach will support a segment of the population who will embrace battery-operated equipment without compromising the commercial/agency user. It should be a choice that allows individuals to evaluate their respective needs based on the application and circumstances of location and personal resources. In that AB1346 only regulates the sale of product in California, and doesn't prohibit an end-user from bringing product into California, usage of gas outdoor power equipment will continue. Therefore, it would be prudent and responsible for the State to regulate the after-life of batteries while limiting the number of the products found in AB1346. (8-Docket)

Comment: I strongly urge the Board to extend the time frame on the generator portion of this regulation until there are other solutions. Also, it is imperative to extend the time frame on the other regulations even longer due to fire concerns. (12-Docket)

Comment: Currently professional-grade battery/electric equipment to run many hours straight without charging intermittently in commercial service settings - and the infrastructure needed to charge, transport safely, and recycle it - doesn't yet exist at the scale necessary to meet the state's accelerated timelines. (21-Docket)

Comment: It is also my belief that substantial rebates or subsidies programs (far more aggressive than South Coast AQMD rebates for lawn and garden equipment) should be offered to mitigate financial burdens from upgrading equipment to small business owners for this effort to work until the battery technology truly becomes mainstream and affordable to all. To make a difference in improving the air quality, the majority need to comply. Without feasible means to get the majority who will be directly affected by it on-board, the adoption of the new bill will only result in a colossal waste of time and tax dollars. (21-Docket)

Comment: I started Carters Precision Pressure Washing to do two things. Make a living and help the surrounding communities. I am not against programs that help to heal the environment. I believe this measure is too harsh on the people that rely on the engines to make a living. There is currently no technology to replace the small off road engines. This ban will cause thousands of businesses to have

to close their doors. It will not only effect the business owners but those that work for them too. Ultimately, it will effect economy of our state with the loss of hundreds if not thousands of jobs. Is there to a chance to ban the small off road engines to the basic consumer on the 2024 date and allow those running a business with machinery to continue to purchase for an additional time. (23-Docket)

Comment: As battery technology has advanced, so too has the availability of electric outdoor power equipment. However, professional-grade battery/electric landscape equipment - and the infrastructure needed to charge, transport safely, and recycle it - doesn't yet exist at the scale necessary to meet the state's accelerated timelines. (34-Docket)

Comment: This transition should also be subsidized for lower income business owners. Many of the landscape maintenance community do not gross a high income and this transition might be costly to them. (37-Docket)

Comment: I do not see how they will be able to provide non gas powered equipment to handle large commercial properties from a landscape maintenance stand point. (40-Docket)

Comment: A ban on gas equipment is the elimination of the landscape industry. This ban is a unrealistic endeavor. Our California representatives and governor should have never just spewed out this ban. If they actually did some tease arch they should have started with residential sales. Homeowners account to more gas powered equipment then all of the landscapers put together. To equip one truck for electric powered equipment there has to be a on board generator, 20-30 spare batteries. Now what happens when the power grid fails. How do these companies operate? They don't! Again this ban would kill the landscape industry! Governor Newsom does not know how to run a state and has destroyed California! (43-Docket)

(43-Docket)

Comment: 2024 does not allow enough time for the commercial landscape companies to implament the change for our business. The development of efficient mowers, the high costs, and supply chain issues it's going to cause will require at least 2-3 more years. 2027-2028 would be more conducive. (45-Docket)

Comment: Our gasoline-powered equipment runs 5-6 hours a day 6 days a week, it would be very frustrating with electric power equipment that is heavy cumbersome from battery weight and will not hold up to hours of service charge and abuse that we need to complete quality work that is demanded in the landscape maintenance services. I would have use a gasoline powered charger to charge the battery equipment, this does not make sense. Please do not place this burden on businesses and resend this law. (49-Docket)

Comment: With the present battery technology we have I would close up shop....period! It can't and will not work as it lacks both the power we need and run time we require. 20 guys would lose their jobs and all the folks we do business with like the lawn repair shops would close. This idea is not feasible, period. (50-Docket)

Comment: While the currently available battery powered Outdoor Power Equipment is suitable for most Homeowners that maintain small in-town residential lots there is nothing currently available that meets the needs of Commercial Landscapers or large property owners with respect to 1) available power, 2) run time, or 3) affordability. Certainly the equipment that is on the market today is much better than what was available just a few years ago but for a User that needs to run a machine all day to earn a living what can be purchased right now just will not get through the day without many batteries and some way to charge them while working out in the open. We need a distinction between the Residential Users and Commercial Users. The product on the market right now absolutely meets the needs of those folks working on their homes in-town so please go forward with restrictions to what they will be able to buy in 2024. For hard working Landscapers, working all day every day to keep our state the beautiful one that it is, they need to let the OPE Industry continue to refine and improve the battery-powered equipment to come up with product that can truly replace the gas-powered equipment that they currently use. (52-Docket)

Comment: Most of electric equipments can only operate less than 1 hour. Besides that the power of the equipments are not strong enough to mow nor blow. It will make the maintenance fees are high to our customers. (57-Docket)

Comment: I run a smaller office for a national tree care company. Our office prides itself in having the latest technology and best equipment. We have almost all new trucks and chippers. We use husqvarna battery chainsaws almost exclusively for tree pruning. That said, we still rely on the use of gas powered chainsaws greater than 45cc as the technology is not offered. We also lean on our gas equipment when working in remote locations, for fire abatement, and recharging batteries is not an option. A ban of gas chainsaws would bring our industry to a screeching halt. While I do feel that the technology will get there I think there needs to be adequate time for the industry to adjust. I appreciate the consideration. (63-Docket)

Comment: With the cost and weight of the electric equipment at this time it takes us longer to do our work. This leads to more cost for our clients. If the batteries do not improve the extra cost could potentially be to expensive for some clients and companies. (71-Docket)

Comment: Perhaps the $30 million proposed allocation to help with the transition from gas to electric could be in part used to incentivize the creation of better battery technology, a battery allowance, and or homeowner rebates (largest user segment). (74-Docket)

Comment: Commercial (for profit) Landscape Maintenance Companies can NOT make battery equipment work. The average 4-man landscape crew would have to carry over 20 lithium batteries per day in order to service properties. This does not work. Homeowners on the other hand COULD be make battery powered equipment work. This is just another in a long list of California Business Killer regulations. Zero Emissions will not work in Commercial Landscape Maintenance. (77-Docket)

Comment: I've been a landscape contractor for 30 years. While we have embraced battery landscape equipment, there are applications where the technology is not yet close to practical or replaceable. Medium to large chainsaws; The power needed to weight ratio of battery power makes it impossible to move safely while working, even backpack battery don't have enough runtime and also add

operator loose of balance and fatigue. Lawn mowers; the weight added by battery's sufficient to operate large mowers creates soil compaction problems and requires frequent charge or change outs that make them impossible to use commercially or institutionally. While battery Backpacks solve some power longevity problems, they add fatigue, safety, heat stress and cost issues (over $1000.00 each). Firefighters, Licensed tree & landscape workers need exemptions from this ban to safely be able to take care of our urban environment until suitable, plausible equipment is available. (78-Docket)

Comment: It would be impossible to get the job done here at LBCC. We need an ABSOLUTE MINIMUM of a solid 12 hours of constant power to operate and maintain operations and facilities. We have already partially converted to battery power. It just does not have the ability to run and sustain the consistency that is needed. (80-Docket)

Comment: This new proposal for gas powered equipment is another example of how government is not paying attention to small business. For two reasons. First a lawn service business will not be able to function without gas powered vehicles unless the buy thousands and thousands of dollars worth of batteries to operate this business. Anyone that has used an electric blower knows that it requires multiple batteries just to do one house. They use a lot of electric power. Each battery is in excess of $100. So if a small company is doing 20 houses a day you will need $2,000 for each worker on the crew. But the second part of this is now you are creating toxic metal contamination for when these batteries go bad in two years. Then these batteries will need to be replaced again at another $2,000 per man. (81-Docket)

Comment: This new law would be devastating to small business landscape owners. The financial burden this would require to take on all new battery equipment along with the electrical outlets needed to power this equipment is beyond comprehension. Just few thoughts the amount of batteries required would be shortage nationwide, repair shops could not handle repairs, outlets needed at shops and on trucks. Also imagine all the companies and homeowners charging batteries every night. Please reconsider. (82-Docket)

Comment: In response to the proposed new regulations we have been incorporating battery powered blowers and lawn mowers into our landscape maintenance operations over the past 3 years. These are applicable to small projects where the service is only an hour or two and is applicable to Homeowners not commercial use. We have found that battery technology has not yet caught up to this type of equipment. For those properties that request battery operated equipment there is a increase in cost of equipment and labor pasted on to the consumer. I believe that the time table of 2024 is to short and will negatively impact our business as equipment costs rise. More time is needed for the equipment industry to implement battery technology into their equipment that will provide cost effective equipment with better battery life. Suggest that this be rolled out to all residential equipment and eliminate the sale of gas powered equipment to the homeowner as a first step. (84-Docket)

Comment: Asking companies to use electric equipment for commercial use would be an absolute disaster. Not only will it be extremely expensive but the electric equipment available is not powerful enough for commercial use. This would devastate our operations and ability to perform the work we have been hired to do. (85-Docket)

Comment: An incentive/buy back program, possibly something like the "cash for clunkers" (CAP) program to help with upfront costs, accurate data on the lower costs of running electric equipment might help ease the concerns of some. (90-Docket)

Comment: Significant financial grant assistance will be required for the smaller companies who have already been impacted by the pandemic and the associated loss of business. (91-Docket)

Comment: This 2024 transition that bans gas powered lawn equipment will have a significant impact on the many smaller operators of local landscape maintenance companies. There is a concern regarding access to electrical outlets and maintaining charging of batteries as may become necessary. (91-Docket)

Comment: I do not believe it is in the best interest of any landscaping company to allow our government to take away the use of gas powered machines in California. Battery operated equipment at this point is not sustainable. We can review this in the future but at this point no it is not a good idea. (92-Docket)

Comment: **Subject: use of battery powered leaf blowers, battery powered mowers and weedeater tools**
With over 50 years experience in California landscape care our company Hanson Palms llc wanted to voice our opposition to not only the extreme shortness of time to change over to all electric equipment but the basic misunderstanding of commerical care of landscapes in california.
Point 1 there are no battery powered equipment that are capable of being carried by a single person that will function as a replacement for gas power backback blowers, The units would be extremely heavy, require charging stations that are mobile on the trucks and be 30 % more expensive min. Point 2 other equipment such as parking lot sweepers, which are gas powered cannot be used because of the size of the machines prohibits their use in small areas. Point 3 there is currently no equipment available to mow large pasture like areas of turf or clean up cramped small areas. How can the state of California impose replacement guidelines when there is no alternative equipment available. (96-Docket)

Comment: While the goal of reducing emissions by eliminating gas powered landscape equipment is worthwhile, the alternative technology just does not exist that would be powerful enough and cost effective enough for commercial maintenance applications. For example: we have typically in each of our commercial landscape maintenance trailers two each gas powered: blower, mower, hedge trimmer and string edger. Eight pieces of equipment that on average are used about six hours a day each, that's 48 hours of run time needed. Equipment that is powerful and can deal with 105 degree heat, cold near freezing, rain, UV, wet heavy leaves, wet lawns very efficiently (97-Docket)

For the alternative equipment battery life is all over the place and often what's listed is best case, not taking into account that heat, cold, exposure to rain and UV, heavy power drains like wet leaves or wet grass all reduce battery life and battery power (battery power is not constant like gas power) very quickly. So for our eight pieces of equipment used about six hours a day each we would need on board at least how many batteries? Dozens ... with a charging/holding rack that could hold them. (97-Docket)

We'd need a new trailer for our trailer to handle the extra weight and charging racks, not practical, and at how much additional cost if it was? Or we load it all onto the pickup truck and since it has to be protected from the elements and theft, we lose the storage/hauling capacity of the truck. Then we need additional separate trucks and crews for hauling, what are the costs both financially and to the environment, to all the extra trucks and trailers? Very, very significant. (97-Docket)

As for charging ... our trucks run for maybe five minutes as we go between accounts, then they sit idle/not running when they at an account for thirty minutes or more. Could all those batteries be

recharged for the next day given those short run times between accounts? Or would we need a whole separate, massive, charging station at our small storage yard? By the way, we don't have extra room for a charging building (has to be indoor, can't be exposed to the elements or theft), or even electricity for that matter, at our storage yard. How would we do it and at what very significant capital investment costs? (97-Docket)

Comment: Greenworks battery powered equipment worked great for as long as I was able to charge the batteries. However, the company is in Canada and problem solving with that company is next to impossible! I now have a group of Greenworks tools that are inoperable because I can't get the batteries charged or buy new ones. I really liked the ease in usage while I had battery power, though. The equipment needs to be more accessible if it's required. (98-Docket)

Comment: With the mass circulation of information regarding the potential ban on purchasing new gas-powered equipment as early as 2024, our small business cannot help but feel an overwhelming sense of dread and fear for the obstacles this ban would implicate. As a commercial landscape provider, our staff meet onsite our yard each morning to clock in. From there, they embark on 8 hours service routes ranging from 5 to 50 miles away from home base. During that time, even the simple task of finding a restroom to use can be difficult. With possible bans on new gas-powered equipment, we now will need to figure out ways to charge all of our equipment, while still remaining profitable, without causing an inconvenience to our customers, and to do so with limited resources as the technology that has been developed for the commercial landscape industry is severely lacking. The availability of affordable equipment that can hold charge long enough to support a full day of use does not exist nor does the equipment necessary to charge that equipment (99-Docket)

Comment: I have operated a small engine sales & repair business since 1984 and have 5 employees with thousands of customers who depend on the small engine industry. I first want to say I am concerned about our environment and want to do my part in keeping it clean but I also know banning all small engines by 2024 is not really feasible with the technology in place now or by 2024. All of the brands we represent have been designing new and environmentally conscious equipment but some products cannot be replaced with electric power. (102-Docket)

Comment: I believe the added costs of inhibiting the use of 2 -cycle equipment by 2024 will cause more emissions and hardship for the users of this equipment. I have a background in commercial licensing of lithium ion battery technology and believe I have sufficient understanding to have a real opinion. Current electric equipment technology is not sufficient to reliably use in the landscape industry. The material science in the batteries is not yet capable of holding a sufficient charge long enough and deliver enough power to satisfy the typical landscaper. The balance of weight, cost, life and load is not yet appropriate for our use. Thus forcing companies to use inferior technology too soon will only increase the number of batteries, pieces of equipment needed to be purchased, all drivers of carbon emissions, while also increasing drive time for crews, mechanics and repair shops trying to support each crew in the field. (105-Docket)

Comment: Currently battery powered equipment and electrical equipment can't compete with gas powered equipment in terms of power, output, and efficiency. (106-Docket)

Comment: GAS IS MORE POWER, MAYBE TIME TO GET OUT OF THIS BUSINESS.SO NEXT NO CARS TOO. THINK ABOUT THIS..... (107-Docket)

Comment: the technology does not exist to ban all gas engines and will not in 2024. you will simply force those with no solution out of business in your state. Yes in the handheld market their are

solutions that are improving. in the construction market which will no doubt be active with the infrastructure bill there is none at this time fo many of the gas powered units used in construction. it is also an issue in turf care as well. it would seem to be premature when there is no replacement in many cases. (110-Docket)

Comment: We are asking that CARB allow gasoline-powered commercial grade landscape equipment to be sold until at least 2028, so equipment can be further developed, costs can come down and supply chain issues be solved. (111-Docket)

Comment: Batteries powering lawn equipment will rarely last long enough to complete the smallest job. Think about what school districts and municipalities will do to maintain the vast amount of public spaces if they have to use only battery powered equipment.This is a noble but terribly impractical idea. Send it to the trash bin. (112-Docket)

Comment: Currently, the need for in-field charging means that either our gas or diesel trucks or generators will need to be run to facilitate charging batteries (113-Docket)

Comment: I'm curious if there would be available a buy back program that could help offset some of the burden? (114-Docket)

Comment: I think there should be some funding available to help smaller companies transition to gas-powered leaf blowers as well. The batteries are the most expensive part of the equation and the higher the wattage, the more expensive. They also need to have multiple batteries and chargers that charge quickly so that the same number of clients can be serviced on their regular schedules. (115-Docket)

Comment: I am against any ban on small engines. Small engines work hard and last a long time. Battery operated equipment is an option for the contractor, not a mandate. I own several pieces of battery operated equipment, which I love. But I also love the small engine. No battery mower can top my Honda mower. What are we going to do with all those used batteries? This is do good- ism to the max. I'm against it. (119-Docket)

Comment: Please consider postponing this mandate to outlaw gas powered equipment until appropriate improvements have been made to electric powered (or other alternative) equipment options allowing the vigorous demands of the landscape industry to be met consistently on a daily basis. As a proponent for change based on environmental impact of gas powered machines, we have tried electric powered equipment on a number of occasions including outfitting a low demand landscape maintenance route with standard required demo equipment. We were met with challenges from the beginning including inferior power, underwhelming battery life, heavy equipment, etc. all culminating in inferior performance and higher labor demands. With increasing wage demands and now potentially new equipment purchase requirements, I urge that 2024 be reconsidered for a later date in order to improve efficiency for a more seamless transition on all levels. Product performance, battery life, quick charging stations, gas powered equipment buybacks/rebates, supply issues and so more all need to be addressed before we can make such a drastic change. (120-Docket)

Comment: I am a licensed landscape contractor in California. I have read the bill, which alleges that the alternative technology is equivalent to gas powered engines. This is completely false. My company uses the battery powered equipment, in addition to gas powered - and there is a very clear winner here. Gas powered equipment is far more powerful, efficient, and cost effective. 1/1/24 does not allow enough time for electric/battery-powered commercial grade landscape equipment to be

able to handle the demands of professional landscape work. Please allow gasoline-powered commercial grade landscape equipment to be sold until at least 2028, so equipment can be further developed, costs can come down and supply chain issues be solved. (122-Docket)

Comment: Small mowers and blowers can be OK with battery or power cords, but chain saws and large mowers probably can't. (127-Docket)

Comment: I am writing to you today as a landscape and garden professional. Landscape professionals work every day to take care of our nations green spaces, and we share Governor Newsom and other California policymakers desire to reduce carbon emissions from gas-powered equipment as quickly as is feasible. However, a two-year timeline is simply too fast a transition for commercial users and at this time is not technically feasible. The battery powered commercial-grade equipment on the market today is not yet ready for high-volume use it does not perform as well; the repair and maintenance infrastructure are not there; Californias energy grid may not be able to handle the increased loads, and industry companies would have to rewire and retrofit their buildings to add additional powerlines and charging stations at a significant cost. (Form Letter I-Docket) (287-Docket)

Comment: I am writing to you today as a landscape and garden professional and leader of a youth motorsport non profit organization. While I share Governor Newsom and other California policymakers desire to reduce carbon emissions from gas-powered equipment as quickly as is feasible, a two-year timeline is simply too fast a transition for commercial users and at this time is not technically feasible. The battery powered commercial-grade equipment on the market today is not yet ready for high-volume use it does not perform as well; the repair and maintenance infrastructure are not there; Californias energy grid may not be able to handle the increased loads, and industry companies would have to rewire and retrofit their buildings to add additional powerlines and charging stations at a significant cost. (287-Docket)

Comment: Battery-powered landscape equipment is a good solution for many suburban and urban homeowners with small yards to maintain, but the equipment is not ready for high-volume professional use. It is less powerful, does not work as well on slopes and grades, and takes significantly more time to complete the same task as existing equipment. In California there are 55,000 landscape companies and 99% of them are small businesses. Many are minority owned and are not prepared to make this transition in only 2 years. We support a responsible transition to zero emission equipment when the equipment is ready. However, currently, commercial battery-powered equipment has performance issues, cost issues, and infrastructure issues. According to its own data, the California Air Resource Board can allow a much longer timeline for commercial landscape companies to make the transition to battery equipment and still meet its emission goals without placing a financial burden on the 50,000 small landscape businesses in California. Because of this please delay implementation of this transition for commercial/professional grade equipment to 2026 or beyond. (Form Letter I-Docket) (287-Docket)

Comment: In addition, to assist a transition to ZEE there must be a robust rebate and tax incentive program put into place. We understand and acknowledge that the power of the purse is vested in the California Legislature, but we must highlight how concerned we are as an industry that our voices are not being heard. While we appreciate that the California Legislature approved $30 million to support AB 1346 and this transition, that amount is woefully inadequate. Based on the CSUF data published in CARBs ruling, if ALL that money went to ONLY commercial business (1,911,555) that would mean that only $15 dollars would be provided per piece of equipment traded in. We are talking about investing 10s to 100s of thousands of dollars for each company to transition and $15 does not come close to supporting the landscape industry and our majority small business demographic. This further

highlights how a delayed transition for commercial grade equipment will make this transition easier and less costly for all those involved. (287-Docket)

Comment: In conclusion, the landscape industry cares deeply for the environment. We genuinely want to support a transition to ZEE, and we believe that time is coming but not by 2024 for a complete transition. The landscape industry relies on this equipment to support their employees, customers and families and their concerns must be considered. (Form Letter I-Docket) (287-Docket)

Comment: Economics of jobs using these engines may need some future tax incentives to help the transitions, instead of paying oil producers so many write-offs! (383-Docket)

Comment: It is important that these regulations be introduced and enforced in a way that prevents small, proprietor-owned landscapers from being put out of business. To that end, the California Legislature has appropriated $30 million for your agency to distribute to small proprietor landscapers to enable them to transition to new, zero emission electric and manual equipment. This is in addition to subsidies and buy-back programs already in effect under the auspices of air districts throughout the state. You must see that these subsidies and programs are effective and even handed so that no small landscaping business is harmed by the regulations. (381-Docket)

Comment: As a landscape industry, we are in favor of moving more toward a sustainable, more environment friendly use of power equipment. As contractors, we clearly understand the important role we play and how our efforts to reduce gas emissions is critical to a long term solution in the fight against global warming. Where we differ is the 2024 timeline to make this abrupt and radical transition. The cost of gas vs. electric is extremely prohibitive for small contractors who make up the majority of businesses in this state. There also needs to be greater improvement in the technical development of electric equipment where it is of equal performance or better than current gas powered units. Its important to listen to all voices and bring all parties together to formulate a viable plan which is a win win for the State, Contractors and Manufacturers. Thank you. (387-Docket)

Comment: Give the industry a reasonable time frame to adjust, adapt, and evolve. Lastly many of the landscape contractors are not large multi million companies. Meaning they simply do not have the capitol to change their fleets over to fully electric either at all or in this timeframe. Please consider providing a more reasonable deadline. We landscape industry and the manufacturers of these products do welcome this change however just in a more organic reasonable time. Thank you. (395-Docket)

Comment: Working as a grounds men for the Kern High School District myself the idea of trying to get rid of the small gas engine is a horrible idea. Battery powered equipment is good for home owners not for commercial work. Longevity and the run time of the equipment is not even on the same level. I have done many demo's on battery powered equipment and this would be a big mistake if California decides to go this route. (398-Docket)

Comment: As a Landscape Architect, many of the landscape contractors that we work with have expressed to us that the proposed banning of gas powered engines of 25HP or less will have a crippling affect on their businesses. The proposed battery operated equipment is extremely expensive and require multiple batteries to power the equipment throughout the day. In addition, these batteries are not long lived, so they will ultimately end up in landfills contaminating ground water which California desperately needs to protect as a secondary backup water source during extreme drought situations. The financial impact of this bans will hurt businesses, their employees,

families and their clients. We ask that this ban be postpone until long term sustainable solutions are developed. The technology is just not there yet. (404-Docket)

Comment: I urge you to delay implementation of this action to at least 2030. As the Maintenance Department Manager for a licensed landscape contractor and small business, early (2024) implementation will cause economic hardship and potential loss of business. While these efforts are to be applauded, current replacement of small gas engines with battery power is not reliably viable with current technology and processes within the landscape industry. Critique of this technology is as follows:

-charge capacity too small to run all day for large projects

-discharge rate anxiety by professional users (draw down time highly variable depending upon use and battery size)

-reduced battery lifespans due to constant or frequent use and constant recharging

-insufficient torque/power (i.e. more power = less run time)

-high price point to purchase

-high price point for replacement batteries

-no to little standardization in battery design

-issues with California's electrical grid including PSPS

-difficulty and or extra costs associated with the need for charging stations or carrying multiple extra batteries during workday

-supply chain issue challenges for foreseeable future

-repair issues - often more economical to throw away than repair (420-Docket)

In general, the landscape industry is beginning to use some battery technologies such as portable power tools (drills, saws, chainsaws, small lawn mowers). The challenges listed above will lessen over the next 10 years as the technology improves and price points reduce. A two-year plan is too soon to avoid the issues above. If battery technology was equal to small gas engines in power and price, I can assure you, many landscape contractors would begin to make the switch. (420-Docket)

Comment: Until there is an affordable and realistic option to this regulation, this will be a tremendous burden to the landscape industry. Although Battery operated equipment is available, it is not feasible to have workers swap out batteries throughout the day since this equipment batteries will not last 8 hours or more. Again, until there are options, this is a waste of time and money to continue this amendment. (422-Docket)

Comment: First off would you be willing to pay two to three times more to have your landscape maintained? The cost to a landscape contractor would be enormous. Just the cost of battery equipment alone is two to three time higher than gas powered equipment just for the basic unit, battery and charger. They would still need to buy additional batteries and charger's because one battery wont last more than an 90 minutes. (424-Docket)

Comment: I am against the banning of small off road engines. I have been a California Licensed Landscape Contractor for 40+ years. Here are my objections;

1. The thousands of small gardeners & tree trimmers will eventually have thousands and thousands of battery equipment. All Lithium charged. And when those pieces of equipment go bad where do you think those defunct Lithium batteries will go?? Answer straight into our landfills. That is a disaster!!!

2. This will cause work productivity to plummet. Thus landscape maintenance costs will sky rocket. Adding to added cost to Homeowners & HOA's = added inflation.

3. Huge gas tax loss with no gas being purchased for thousands of equipment pieces. Where will this lost tax revenue for our highway repairs come from??? (428-Docket)

Comment: As a small business owner, the ban of sale of small engines would be detrimental to our business. After doing rough calculations it would cost approximately $75,000 per maintenance truck to convert to all electric. With 5 maintenance trucks currently in operation that equals $425,000. That doesn't include the cost to upgrade the pg&e service to our property and add additional electrical circuits to our shop to be able to handle the power needed to charge all the equipment. A study shows that there are over 2 million pieces of commercial equipment in the state of California and the proposed 30million in Grant money to replace them only equals 15 dollars per piece of equipment. That doesn't seem like an equal trade. (431-Docket)

Comment: I think the ban of gas equipment will be detrimental to not only our small business but the industry as a whole. We have had to over come a few large hurdles in the past 5 years we don't need another one. I feel if there is proper funding for direct replacement of equipment that will be the only way company's will be able to survive. I also find it interesting that the automobile was given over 15 years to do research and development to eliminate the sale of gas vehicles by 2035 but the landscape industry is only given 2 years? I strongly advise administration to think about the consequences before passing this law. (431-Docket)

Comment: We made the switch and it has been a challenge. The equipment requires constant maintenance because they're not made for commercial use (though their price tag is high as if they are), there are limited vendors who repair them and they require constant charging, limiting where and when they can be used. I don't agree with a ban on gas mowers. While we have been reducing the amount of lawns we install, the ones that are out there growing still require cutting and battery and electric options aren't for commercial use. This will result in constant cost and headache for the companies who are following the rules while most gardeners who are not operating legally will continue to do things their way and the homeowners who hire them will continue to support them. (451-Docket)

Comment: It is my opinion that small gas powered equipment should not be banned. I am a partner of a small landscaping business with 7 employees. At the moment we focus on mostly landscape maintenance and we rely heavily on gas powered equipment like leaf blowers, weed eaters and hedge trimmer. Although we have started to try out the newer electric counter parts the tools are just not as reliable as gas powered. I feel the market is just not there yet to convert to full electric. This is not to mention that full electric tools are more expensive and have required more expensive repairs faster than gas powered equipment. (456-Docket)

Comment: Banning the sale of small gas engines up to 25hp in California 2024 for homeowners use is one thing but to do it to business owners who rely on small gas engines to forge out a living & to expect them to replace those engines with electric equipment is irresponsible & wrong to do that so soon. The reason for this is the technology is not there yet to make this practical & feasible. If by

enacting this law in 2024 the outcome will eventually be catastrophic for many companies to stay in business. Until the technology is sound enough this law should be abolished until that can be proven. (458-Docket)

Comment: The California Alliance for Golf (CAG) is incorporated under the Laws of the State of California for the purpose of congealing the state's normative golf organizations/associations/businesses into one organization that can credibly purport to speak on behalf of the $13.3 billion California golf industry. The comments that follow are submitted in accordance with the Alliance's procedures for taking positions on proposed legislation and regulation. Please accept the below comments on the proposed amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions. The California golf industry is an end user of many products that will be affected by the proposed changes to CARB's SORE regulations. Some of these products used on golf courses include chainsaws (<45cc), handheld grass and hedge trimmers, handheld and backpack leaf blowers, handheld pole pruners, handheld and ground supported edger's, walk behind and riding greens mowers, select fairway mowers, generators, verti-cutting and aerator units, pressure washers and snow blowers. The California Alliance for Golf supports CARB's efforts to develop an emission reduction strategy to reduce pollution and noise in the state. As a commercial user, we recognize that the green industry will continue to move to lines of zero emission equipment in the future and that these lines offer numerous benefits, including healthier working environments, lower maintenance costs, reduced noise, reduced environmental impacts and reduced fuel costs. However, we are concerned that the current inability to mass produce zero emission equipment that meets commercial use standards by January 1, 2024, will hinder golf courses and other large green industries' ability to conduct operations that meet the expectations of end users and customers. (459-Docket)

While some pieces of zero emission equipment may meet commercial needs by January of 2024, numerous others may not; they will require considerable additional technological tweaking before they are likely to meet the "fit for intended use" standard. The current zero emission equipment available to commercial users poses infrastructure and cost/performance issues, including limited battery life, charging challenges, durability/shelf-life problems, lack of maintenance support, and incapacity to complete large golf course maintenance and landscape tasks. (459-Docket)

Comment: Additionally, as acquisition of zero emission equipment will be of higher initial expense to end users (realized savings will come in future years), we believe that the $30 million allocated for procurement of this equipment needs to be increased to meet what will be great demand from the green industry in California. Based on the CSUF study on SORE (if the entire amount went to commercial rebate), this would only amount to $15 per piece of equipment transitioned/traded out. (459-Docket)

In closing, the California Alliance for Golf requests that CARB consider the above-mentioned factors and works with manufacturers, green associations, and retailers to maintain the 2024 end of sale date for zero emission residential SORE but consider extending the time period to transition to zero emission "commercial/professional grade" equipment beyond 2024 to the degree to which fears about the commercial unavailability of equipment fit for intended use are borne out. Based on Alternative 2 in the ISOR document released Oct. 12, 2021 (with a phase out of all equipment no later than 2026 with the exception of generators), the above request would still allow the state to meet its targeted 2016 State SIP Strategy expected emission reductions for SORE while allowing industry further time to enhance and implement zero emission equipment suitable for commercial purposes. (459-Docket)

Comment: Please reconsider the small engine ban scheduled for 2024. In a state that is already very difficult to operate a small business due to high taxes and other regulations this could be the final nail in the coffins for many small businesses that depend on these types of power equipment. The cost to convert to battery to accomplish the tasks that the small engines perform is staggering. The current technology only allows us to operate these electric powered tools for approximately 30 minutes. I'll need 16 battery packs per each power tool we use in order to work a shift. (460-Docket)

Comment: Battery technology offers homeowners excellent alternatives to gasoline power for occasional use equipment. However, due to the weight and space requirements of extra batteries, this technology is still not practical for most commercial users. In the power generation segment, battery packs do not currently (nor will they soon) have the power density to replace a gasoline generator. Fuel cells present a clean option, but the technology is costly and requires users to store, and have access to, substantial amounts of hydrogen for fuel. (461-Docket)

Comment: We are very opposed to the Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions. This is not cost effective for commercial landscape care and will cost companies accounts and ability to continue to do business. The commercial electric/battery powered options are not effective, they take twice as much time to operate and the batteries do not last long enough to complete more than 1 job. Please do not pass this amendment. In the cities where it is required we are following requirements and are having to increase cost of service as well as buy new batteries (which are terrible for the environment) constantly. (462-Docket)

Comment: I ask that CARB please help commercial landscape contractors with the implementation of going electric. This is a much needed change and for many good reasons. However, there are a few problems with the the time line of said bill. Having spoken directly with our distributors and manufacturers, there are few if any options available for electric/battery operated commercial equipment. Due to the lack of commercial equipment how would the Landscape industry implement a change over in such a short period of time? I think a more reasonable transitional time period would be a good start. The auto industry, for instance has many options available, however they do not have to comply until 2035. I would suggest a phased in approach starting in the year 2028 which would also allow the technology to catch up with the needs of the commercial landscape contractor. Then a complete target date of 2030 to change to electric. In addition, incentives and tax credits should be made available since this would require a substantial investment by the entire industry. (464-Docket)

Comment: If this proposed legislation were adopted it would cause a tremendous financial hardship for landscape maintenance (gardening) professionals as well as construction professionals. Retooling and adjusting facilities to new charging requirements would put undue burden on business owners. (465-Docket)

Comment: This is going to be a very hardship for our small business. The reason is the technology is not ready to accommodate the way we operate. We have no outlet available to power and recharge the batteries as we are operating outside only and in remote areas where there is no outlet. It would not be very cost effective at all. We would need to buy a lot of batteries which is very costly. We perform a lot of public works performing revegetation in remote areas and we need a generator to power our shovel to dig and trench. We need to do weed abatement and use our weedeater for hours. We would not have enough batteries to finish the job in a day or use our chainsaws. Our lawn mowers would not even last all day when we have to mow turf areas that have been repaired and reseeded for the school districts. (478-Docket)

Comment: I am a third generation gardener. I, along with my brothers and my father, own a landscape maintenance contracting company in the Los Angeles area. To build our commercial gardening business has been both the most incredibly challenging and most rewarding professional endeavor. I believe this new proposed regulation, while crafted with great intentions, parts of it are greatly mistaken and have the potential to bring incredible harm to small and what I imagine are predominately minority business owned enterprises. We have experience using battery powered equipment. We purchased the commercial grade battery set available from STIHL. We also use 4 of their blowers combined with the AR 3000 backpack battery. This is the most powerful battery option available in the market today. In our experience this battery set up has a real run time of about 2 hours. This forces us to purchase more batteries if we want to perform the full day. While a STIHL BR 500 (gas powered) blower costs about $500, the commercial battery option costs about $1500 plus another $1000 for an extra battery pack. The battery option for the commercial gardener costs $2500 minimum when the goal is full day performance. This price tag of 5x is an incredible burden. Not to mention the increased repair costs and decreased longevity of this option. I would encourage you to talk to lawn mower repair shops that are familiar with this such as Garvey Equipment in San Gabriel. (481-Docket)

Another factor is increased labor due to more limited portability. If a job takes slightly longer due to battery run time concerns or we have to be swapping batteries this increases labor. Labor is another extreme challenge we face. There are no prospects of labor becoming more available or less expensive. (481-Docket)

To finalize, I would plead to the CARB board to consider making some sort of exception for commercial enterprises. The use for us is not the same as it is for a homeowner. This regulation for us is like handing us a weighted backpack while we attempt to hike a steep hill. (481-Docket)

Comment: SOREs are very polluting, especially so for the operator. In Napa County we have designed a pilot program to put battery powered leaf blowers into the hands of small proprietor yard care operators. The operators would provide input so the program best meets their needs. We need funding from CARB to get this started. It could then be expanded to serve as a template for a statewide program. (494-Docket)

Comment: CARB's 2024 deadline on sales of gasoline-powered landscape equipment does not allow sufficient time for battery technology to develop a battery suitable for extended commercial use. Permitting sales of gasoline-powered commercial grade landscape equipment until at least 2028 will allow further product development and improvement, reduce costs, and allow supply chain issues be solved. Landscaper use of small gas-powered equipment produces less than a quarter of the exhaust created by these types of engines in California. Homeowner use is by far a greater source of pollution. I know that more regulation is not desirable, but perhaps during the period between 2024 and 2028 sales of small gas-powered landscape equipment could be limited to contractors that hold, at least, some sort of business license (or proof that they are running a legitimate business) with sales quantities limited by business volume. (503-Docket)

Comment: The proposed incentive package of $30 Mio underestimates the true cost and extensive needs of professional users. A financially attractive exchange program for certified ZEEs, similar to those already established throughout California must be established in a timely manner in conjunction with the Proposed Amendment. Nevertheless the additional investments for professional users into a large quantity of batteries is a barrier for the acceptance of this ZEE technology. Therefore focused incentives are needed to foster the transition to ZEE products. We therefore propose to establish a

program for ZEE certified products of $210 Mio to address the baseline needs of a functional transition. (509-Docket)

Comment: I run a small Landscape Maintenance Business which has 50 employees. At current technology for electrical landscape maintenance equipment I would not be able to convert from gas power equipment to electrical equipment. I would need to have 200 batteries for blowers, 100 batteries for string trimmers, 100 batteries for string trimmers, 120 batteries for 21 inch mowers, 160 batteries for 36 inch mowers, 200 plus batteries for small generates, sprayers, rototiller, aerators, seeders, and other gas powered landscape equipment. I would also have to have backup batteries on hand when the batteries do not charge properly. I would have to have approximately 880 plus batteries fully charged on hand every day to perform my daily operation. I would need to build a special area to be able to charge and store these batteries. I would need to know what type of facility and cost to be able to charge that many batteries. I would need approximately $750,000.00 to buy the electrical landscape maintenance equipment with todays technology to make the conversion. I would have to pass this cost on to my clients to stay in business. (510-Docket)

Comment: The Battery Powered Industry for outdoor powered equipment is in its early phase. The cost of Battery Powered Equipment is generally three times that of a gas powered equivalent and with a fraction amount of efficiency. For example, a common commercial backpack blower which costs $500 with a blowing force of 32 Newtons can be substituted with a Battery Powered Blower for $1600 having only 17 Newtons blowing force. (514-Docket)

Comment: The Battery Powered Industry for outdoor powered equipment is in its early phase. The cost of Battery Powered Equipment is generally three times that of a gas powered equivalent and with only a fraction amount of efficiency. For example, a common commercial backpack blower which costs $500 with a blowing force of 32 Newtons can at best be replaced with a Battery Powered Blower for $1600 having only 17 Newtons of blowing force. (514-Docket)

Comment: Manufacturer-derived data show the actual market penetration rates for ZEE in the residential SORE market segment, on the one hand, and in the commercial non-handheld market segment, on the other. Those data - - depicted in the graphic below - - show that while the ZEE market-penetration rate is already reaching up to 80% in the handheld marketplace, without any regulatory mandate, the current feasibility and "utility" issues that apply to the uptake of ZEE in the commercial non-handheld segment have limited ZEE penetration rates in that market to just 3% to 4%. (521-Docket)

**Market Share and Adoption Trends**

| % Share Battery-Electric: | | | | | |
|---|---|---|---|---|---|
| Today | 80% | 67% | 36% | 4% | 3% |
| 5 Years Ago | 73% | 58% | 9% | 0% | 0% |
| 10 Years Ago | 65% | 54% | 6% | 0% | 0% |

(521-Docket)

The "fix" to the dramatically different market-penetration rates at issue, however, is not across-the-board ZEE mandates, but rather providing the necessary time for commercial non- handheld products to achieve the necessary improvements in ZE technology (including delivered- power and run-times), utility and price-differentials. That necessary time is 6-8 years, depending on the non-handheld product lines at issue (e.g., zero-turn commercial mowers), not just the one year of lead time that CARB would allow under its ill-conceived ZEE mandates. Simply stated, near-term mandates will not bridge the gap in the uptake of ZEE that exists between residential and commercial SORE. Market forces and resultant product improvements over a reasonable timeframe (6-8 years) will do that without the need for ill-advised and ill-suited regulatory intervention.[2] [Footnote 2: The slide included above is taken from a presentation (at p. 6) that an EMA-member OEM has prepared to explain the complexities and near-term infeasibility of transitioning the entire SORE market to ZEE by 2024. That presentation is attached thereto (and incorporated by reference herein) as Exhibit "C."] (521-Docket)

Comment: A graphic summarizing the actual utility issues that professional landscapers face in assessing when it may be feasible and cost-effective to purchase commercial ZEE equipment - - factors that CARB largely overlooks - - is set forth below: (521-Docket)

**Commercial Users Need Some Assurances Before Switching to Battery**

| | |
|---|---|
| **Landscaper interest in a battery-powered ZTR due to:**<br>• No gas saves money & eliminates a cause of downtime<br>• Less required maintenance should save money & downtime over the life of the mower<br>• The assumption that a battery-powered ZTR will have the same run time & power output as a gas -powered model - if the run time is less than a full day, assume is "rapid charging" or swapping batteries in field is possible | **Landscaper skepticism exists around:**<br>• *Price* - expect a battery-powered ZTR to be more expensive, but not exponentially so<br>• *Promises* - new technology so need to be able to trust OEMs / dealers to be up front. Will promised run time hold in the "real world?"<br>• *Durability* - how will the technology age under the conditions commercial equipment is subjected to? Battery -powered handheld equipment begins to lose power & run time over time - will mowers do the same? |
| **Concerns can be overcome by:**<br>• *Explaining the investment* - how long will it last? What is the ROI - both over the life of the mower and in a typical season?<br>• *Proving it* - provide dealers and / or influential cutters a way to show that the claims being made about battery ZTRs hold in the "real world."<br>• *Include extra batteries* - insurance against downtime, the possibility that run time isn't as long as promised | **Less of a concern:**<br>• *Charging* - if charging is similar to handhelds, charging seems straightforward. A way to contain cords in the shop and / or charge an entire trailer would be helpful. |

**Key Takeaway: Given the investment of battery powered equipment, understanding the ROI and successful use cases to establish credibility in battery will be important**

*Sources: Ride Electrification Research, Commercial EndUsers (August 2021)*

(Exhibit C, p. 9.) (521-Docket)

Comment: Comment 4 – Funds appropriated to support the mandatory ZEE transition in the Proposed Rule are significantly insufficient. CARB has allotted $30,000,000 to support the Proposed Rule's transition to ZEE[14]. [Footnote 14: CARB approves $1.5 billion investment – largest to date – in clean cars, trucks, mobility options, November 19, 2021] CARB and CSU-F estimate more than 80,000 "landscapers" in the state[15], the majority of which are sole-proprietorships, and many of which minority owned. This accounts for a one-time average of just $375 per landscaper. This would not include transition funding for hundreds of thousands of other "non-landscaper" small businesses that use SORE-powered equipment. As described in these comments, the upfront and on-going costs of batteries significantly could be in the range of $20,000 per average landscaper. Even if each landscaper was guaranteed $375, this would be woefully inadequate to support the up-front and ongoing battery maintenance costs associated with the Proposed Rule and will have a significant impact on sole-proprietorship landscapers, many of which are minority owned. [Footnote 15: Survey

of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations, May 15, 2019, pg 52-53.] (524-Docket)

Comment: SORE2020 estimates approximately 180,000 "lawn and garden" units will be sold to landscapers, not including "light commercial" units. For just calendar year 2024, this would account to $166 per unit. As discussed earlier, the useful life of most landscaper equipment is assumed to be 4-5 years per SORE2020, meaning many landscapers will not turn over their entire fleet in 2024 – in-fact CARB assumes landscapers will turn- over their fleet as equipment fails, to minimize immediate impact of the Proposed Rule.[16] [Footnote 16: *[OPEI's footnote 16 was blank.]*] Even if each product was limited to $166, most landscapers would not receive any funding. In execution, many of the existing programs provide incentives much more than $166 or $375 per piece of equipment. The California South Coast Air Quality Management District (SCAQMD)"Commercial Electric Lawn and Garden Equipment" incentive and exchange program provides $218 to $16,600 per piece of equipment.[17] [Footnote 17: https://www.aqmd.gov/home/programs/community/lawn-and-garden-equipment] At $16,600 per units, the SORE2020 modeled approximately 500 landscaper and commercial riding mowers would exhaust more than $8M in 2024 alone. A similar program would exhaust the $30M allotted for the transition in just months. (524-Docket)

Comment: In addition, it is unclear how such programs would be monitored to assure funding is reserved for small-business landscapers, including sole-proprietors and minority-owned landscape businesses. University of California – Irvine used the above mentioned SCAQMD program to purchase units, including a riding mower eligible for the maximum rebate, and the LA Unified School District used the program to purchase many of the approximately 800 ZEE leaf blowers reported, and was considering 82 riding mowers. These non-landscaper entities certainly put an extensive dent in the SCAQMD program funding. (524-Docket)

Comment: Comment 11 – The COVID-19 pandemic has resulted in worldwide supply chain disruptions, including in the SORE and ZEE sectors. Additional time is needed to resolve current supply and demand issues and prepare for such a paradigm shift to ZEE. (524-Docket)

Comment: Implementation of the Proposed Rule, and the transition of an entire industry to zero emission equipment should be delayed until the supply chain is able to adequately support (524-Docket)

Comment: My name is Francisco Lesaca. My wife and I own and operate Lesaca Landscape Company, Inc. in Bakersfield, CA. We have 12 full time employees, which we are proud to say have been with us on average for 15 years. Our landscape services include design, build and maintenance. My father and mother started the business in 1974. We hope to continue what they started. I have a deep concern for the new proposed amendments to the small off-road engine regulations and the time in which you want to implement them. I understand the need to reduce our carbon footprint. And being a lifelong resident of the central valley, I understand how important our air quality is to us. But to do a complete ban by 2024 of all gas engines under 25 hp will create a financial hardship for me and many small businesses owners. Every piece of small equipment I have is under 25 hp. Which include mowers, blowers, chainsaws, edgers, string trimmers, plate compactors, aerators, pressure washers, power brooms, augers and concrete saws. We take care of our equipment so it will last us a long time. We try to 3-10 years life out of every piece of equipment. And we only buy professional equipment that we know is dependable and can handle the riggers of our work. It's taken us years to find the right equipment that meets our standards. Now you are asking us to do the same thing with electric equipment in less than 3 years. This is a hard pill to swallow. Its not just the new equipment

we will need to purchase. But the cost of setting up our shop, trucks and trailers with charging stations and even maybe solar panels. I don't know where to begin!!! (526-Docket)

Comment: I hope you can reconsider this timeline of 3 years and extend it to 10+ years. By then, maybe the battery technology will be more advanced. Also, with more time the cost of the equipment may be more comparable to our current gas-powered equipment. If anything, the added time will help us phase out our old gas power equipment and purchase the new battery equipment. (526-Docket)

Comment: **2. CARB's Proposed Amendments Are Currently Impracticable for Commercial Applications**
Briggs & Stratton shares CARB's goal of reducing emissions and is actively developing technology and products to achieve those goals. However, CARB's proposed Transition to Zero Emissions amendments are based on an infeasible timeline that is divorced from the reality of the state of technology. As CARB's own data demonstrate, the commercial landscaping industry is heavily reliant on gasoline-powered SOREs. To ban the sale of these engines so abruptly would be disastrous to this industry for a number of reasons. (528-Docket)

Comment: Commercial landscapers must use their equipment continuously throughout the day each day. The downtime necessitated by charging electrical equipment would prevent continuous operation, which would lead to fewer jobs completed, less revenue, and reduced employment in California. Further, even if electrical equipment were to be used in commercial applications, the power to charge that equipment must come from somewhere. It is likely that the only portable source of electric charging would be diesel- or gasoline-powered generators, which would themselves then contribute to emissions in California. For a significant portion of the market, the currently available electrical equipment is impracticable as replacements for gasoline-powered SORE commercial applications. (528-Docket)

Comment: Briggs & Stratton has routinely demonstrated our commitment to reducing exhaust emissions in the past by investing in innovative technologies. Briggs & Stratton is not opposed to the goal of CARB's proposed Transition to Zero Emissions amendments to the SORE regulations. Briggs & Stratton acknowledges that CARB is tasked with the significant challenge of reducing emissions to meet the State Implementation Plan (SIP) in order to address non-attainment with the Clean Air Act. This is why Briggs & Stratton has tailored this letter and our request to commercial applications. Demonstrating both the industry's inability to transition to electrification at this time and Briggs & Stratton's respect for CARB's Transition to Zero Emissions program, Briggs & Stratton supports the EMA Proposal to mandate residential walk-behind lawn mowers sold in California be electric-powered. Abandoning SORE-powered walk-behind lawnmowers in California will cost Briggs & Stratton 150,000 to 200,000 sales per year. Walk-behind lawn mowers are one of the largest volume applications in the SORE category and a key part of Briggs & Stratton's current and historic business. However, SORE-powered commercial applications cannot be eliminated without massive detriment not only to SORE producers but to Californians who rely on these applications to make a living. (528-Docket)

Comment: **3. Commercial Gasoline-Powered SORE Applications Require a Phase-In Period.** Rather than a full ban on commercial gasoline-powered SORE applications, as proposed, this equipment requires a phase-in period. CARB has already recognized that a phase-in period is required for certain equipment, as it has specifically provided that portable generators would not be subject to the same Zero Emissions requirements as immediately as other SORE applications. Under the proposed amendments, generator emission standards would be more stringent than the existing emissions

standards starting MY2024, but they would not be zero. The zero emissions standards would then apply to generators in a second phase starting in MY2028. (528-Docket)

A similar phase-in schedule for commercial SORE applications would strike an appropriate and necessary balance between CARB's goals and the present technological landscape. CARB should identify a similar level of reduction for commercial SORE applications for MY2025 as has been set for generators, which will accomplish CARB's goal of reducing emissions from SORE-powered equipment. A required reduction without a ban would reduce emissions in California while giving industry time to innovate and develop cost effective alternatives for SORE-powered machinery used for commercial purposes. (528-Docket)

Comment: The CARB committee should extend the date until 2028 when this new battery powered devices can be manufactured and maintained effectively and economically so that existing landscapes can be properly maintained. Please also consider the economic impact the change to this new ruling to the owners and tax payers will be to properly make this change throughout California. Please consider the extention. (529-Docket)

Comment: The National Association of Landscape Professionals (NALP) is the national trade organization representing the $98 billion landscape industry employing over 1.4 million employees in the United States. Member companies specialize in lawn care, landscape maintenance, tree care, irrigation and water management. Landscape professionals throughout the nation work daily performing essential services to homes and businesses to maintain their landscapes, sustain the environment and enhance and maintain healthy and safe green spaces. We are writing to you on behalf of our member companies concerning Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions, Initial Statement of Reason (ISOR) published October 12, 2021. (533-Docket)

Comment: We are respectfully requesting you to support an amendment to the ISOR and delay implementation of the transition to Zero Emissions Equipment (ZEE) ONLY for commercial/professional grade small off-road engines (SORE). (533-Docket) (533-AppA-Docket)

Comment: NALP and the California Landscape Contractors Association (CLCA) submitted a letter[1] articulating this position to CARB staff on November 9, 2021. These comments echo many of the same points made in that letter but also provide greater detail and context to support our position of record into the public docket for the proposed SORE rule. [Footnote 1: See Appendix A "CLCA and NALP Letter to CARB" November 9, 2021] (533-Docket)

Comment: We believe in addition to extending this transition beyond 2024 that a much more robust rebate program must be properly funded and made available prior to moving forward with any restrictions on the sale of non-ZEE SORE. (533-Docket)

Comment: To assist a transition to ZEE there must be a robust rebate and tax incentive program put into place. We understand and acknowledge that the "power of the purse" is vested in the California Legislature, but we must highlight how concerned we are as an industry that our voices are not being heard. While we appreciate that the California Legislature approved $30 million to support AB 1346 and this transition, that amount is woefully inadequate. Based on the CSUF data mentioned above, if ALL of that money went to ONLY commercial business (1,911,555) that would mean that only $15 dollars would be provided per piece of equipment traded in. We are talking about investing 10s to 100s of thousands of dollars for each company to transition and $15 does not come close to supporting the landscape industry and our majority small business demographic. This further

highlights how a delayed transition for commercial grade equipment will make this transition easier and less costly for all those involved. (533-Docket) (533-AppA-Docket)

Comment: **How much would a strong rebate program cost?** One way to model the amount a rebate program would cost is to look at existing rebate programs already in place in California. San Joaquin Valley offers the following for businesses[18] [Footnote 18: San Joaquin Valley Air Pollution Control District "Incentive Program" https://www.valleyair.org/grants/cgym- commercial.htm]: (533-Docket)

| Eligible Electric Landscape Maintenance Equipment | Maximum Amount Per Equipment |
|---|---|
| Edgers, Trimmers, Chainsaws, & Polesaws | 70% of purchase price, up to $200 |
| Blowers & Vacuums | 70% of purchase price, up to $250 |
| Walk-behind Mowers | 70% of purchase price, up to $750 |

(533-Docket)

| Eligible Electric Landscape Maintenance Equipment | Maximum Amount Per Equipment |
|---|---|
| Ride-on / Stand-Ride Mowers | 70% of purchase price, up to $15,000 |
| Additional Batteries and Chargers | 100% of purchase price for up to two (2) batteries and one (1) charger per piece of equipment purchased |
| **Funding will be limited to $25,000 annually per applicant** | |

(533-Docket)

Based on sales data and estimates we conservatively calculated the percentage of type of equipment that would be eligible to be replaced. We have also combined vendor and commercial to provide the following calculations. (533-Docket)

| | Number of Units | Rebate Cost | Total |
|---|---|---|---|
| Riding Mowers (1%) | 19,115.55 | $ 15,000.00 | $ 286,733,250.00 |
| Push Mowers (15%) | 286,733.25 | $ 750.00 | $ 215,049,937.50 |
| All Other (84%) | 1,605,706.20 | $ 250.00 | $ 401,426,550.00 |
| | 1,911,555.00 (Comm/Vendor) combined | | $ 903,209,737.50 |

(533-Docket)

This exhibit illustrates that there would need to be OVER $900 million in rebate funds just to satisfy demand for businesses, like the landscape industry that rely on the equipment. (533-Docket)

Comment: This reduction in productivity puts landscape companies in a tough spot since they are already faced with a historic work force crisis. This proposal pushes an industry that cannot find enough willing and capable employees to now rely on less efficient equipment that takes more time and requires additional labor to perform the same task in the same amount of time to remain competitive and profitable. (533-Docket)

Comment: For landscapers, time is money so if the amount of work is less than more time is spent on the job which means less jobs per day (533-Docket)

Comment: The California Landscape Contractors Association (CLCA) represents California's licensed landscape contractors and those allied tradespeople who provide support, goods and services to them. CLCA's member companies specialize in lawn care, landscape maintenance, landscape construction, tree care, irrigation, and water management. Landscape professionals throughout California work daily performing essential services to homes and businesses to maintain their landscapes, sustain the environment, and enhance and maintain healthy and safe green spaces. CLCA writes to you on behalf of our members concerning Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions, Initial Statement of Reason (ISOR) published October 12, 2021. CLCA respectfully requests your support for an amendment to the ISOR and delay implementation of the transition to Zero Emissions Equipment (ZEE) SOLELY for commercial/professional grade small off-road engines (SORE) until model year 2028 or later. (542-Docket)

Comment: Our proposed amendment would only delay the transition to commercial grade landscape ZEE which would make CARB's analysis significantly more different. Manufacturers certify professional grade SORE to the highest durability periods, therefore implementing different dates to transition to ZEE based on how the equipment is typically used should not be an impediment for CARB or retailers/dealers. (533-Docket) (533-AppA-Docket) (542-Docket)

Comment: Landscape professionals work every day to take care of California's green spaces – we care deeply about the environment - so we support a responsible transition to zero-emission equipment. However, the two-year timeline is simply too fast of a transition for commercial users. (533-Docket) (533-AppA-Docket) (542-Docket)

Comment: We believe that CARB can accomplish their goals by extending the time to transition to zero emission "commercial/professional grade" equipment beyond 2024 but maintain the 2024 end of sale date for ZEE residential SORE. (533-Docket)

Comment: Frustratingly, CARB seems to acknowledge significant cost increases are associated with a complete transition yet nothing CARB has put forth makes accommodations for the landscape industry. CARB's approach seems to lack any attempt to ease this transition on the industry and pointedly assumes small businesses and the customers they service will just have to bear the brunt of this transition. (533-Docket)

Comment: We believe there is a solution and one that we are urging CARB to adopt prior to the December 9th vote on this very important proposal. (533-AppA-Docket)

Comment: II. **Solution** - Extend the time period to transition to zero emission "commercial/professional grade" equipment beyond 2024 but maintain the 2024 end of sale date for zero emission residential SORE. A. Delay implementation on commercial/processional grade equipment (533-Docket) (533-AppA-Docket) (542-Docket)

Comment: Despite our efforts, connecting with CARB staff early in the process to bring forward the daily realities of ZEE use in commercial landscape operations was limited. Unfortunately, this resulted in a proposal that lacks understanding of the difficulties of full commercial grade ZEE adoption by 2024. Furthermore, it lacks recognition of inadequacies of the equipment and impediments to full scale adoption. (533-Docket) (533-AppA-Docket)

Comment: But there remains a path forward. The ISOR admits that in a considered Alternative 2 that changing the date of 2024 to 2026 for both residential and commercial grade equipment would still meet targeted emissions goals:

> "Alternative 2, only 89.3 percent of the small off-road equipment population subject to the SORE regulations would be ZEE in 2035, as compared to 93.4 percent under the Proposed Amendments. The remaining 10.7 percent would continue to turnover to ZEE over the following years, reaching 98.8 percent ZEE in 2043. Emission benefits under Alternative 2 in 2031 would be 6.8 tpd and 50.2 tpd of $NO_x$ and ROG, respectively. These emission reductions are both smaller than those that would occur with the Proposed Amendments. While these emission reductions would meet the 2016 State SIP Strategy expected emission reductions for SORE. . ."[13]
> [Footnote 13: California Air Resources Board "Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions" Staff Report: Initial Statement of Reasons (p. 135) October 12, 2021] (533-Docket) (533-AppA-Docket) (542-Docket)

According to CARB waiting until 2026 would still enable CARB and Governor Newsom to accomplish their 2031 and 2035 targeted goals. A primary goal is to reduce the amount of non- ZEE SORE in California by the year 2031 and 2035. Understanding the universe of equipment we are currently dealing with in California is important to consider to achieve these goals. (533-Docket) (533-AppA-Docket) (542-Docket)

Comment: The difference of 4% between the target ZEE SORE of the market share by 2031 of 93.4% and 89.3% by the year 2031 proposed by the ISOR and Alternative 2 respectively could certainly be narrowed and/or mitigated when 85% (residential) of the equipment begins to be phased out and only 15% (or likely less) is extended beyond the 2024 date. (533-Docket) (533-AppA-Docket)

Comment: Further supporting this goal to eliminate non-ZEE SORE is that commercial grade equipment has a much shorter life cycle than residential, typically commercial grade equipment is about half that of residential[15]. [Footnote 15: California Air Resources Board 2020 Emissions Model for Small Off-Road Engines- SORE 2020 (page 9 Table 16) September 2020] This life cycle difference would support extending the sale of commercial/professional grade products until closer to 2028 or 2029, by which 2031 targets can still be achieved. Our proposed amendment, which would extend the sale of non-ZEE to 2028 or a later date, we believe would produce very similar results to the current proposal in the ISOR and would certainly meet the 2016 State SIP and Governor Newsom's Executive Order on climate change. (533-Docket) (533-AppA-Docket) (542-Docket)

Comment: Both performance and cost remain tremendous hurdles, specifically for the larger commercial equipment that requires significant more run time and power. (533-Docket)

Comment: In conclusion, the landscape industry cares deeply for the environment, and we genuinely want to support a transition to ZEE. We believe that time is coming but not by 2024 for a complete transition. (533-AppA-Docket)

Comment: CLCA supports the ability of our landscape professionals to source the products that best fit their needs. In some cases, they can and have integrated ZEE into their equipment mix. In other cases, they have not because performance and cost remain tremendous hurdles, specifically for the larger commercial landscaping equipment which requires significant more run time and power. (542-Docket)

Comment: The first question asked by landscape professionals before buying any piece of equipment is 'can it meet the performance needs we ask of it?' With commercial grade landscape ZEE, the answer is usually 'not yet.' (542-Docket)

Comment: When looking at these results, it appears CARB staff based the comparisons solely on marketing data which may not reflect the equipment performance beyond a snapshot in time or may have inaccurately depicted equivalence in performance and run time. (542-Docket)

Comment: CLCA represents the end users, licensed landscape contractors, and we cannot strongly enough state that it is NOT technically feasible to transition commercial/professional grade landscape equipment to ZEE by 2024. (542-Docket)

Comment: **Solution** - Extend the time period to transition to zero emission "commercial/professional grade" equipment beyond 2024 but maintain the 2024 end of sale date for zero emission residential SORE. (542-Docket)

Comment: The proposed rule has a stated target for ZEE SORE market share of 93.4% by 2031. In the ISOR, the considered Alternative 2 states a target of 89.3% by 2013.[7] [Footnote 7: Small Off-Road Engines: Transition to Zero Emissions. CARB Staff Report: Initial Statement of Reasons, page 126. October 12, 2021.] This 4% difference could certainly be narrowed and/or mitigated when residential equipment (representing 85% of the pieces in use per the CSUF data) begins to be phased out in 2024 and the remaining 15% (or likely less) of professional/commercial equipment is extended beyond the 2024 date. (542-Docket)

Comment: Because of the aforementioned higher cost of commercial grade landscape ZEE, any transition means a robust rebate and tax incentive program is necessary. While we appreciate that the California Legislature approved $30 million[14] to support AB 1346 and this transition, that amount is woefully inadequate. [Footnote 14: Senate Bill 170 (Skinner), page 96; chaptered September 23, 2021.] Based on the CSUF data mentioned above, if all that money went to only commercial businesses, who use an estimated 1,911,555 pieces of gas-powered SORE landscape equipment, that would mean a scant $15 would be provided per piece of equipment traded in. As mentioned earlier, replacing a $350 gas powered leaf blower with comparable ZEE (and the batteries necessary to handle a full workday) costs upward of $2,000. It is abundantly clear that $15 does not come close to supporting the equipment transition for the landscape industry and our majority small business demographic. This also supports how a delayed transition for commercial grade landscape ZEE will make this transition easier and less costly for all those involved. (542-Docket)

Comment: In conclusion, CLCA and the landscape industry care deeply for our California environment, and we genuinely want to support a transition to commercial grade landscape ZEE. We believe that time is coming but that implementing a ban on gas SORE starting in model year 2024 for a complete transition is way too soon. Adopting an amendment allowing commercial grade landscape SORE to continue to be purchased until 2028, will lessen the jarring impacts on the industry and still allows for the targets of 2031 and 2035 to be achieved. In all, this would be a win for all parties involved. We would be happy to work with the Governor, CARB, the legislature, and air districts throughout California to promote and assist in this transition. (542-Docket)

Comment: What's happening here is what has happened time and again. Legislation that is going to be on the backs of small business people, who make up the back bone and fabric of the communities are going to be the first ones to suffer. There are other options. Limiting horsepower under 5 for example. Taking a wade-in in approach instead of a plunge and see how technology can or will catch

up. A lot of people here talking about how small are gas powered blowers or lawnmowers are causing them a lot of distress and air pollution. And I sympathize with that. But the overreach here in terms of horsepower here is going to have a crippling effect on the small business cleaning, landscaping, services business that has not been thought through. And when you go to your local facilities and see somebody hand brushing with a bristle brush the venue, then using 8 to 10 gallons a minute from a water hose it's going to catch you that this might not be the best approach. There's a better way to go about this, not the sledgehammer all encompassing, under 25 hp catastrophe that this is about to rain down on this great state. Let's make sure the technology can handle the regulation. At this time it cannot. (543-Docket)

Comment: My name is Jay Martinez, owner of JVM Landscape Construction, Inc. in Sacramento, CA. We are a small business, with full-time employees, serving the greater Sacramento area. We primarily are a landscape design and build company, specializing in residential homes. In reference concerning Proposed Amendments to the Small Off-Road Engine Regulations, Transition to Zero Emissions, Initial Statement of Reason (ISOR) (published October 12, 2021) I would like to humbly ask for your support, to support an amendment to the ISOR, delaying implementation of the transition to Zero Emissions Equipment for commercial/professional grade small off-road engines until model year 2028 or later. As a Small business owner, use of the small engines in questions are crucial to our operations. (561-Docket)

Comment: To encourage participation in trade-in programs, please reimburse landscapers for 75% of the cost of new electric equipment. The highest priority should be given to replacing 2-stroke engines since they are the worst polluters. (557-Docket)

Comment: These proposals would drastically limit equipment choice for professional landscape contractors and outdoor power equipment dealers across California. We are small businesses who rely on small engine powered equipment every day as cost-efficient and high-performing solutions to install and maintain living landscapes and green spaces in communities throughout the state, and maintain our state's critical infrastructure. (Form Letter A-Email)

Comment: These proposals would drastically limit equipment choice for professional landscape contractors and outdoor power equipment dealers across California. We are small businesses who rely on small engine powered equipment every day as cost-efficient and high-performing solutions to install and maintain living landscapes and green spaces in communities throughout the state. (Form Letter B-Email) (Form Letter F-Email)

Comment: As battery technology has advanced, so too has the availability of electric outdoor power equipment. However, professional-grade battery/electric landscape equipment – and the infrastructure needed to charge, transport safely, and recycle it – doesn’t yet exist at the scale necessary to meet the state’s accelerated timelines. (Form Letter B-Email) (Form Letter F-Email) (Form Letter H-Email)

Comment: The industry relies on a full range of equipment and power sources to do work, and these proposals make equipment difficult to source and more expensive to acquire. (Form Letter F-Email) (Form Letter H-Email)

Comment: These proposals would drastically limit equipment choice for professional landscape contractors and outdoor power equipment dealers across California. We are small businesses who rely on small engine powered equipment every day as cost-efficient and high-performing solutions to

install and maintain living landscapes and green spaces in communities throughout the state. (Form Letter B-Email) (Form Letter F-Email)

Comment: As battery technology has advanced, so too has the availability of electric outdoor power equipment. However, professional-grade battery/electric landscape equipment – and the infrastructure needed to charge, transport safely, and recycle it – doesn't yet exist at the scale necessary to meet the state's accelerated timelines. (Form Letter B-Email) (Form Letter F-Email) (Form Letter H-Email)

Comment: These proposals would drastically limit equipment choices for professional landscape contractors and outdoor power equipment dealers across California. We are small businesses who rely on small engine powered equipment every day as cost-efficient and high-performing solutions to install and maintain living landscapes and green spaces in communities throughout the state, and maintain our state's critical infrastructure. (Form Letter G-Email)

Comment: As battery technology has advanced, so too has the availability of electric outdoor power equipment. However, professional-grade battery/electric landscape equipment – and the infrastructure needed to charge, transport safely, and recycle it – doesn't yet exist at the scale necessary to meet the state's accelerated timelines. (Form Letter B-Email) (Form Letter F-Email) (Form Letter H-Email)

Comment: **Subject: Follow-up**
*Email sent 11/12/2021 8:41 AM:* Were you able to check into that Alternative 2 scenario that was discussed at the Workshop last Spring. I remember that alternative with language saying that a phaseout of residential equipment by Jan. 1, 2024 and commercial equipment by 2026 would still meet the 2031 and 2035 emission goals? *Email sent 11/12/2021 12:32 PM:* Starting on page 125 in the attached.[25] Under Alternative 2, it had proposed a phase-out of all gas powered equipment by 2026 with the exception of generators. The following sentence is included: While these emission reductions would meet the 2016 State SIP Strategy expected emission reductions for SORE, they would fail to maximize health benefits that could be achieved and would make less progress toward statewide commitments. So, I understand that this wasn't adopted, but what would be the possibility of this alternative combined with a 2024 date for residential & 2026 for commercial? Might that not get pretty close to progressing towards those statewide achievements? (585-Email)

Comment: These proposals would drastically limit equipment choice for professional landscape contractors and outdoor power equipment dealers across California. We are small businesses who rely on small engine powered equipment every day as cost-efficient and high-performing solutions to install and maintain living landscapes and green spaces in communities throughout the state. (Form Letter H-Email)

Comment: Far West Equipment Dealers Association (FWEDA) represents agricultural, industrial, material handling, hardware, lumber, outdoor power and rental equipment dealers across seven Western States including California where our office is located in Davis. California dealership locations comprise hundreds of businesses whose contributions provide thousands of quality jobs and enhance a healthy economy. FWEDA supports efforts to improve air quality and the health and well-being of our citizens and has worked tirelessly across our territory to defeat illegal tampering legislation

[25] The commenter attached the ISOR to the email.

advanced by "right-to-repair" advocates who seek unrestricted access to software in machinery that would override emissions and safety controls. (2001-Docket)

On behalf of California equipment dealers, FWEDA shares serious concerns about the ban on new sales of gas-powered small off-road engines (SORE) starting in 2024 or whenever the California Air Resources Board (CARB) determines feasible. The regulations CARB proposes are neither technologically feasible nor cost effective under this timeline. These rules will have damaging impacts on the many businesses that equipment dealers serve in California, and therefore will have a significant negative impact on our stakeholders. (2001-Docket)

FWEDA concurs with the Outdoor Power Equipment Institute (OPEI), National Association of Landscape Professionals (NALP), the Truck & Engine Manufacturers Association (EMA), the Portable Generators Manufacturers' Association (PGMA), the California Landscape Contractors Association (CLCA) and many others in urging the CARB board to delay implementation of the staff proposal. (2001-Docket)

**FWEDA endorses an amendment to the ISOR to delay implementation of the transition to "zero emissions equipment" (ZEE) SOLELY for commercial/professional grade small off-road engines (SORE) until model year 2028 or later for the reasons outlined below.** This would provide a responsible transition that mitigates the negative financial impact on the small off-road engine sector including the turf and landscape industry. (Bullet points below refer to attached References.) (2001-Docket)

- Equipment Dealers report significant supply chain disruptions that extend up to two years in filling orders placed now, which impacts all sectors of our industry. Manufacturers are also notifying dealers of inflationary prices increases, which in some cases are substantial. There has also been a misunderstanding related to the performance of residential vs. commercial equipment. As noted by NALP, a "**low adoption rate is not due to an unwillingness to use ZEE equivalents but rather evidence that the equipment is not technologically capable to be the exclusive equipment used by commercial landscape companies at this time**." The absence of sufficient technology to support the proposed amendments will hamper the ability of dealers to perform in this sector. (2001-Docket)

Comment: FWEDA Reference **3) EMA Comments CARB Proposed Amendments to the Small Off-Road Engine Regulations, November 29, 2021**: "The scope of the proposed SORE Amendments has expanded well beyond what was described in the 2016 State SIP Strategy as the next-tier mitigation measure for SORE. Instead, what staff are now proposing amounts to an overly-aggressive interpretation, not of the underlying 2016 State SIP Strategy, but rather of the Governor's recent Executive Order directing the transition of off-road mobile sources in California to zero emissions by 2035 – a goal that CARB proposes to accelerate by more than a decade in this case, to 2024 for all SORE except portable generators. Moreover, staff are proposing to mandate that dramatically accelerated transition to zero-emission equipment without having undertaken the necessary analysis of the technical feasibility and cost effectiveness of doing so. As a result, the pending proposal is neither reasonable nor implementable." (2001-Docket)

FWEDA Reference **4) NALP**: CARB relied upon a survey conducted by California State University of Fullerton (CSUF) to compile a large portion of their data. Within this survey it was concluded that only 3 percent of chain saws, 3.5 percent of lawn mowers, 0.3 percent of riding mowers, and 5.9 percent of trimmers used by professional landscape companies in California are ZEE, compared to over 50 percent for residential homeowners. **This low adoption rate is not due to an unwillingness to**

**use ZEE equivalents but rather evidence that the equipment is not technologically capable to be the exclusive equipment used by commercial landscape companies at this time.** (2001-Docket)

FWEDA Reference **5) CLCA**: "The landscape industry in California is a $9 billion industry annually with more than 55,000 companies employing over 133,000 employees; 99 percent of these businesses are considered small businesses and a vital industry for entrepreneurs throughout the state of California, many of which are Latino or minority owned. CLCA continues to hear from landscape professionals about ZEE landscape equipment: The power is just not comparable; Impossible to use exclusively on large scale commercial jobs like HOAs, resorts, business parks and other public and commercial green spaces; Requires too many batteries to conduct their job function in an efficient manner; Charging issues in the field and in the workshop; Durability concerns; Batteries are too heavy; Cannot mow slopes on riding mowers because of the weight issue; Mow times are longer, and batteries cannot last a full workday; Leaf removal during seasonal changes is very difficult; Debris removal to mitigate fire spread is significantly more difficult; Shortage of dealers and maintenance shops to support transition; Batteries are not interchangeable between brands." (2001-Docket)

Comment: FWEDA urges CARB to engage with industry to develop an emissions reduction strategy that allows the continued sales of SORE equipment in California until manufacturing, performance, economic and recycling challenges of lower-emission alternatives are resolved. We also join other stakeholders in urging the CARB board to postpone action on the proposed amendments to further consider expert recommendations in making this transition, and to incorporate an amendment to the ISOR to delay implementation of the transition to "zero emissions equipment" (ZEE) SOLELY for commercial/professional grade small off-road engines (SORE) until model year 2028 or later. (2001-Docket)

Comment: Information provided by CLCA at the request of Dr. Pacheco-Werner

**- Information on the constituent size of Contractors State License Board C27 licensed landscape contractors**
As of 4:00 p.m. today, California has 11,424 active licensed C27 landscape contractors. There are other C27 license holders who currently have their license in "inactive" status, meaning that they cannot currently contract at this time. (2005-Docket)

**- Information on the constituent size of soleproprietor gardeners and income estimates**
According to the Bureau of Labor Statistics (https://www.bls.gov/oes/current/oes373011.htm) the average income for a landscape worker is under $40,000. The exact number of soleproprietor gardeners, who are overwhelmingly latino, is harder to establish as they do not have to hold a C27 license and many do not even have local business licenses. A recent article from CalMatters puts the estimated number of soleproprietor gardeners at 60,000. (https://calmatters.org/california divide/2021/11/a50couponforonetoolgardenerscallcaliforniassubsidyinadequate/) (2005-Docket)

**- Calculation on funds needed if licensed landscape contractors and soleproprietor gardeners were to have ZEE transition funding under the San Joaquin Valley Air District funding model**
As we discussed, if the San Joaquin Valley Air District's commercial Clean Green Yard Machines funding limits ($25,000 per applicant) were applied to the C27 landscape contractors and unlicensed sole proprietor gardeners that would necessitate $1,785,600,000.00 in assistance funds. (https://www.valleyair.org/grants/cgymcommercial.htm) (2005-Docket)

Comment: Second, from a perspective of small business owners, such as commercial landscapers, the products in the commercial space in particular have to perform at a high level for a full eight-hour

working day five to six days per week. Because of this usage requirement, only about one percent of the commercial market has adopted battery-powered mowers or chore products due to several issues, battery runtime, lack of infield charging options, high cutting performance requirements, and the very high price of electrified machines. In summary, our position is not one of opposing a move to zero emissions in California. However, the time frame of 2024 creates unrealistic timelines for manufacturers and commercial small businesses to convert to products that meet zero emissions. We support the EMA proposal, which provides for significant emission reductions to meet SIP goals. (3003-Oral Testimony)

Comment: We strongly support -- we strongly supported AB 1346 and are encouraged by CARB's work to implement the law. I also want to note that this proposed policy represents a commitment made in the 2016 SIP and allows the Board's approval -- and follows the Board's approval last month of the 30 million for incentives that are available years before the rule goes into effect. We want to also make sure that CARB prioritizes outreach and support to small businesses to ensure they are notified and able to apply for these incentives. (3006-Oral Testimony)

Comment: In retail, customers are paying sometimes more than double the cost compared to a gas unit for a battery. Due to the already low inventory on certain units, I don't anticipate the manufacturers to be able to supply a cordless product by the year 2024. I am not here to be against environmental improvements, but would like the Board to consider only restricting homeowner rated units to be cordless or pick a type of unit to start with such as the blower, or even more importantly meet with the manufacturers on using their clean burning four-stroke gas engines on more units and get rid of the dirty engines with the emission credits. (3012-Oral Testimony)

Comment: Many types of equipment subject to the regulation, such as lawn and garden equipment, have many existing zero-emission substitutes making a 2024 deadline achievable. To ensure this, we encourage CARB to work with air districts on ongoing State funding for incentives to assist in this transition, especially for small owner/operators and businesses in disadvantaged communities. (3026-Oral Testimony)

Comment: My name is Randy Sherman. I'm the Vice President of Sales for the Zama Group. Zama is a worldwide operating group producing 15 million carburetors, six million oil pumps, and other high precision machine parts every year. Zama supplies emission control components to almost all major manufacturers in the industry. To carburetor manufacturers, the key performance indicators are lead time and cost for the development of electronic emissions control units. Before 2031, it is highly unrealistic that battery-powered products should replace existing technology. Consequently, there would be a lack of outdoor power equipment for maintaining roadway signage visibility and fuel mitigation to reduce wildfires. Zama encourages CARB to consider alternatives, which if used in connection with restrictions for homeowner SORE products would easily achieve CARB's SIP goals while avoiding significant impacts on small businesses and professional users. Developing state-of-the-art limit values shall be considered as an appropriate approach. (3031-Oral Testimony)

The current international development of limit values, including best available technology, is continuously published by several organizations, including the European Joint Research Center. Although Europe and California have different emission ABT schemes, the proposed European standard of 3550 gram kilowatt hours HC plus $NO_x$ without any compensation scheme are based on best available technology. These values would give the emissions reductions needed to meet the 2016 SIP goals and 2031 federal air quality standards. Therefore Zama proposes to introduce limit values for professional use engines. To this end, feasibility studies need to be conducted in order to

reflect the different multi-directional applications and differentiate between professional and homeowner use. (3031-Oral Testimony)

Comment: My name is Casey McGrath and I'm Director of Pacific Stihl, a California branch of Stihl, Inc., that distributes gas and battery-powered equipment to independent authorized dealers throughout California. Stihl, Inc. understands CARB's effort to improve air quality throughout California and supports a transition to ZEE, but we are concerned that the accelerated timeline is not feasible for professional products. It does not take into consideration the true impact to professional users and cannot be sustained by the manufacturers that supply the market. We request adjusting implementation of the proposed rule for professional products to allow for additional cooperation between industry and CARB to successfully transition to ZEE. (3032-Oral Testimony)

Comment: It is not a coincidence that according to CARB's own data, that less than five percent of landscape companies have made this transition. That is actually compelling evidence that the ZEE equipment is not ready and it is alarming that the proposal before you is pushing for this transition for the 95 percent majority of companies in only two short years. ZEE equipment has performance deficiencies, it's cost prohibitive, and the infrastructure to support the transition is not yet in place. I was going to mention points on each three, but with limited time, I'd like to present a solution. Extend the time period to transition to zero emission for professional commercial equipment, but maintain the 2024 end-of-sale date for non-residential grade equipment. This is similar to Alternative 2, but would reduce emissions even further by eliminating residential. (3034-Oral Testimony)

Comment: Lastly, when we say that a transition must be done responsibly, we mean that timelines should be laid, but also that any transition needs to be adequately supported financially through rebate programs, tax incentives, and training opportunities. The landscape industry is frustrated that the only money put forward to assist is 30 million, which equals only 15,000 -- I mean, $15 per piece of equipment when costs exceed 20,000 for a ZEE commercial grade riding mower. Please reconsider providing more time of the landscape industry to continue to integrate to commercial professional ZEE. Thank you for your consideration. We are committed to working with CARB to achieve this transition on a responsible timeline for the landscape industry. (3034-Oral Testimony)

Comment: We just kindly ask that you give us more time to incorporate this for a smoother transition. This is real-world issues for our industry. (3035-Oral Testimony)

Comment: While Zero-emission equipment exists, it has a long way to go before it can meet the needs of daily landscape professionals. Performance needs strengthening, supply chains are still unstable, and battery life needs an incredible improvement, because the need for extra batteries drives up the cost immensely for users. (3037-Oral Testimony)

Comment: The $30 million the Legislature equates to only $15 per piece of SORE equipment used in the commercial sector, which is woefully inadequate. (3037-Oral Testimony)

Comment: Much like NALP, we propose an amendment, ban gas-powered equipment in 2024 for residential users - after all, that's 85 percent of the equipment - delay until 2028 for commercial users. Local air districts have programs that differentiate between residential and commercial equipment, so it would be achievable for CARB to do the same. 2028 would give more time to secure transition assistance funds. The $30 million the Legislature equates to only $15 per piece of SORE equipment used in the commercial sector, which is woefully inadequate. (3037-Oral Testimony)

The amendment that we're proposing would have CARB achieve your 2031 emissions goals, as stated in your SIP, while it would still allow equipment manufacturers time to improve their products to be able to meet the daily professional needs of landscape industry pros. (3037-Oral Testimony)

Comment: To conclude, Stihl supports the transition to ZEE, but we are concerned that the current transition time is too ambitious, especially for professional users. (3038-Oral Testimony)

Comment: Thirty million dollars supporting this transition is a great start, but there will likely need to be more funding to support training programs and small business owners who will be impacted as well. California should accelerate its efforts to partner with local governments to speed up and scale up enactment of this new law. Thank you for the opportunity to comment. (3043-Oral Testimony)

Comment: FWEDA understands the need to improve air quality but we emphasize that our small business customers will experience a dramatic negative impact associated with this transition on this timeline. FWEDA joins other stakeholders in asking CARB to delay implementation of this transition to zero-emissions equipment solely for commercial professional-grade SORE until model year 2028 or later. (3045-Oral Testimony)

Comment: The District supports efforts to reduce emissions from this sector and recognizes that this transition will not be an easy one that will require ongoing evaluation of technologies and will need significant new funding to assist in the transition. This funding and need for ongoing attention and support is particularly important for small businesses and residents, especially in disadvantaged and rural communities that would be most impacted by this effort. Thank you for your efforts and for the opportunity to provide comments on this item. (3046-Oral Testimony)

Comment: So I, along with my brothers, own a successful small landscape maintenance business. We have invested thousands of dollars on ZEE equipment. And we have used various commercial grade ZEE equipment, including the Stihl battery blower in combination with the AR 3000 battery backpack, which is the most powerful option available to us as professional gardeners today. This tool is about five times more expensive than the -- than the Stihl BR 500, which CARB is familiar with, since it was one of the original pieces of equipment that was used with the leaf blower exchange program. We can honestly say that the commercial ZEE equipment offering is not ready for long-term commercial use. It is also currently more expensive and not less expensive to maintain ZEE equipment. Fellow landscape professionals who have invested heavily in ZEE equipment have shared their frustrations with us with both the entry cost and elevated upkeep costs due to the frequent breakdowns of the equipment. We're asking the Board to consider delaying or providing some sort of exception for professional use of SORE equipment. (3062-Oral Testimony)

**Agency Response:**

These comments suggest CARB consider an alternative to the current rulemaking that would allow more compliance time for some or all SORE equipment used by landscaping businesses and other professionals (commercial SORE equipment), while still requiring a MY 2024 compliance date for SORE equipment used by residents/homeowners.

The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. Gardeners, landscapers, and other professionals can continue to use and repair their current SORE equipment until the end of its life. As described in sections II.A.1.e and II.A.2.d of this FSOR, in response to stakeholder comments about technological feasibility specific to commercial pressure washers, CARB

made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers typically used by professional cleaning services, maintenance companies, other businesses to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for pressure washers using engines with displacement of 225 cc or larger that are the same as those proposed for generators and setting emission standards of zero for MY 2028 and later for these pressure washers. These modifications are expected to reduce impacts to businesses that would have occurred under the Proposed Amendments as they were defined in the ISOR. Please refer to sections II.A.1.e and II.A.2.d and the Agency Response in section IV.A.2.4.1 for additional discussion about these modifications.

As explained in ISOR sections I.E and II.A, the Proposed Amendments include a longer timeframe for portable generators to comply with emission standards of zero because they are frequently used as power backup and to provide time for the zero-emission generator market to mature. As described in detail in ISOR section I.E, the level of performance, number of brands, and number of zero-emission equipment options for both residential and professional use have increased greatly and continue to do so today. Battery and electric motor technology has advanced rapidly in recent years, while costs have declined. For the most common types of SORE equipment, there are ZEE equivalents available in the market with similar or better performance characteristics and lifetime. Please refer to the ISOR section I.E. and Agency Responses in sections IV.A.35.1 and IV.A.35.2 for additional discussion of the current technological feasibility of ZEE for other equipment types and why more time is not needed for them to comply with emission standards of zero. In addition, please see the Agency Responses in other sections that discuss the technological concerns expressed in the above comments as well as concerns expressed elsewhere in their submissions, including but not limited to: ZEE battery charge capacity (section IV.A.2.2.1); ZEE battery lifespans (section IV.A.35.1); ZEE performance/power (section IV.A.35.1 and IV.A.35.2); higher upfront costs of ZEE (section IV.A.12); standardization in battery design (section IV.A.35.1); battery production and afterlife (section IV.A.6.2); purchasing SORE equipment outside of California (section IV.A.14.1); costs for extra batteries and issues associated with transporting extra batteries during a work day (sections IV.A.12 and IV.A.6.2); gasoline tax loss (section IV.A.28.3); CARB's emissions inventory modelling (section IV.A.14); and California's electrical grid and PSPS (section IV.A.6.4 and section IV.A.27).

In response to the statement, "To equip one truck for electric powered equipment there has to be a on board generator, 20-30 spare batteries. Now what happens when the power grid fails. How do these companies operate? They don't! Again this ban would kill the landscape industry! Governor Newsom does not know how to run a state and has destroyed California!" "Currently, the need for in-field charging means that either our gas or diesel trucks or generators will need to be run to facilitate charging batteries," and similar comments: These comments do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The commenters' claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenters' assessments of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB,

2020[26]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. The current SORE regulations and the Proposed Amendments do not specify the purposes for which users may use SORE generators or motor vehicles. The commenters raise the possibility of using a SORE generator or a motor vehicle to charge batteries for ZEE. Such use of a SORE generator or a motor vehicle is not the goal of the Proposed Amendments and could result in avoidable emissions. The commenters do not demonstrate that such use would be prevalent or would significantly impact the emission reduction benefits of the Proposed Amendments. The comments imply that any use of a SORE generator that might be avoidable or use of a motor vehicle to charge batteries for ZEE would indicate the Proposed Amendments were ineffective and should therefore be abandoned. CARB disagrees with that conclusion. A significant amount of SORE emissions are created by activities that are often recreational or discretionary, such as the use of an RV or landscape maintenance. The SORE regulations do not limit users' ability to engage in these activities. The comments include a picture of a person using a corded lawn mower being followed by another person pushing a wheelbarrow with a portable generator in it, which is providing power for the lawn mower, with the caption "This is how green technology works." This appears to be included for satirical purposes. The commenter does not provide evidence that landscapers would use lawn mowers, wheelbarrows, or portable generators in such a manner.

In response to the comment, "Greenworks battery powered equipment worked great for as long as I was able to charge the batteries. However, the company is in Canada and problem solving with that company is next to impossible! I now have a group of Greenworks tools that are inoperable because I can't get the batteries charged or buy new ones. I really liked the ease in usage while I had battery power, though. The equipment needs to be more accessible if it's required,": The Proposed Amendments do not require anyone to stop using SORE equipment or to use ZEE. Greenworks batteries are available through various retailers. The commenter doesn't specify which problems it was trying to solve with Greenworks, but such problems are beyond the scope of this rulemaking. The commenter does not provide evidence that ZEE are not accessible.

In response to the statement, "As a commercial landscape provider, our staff meet onsite our yard each morning to clock in. From there, they embark on 8 hours service routes ranging from 5 to 50 miles away from home base. During that time, even the simple task of finding a restroom to use can be difficult. With possible bans on new gas-powered equipment, we now will need to figure out ways to charge all of our equipment, while still remaining profitable, without causing an inconvenience to our customers, and to do so with limited resources as the technology that has been developed for the commercial landscape industry is severely lacking. The availability of affordable equipment that can hold charge long enough to support a full day of use does not exist nor does the equipment necessary to charge that equipment," and similar statements: The Proposed Amendments do not require anyone to stop using SORE equipment, nor do they prohibit the sale of CARB-certified SORE. CARB did not assume landscapers would need to or be able to charge batteries during a work day. The economic analysis assumed users would purchase enough batteries to complete a day of work, as described on page 39 of the SRIA. The commenter does not provide evidence to support its claims regarding the availability of equipment or chargers. Chargers are included in the costs

[26] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

for ZEE discussed in Chapter VII of the ISOR. Chargers for ZEE generally plug into standard electrical receptacles.

Regarding the comment "The ISOR admits that in a considered Alternative 2 that changing the date of 2024 to 2026 for both residential and commercial grade equipment would still meet targeted emissions goals": This "Alternative 2" is described on pages 125-135 of the ISOR. While emission reductions under Alternative 2 would meet the 2016 State SIP Strategy expected emission reductions for SORE, they would fail to maximize health benefits that could be achieved and would make less progress towards meeting the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible, and other mandates. Under Alternative 2, only 89.3 percent of the small off-road equipment population subject to the SORE regulations would be ZEE in 2035, as compared to 93.2 percent under the Proposed Amendments. The remaining 10.7 percent would continue to turnover to ZEE over the following years, reaching 98.8 percent ZEE in 2043. Emission benefits under Alternative 2 in 2031 would be 6.8 tpd and 50.2 tpd of $NO_x$ and ROG, respectively. These emission reductions are fewer than those that would occur with the Proposed Amendments. The commenter's quoted text does not provide the reason stated in the ISOR for CARB to reject Alternative 2: Alternative 2 fails to maximize health benefits as required by California Health and Safety Code section 43000, subsection (b). It would also make it more difficult for California to meet its SIP commitments, since as described in detail in the ISOR (sections II.A.1 and III.A.3), current SORE regulations will not achieve emission reductions expected under the 2016 State SIP Strategy.

Delaying implementation for SORE equipment used by professionals would similarly fail to maximize health benefits that could be achieved and would make less progress toward statewide commitments. As commenters noted, 15 percent of SORE equipment are used by professionals and 6 percent of SORE equipment are used by professional landscapers. Equipment used by professionals ("commercial-grade equipment") typically have a shorter life cycle and higher use times than residential SORE equipment. On average, landscapers use a lawn mower 240 hours per year, while residents use a lawn mower 19 hours per year [CARB, 2020[27]]. Therefore, emissions from a piece of commercial equipment are often higher than those from a piece of residential equipment. Emissions from landscapers' equipment are 21 percent of the overall emissions from SORE [CARB, 2020[28]]. Transitioning landscaping and other commercial equipment to ZEE is important for statewide emissions reductions. The noncompliance rate with current evaporative emission standards is high (~40 percent since 2015, see ISOR section II.A.1), so previously expected emission reductions will not be realized. Potential emission impacts from ongoing noncompliance would still not be addressed if implementation of the Proposed Amendments were delayed for commercial SORE equipment.

Allowing emissions to continue for SORE equipment that have feasible zero-emission options would fail to comply with requirements under Health and Safety Code section 43018. Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree

[27] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[28] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

of technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards for ozone and other criteria air pollutants at the earliest practicable date. Many landscaping professionals use battery-powered equipment and have been able to do so successfully for several years. Landscaping business owners have written in support of using ZEE and the proposed implementation timeline (see comments provided in section IV.A.1.1. Many have shared their personal experiences, which highlight benefits beyond even those identified in the ISOR (Section I.E), such as higher profits, reduced maintenance, lower noise, and less exposure to fumes.

For these reasons, none of the suggested alternatives to delay implementation for commercial SORE equipment are viable alternatives for the rulemaking. CARB made no changes based on these comments.

In response to EMA comments that state that market forces and resultant product improvements would bridge the gap in the uptake of ZEE that currently exists between residential and commercial SORE in six to eight years without any regulatory changes: The EMA comment letter does not provide any supporting evidence for this statement, and this statement is not supported by evidence described in the ISOR. Consequently, CARB made no changes based on the comments. As described in detail in ISOR sections II.A.1 and III.A.3, SORE emissions are expected to increase as California's population grows and are forecast to be nearly twice those from light-duty passenger cars in 2031. Health and Safety Code § 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards at the earliest practicable date. As explained in the ISOR, the predicted growth in ZEE sales will be insufficient to maximize the reduction of SORE emissions without further regulation.

Regarding the comment "As contractors, we clearly understand the important role we play and how our efforts to reduce gas emissions is critical to a long term solution in the fight against global warming": While the Proposed Amendments would reduce greenhouse gas (GHG) emissions that cause climate change, they are specifically designed to achieve the expected $NO_x$ and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20. Emissions of $NO_x$ and ROG from SORE contribute to three criteria air pollutants—ozone, PM, and $NO_2$—known to have adverse health effects. $NO_x$ and ROG emission reductions under the current rulemaking would result in significant health benefits for Californians, including reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease. Please refer to ISOR Chapter IV for a detailed description of public health benefits and other benefits anticipated from the Proposed Amendments.

Please refer to section IV.A.2.6.2 for the Agency Response specific to the proposal to introduce "limit values" for professional use engines and averaging, banking, and trading (ABT) emission credits mentioned by some of the comments in this section and other comments related to emission standards.

Regarding the comment "...even more importantly meet with the manufacturers using their clean burning four-stroke gas engines on more units and get rid of the dirty engines with the emission credits": CARB's evaluation of the above-mentioned Alternative 2 found that

delaying implementation of the emission standards described in the Proposed Amendments, with an intermediate step of lower (more stringent), but nonzero, emission standards in 2024, would be less cost-effective than the Proposed Amendments. This finding was one of the primary reasons CARB rejected Alternative 2.

Some comments request to delay implementation due to supply chain issues because of the COVID-19 pandemic. ISOR section VII.B.1 explains that the economic modeling was adjusted to reflect the impacts of COVID-19. Please refer to the Agency Response in section IV.A.28.2 for additional discussion of supply chain concerns.

Regarding the comment "…there would be a lack of outdoor power equipment for maintaining roadway signage visibility and fuel mitigation to reduce wildfires", and the comment, "we still rely on the use of gas powered chainsaws greater than 45cc as the technology is not offered. We also lean on our gas equipment when working in remote locations, for fire abatement, and recharging batteries is not an option. A ban of gas chainsaws would bring our industry to a screeching halt,": The Proposed Amendments do not require anyone to stop using equipment they already own; professionals and residents can continue to use and repair their SORE equipment until the end of its life. CARB does not anticipate that the availability of chainsaws powered by engines with displacement 45 cc and above for remote work, fuel mitigation, and firefighting applications will be adversely affected by this rulemaking. Section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision. As described in more detail in the Agency Responses in sections IV.A.2.5.1, IV.A.29.1.1, and IV.A.29.1.3, CARB does not anticipate that the Proposed Amendments will affect the availability of equipment used for forest fuel reduction, fire mitigation, and maintenance of defensible space.

Regarding the comment "This ban will cause thousands of businesses to have to close their doors. It will not only effect the business owners but those that work for them too. Ultimately, it will effect economy of our state with the loss of hundreds if not thousands of jobs," and similar comments: The commenters did not provide any supporting evidence for their comments that the Proposed Amendments would cause the loss of thousands of businesses and hundreds to thousands of jobs or that dealers or repair shops would close, and CARB's economic analysis did not estimate the number of businesses that might close. CARB's economic analysis found that the Proposed Amendments could result in reduced employment growth and fewer jobs. As part of the economic analysis for the Proposed Amendments presented in ISOR Appendix I SRIA, CARB conducted macroeconomic modelling to determine the indirect impact of the Proposed Amendments to the California economy. The modelling results cannot directly estimate the creation or elimination of businesses. Therefore, changes in jobs and output for the California economy described in the SRIA can be used to understand some potential impacts. The results of the assessment of impacts due to the Proposed Amendments show a decrease in output of $772 million in 2027 and a decrease of $369 million in 2043 as shown in Table E-4, representing a change that does not exceed 0.01 percent of baseline output. As it relates to employment, the Proposed Amendments are estimated to result in an initial decrease in employment growth that is less than 0.03 percent of baseline employment that diminishes towards the end of the regulatory horizon. In total numbers it is estimated that in 2027 the decrease in employment growth would be 4,908 jobs. The decrease falls to 453 by 2043.

Regarding the comments about financial hardship and potential loss of business, such as the comment, "In retail, customers are paying sometimes more than double the cost compared to a gas unit for a battery," "early (2024) implementation will cause economic hardship and potential loss of business," "It's not just the new equipment we will need to purchase. But the cost of setting up our shop, trucks and trailers with charging stations and even maybe solar panels. I don't know where to begin!!!", and "If anything, the added time will help us phase out our old gas power equipment and purchase the new battery equipment": The Proposed Amendments do not require anyone to stop using SORE equipment. A business would not need to purchase a full suite of ZEE at once, thereby avoiding a significant one-time cost to transition to ZEE. Rather, businesses can gradually purchase ZEE to replace SORE equipment as it breaks or for other business reasons, such as upgrading equipment. While CARB's economic analysis found that ZEE can have higher upfront purchasing costs than SORE equipment, it also found that many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. Please refer to ISOR Appendix I SRIA sections B and C, for analyses of potential economic impacts and benefits for California landscapers and other businesses under the Proposed Amendments, and section IV.A.12 for additional discussion regarding ZEE costs. Please also refer to ISOR section I.F for additional discussion of sources of incentive funding that can help reduce ZEE costs. Please refer to the Agency Responses in sections IV.A.13.1.1 and IV.A.13.1.2 for additional discussion of comments related to potential loss of businesses or jobs and fees charged by landscapers for their services, respectively.

In response to comments regarding incentive funding, including potential alternative uses of funding: The scope of the rulemaking does not include specifying details of the implementation of incentive programs to transition to ZEE. The scope of the rulemaking does not include allocating funding for incentives to transition to ZEE, administering a program to distribute such funding, or providing tax incentives to users. The Budget Act of 2021 provided $30 million in the FY21-22 California state budget "to create a program, or utilize an existing program, to provide incentives for professional landscaping services in California operated by small businesses or sole proprietors to purchase zero-emission small off-road equipment." CARB will ensure this funding is used to provide incentives to sole proprietors and other small landscaping businesses in California to purchase ZEE, including batteries for the equipment. The Budget Act of 2021 does not allow for the funding to be used to incentivize the creation of better battery technology or to provide homeowner rebates. CARB agrees that additional funding would be beneficial and that outreach to sole proprietors and other small landscaping businesses will be essential to the success of the program. CARB made no change based on these comments.

In response to the comment, "A ban on gas equipment is the elimination of the landscape industry. This ban is a unrealistic endeavor. Our California representatives and governor should … should have started with residential sales. Homeowners account to more gas powered equipment then all of the landscapers put together," and the comment, "Landscaper use of small gas-powered equipment produces less than a quarter of the exhaust created by these types of engines in California. Homeowner use is by far a greater source of pollution,": CARB disagrees with the commenters' assertion that the Proposed Amendments are unrealistic and implication that SORE equipment used by landscapers is not an important emissions source. The commenter provides no evidence to support their assertions. While it is true that residential users account for over 80 percent of small off-road equipment in each major category of equipment, that is not a reason to not have the Proposed Amendments apply to professional users. Professional users, including landscapers, use their equipment

more often, on average, than residents do. Emissions from landscapers' equipment are 21 percent of the overall emissions from SORE. Therefore, it is unrealistic for CARB to not include professional equipment in the Proposed Amendments.

In response to the statement, "Abandoning SORE-powered walk-behind lawnmowers in California will cost Briggs & Stratton 150,000 to 200,000 sales per year. Walk-behind lawn mowers are one of the largest volume applications in the SORE category and a key part of Briggs & Stratton's current and historic business.": This comment does not request a change to the Proposed Amendments. CARB made no change based on the comment. CARB understands that manufacturers, such as Briggs & Stratton, will likely manufacture fewer SORE for use in walk-behind lawn mowers for sale in California over time as a result of the Proposed Amendments. The SRIA and Chapter VII of the ISOR discuss economic impacts of the Proposed Amendments.

Regarding the comment, "Despite our efforts, connecting with CARB staff early in the process to bring forward the daily realities of ZEE use in commercial landscape operations was limited…," please refer to sections IV.A.35 and IV.A.34.1.2 for additional discussion about stakeholder outreach.

In response to the statement, "The industry relies on a full range of equipment and power sources to do work, and these proposals make equipment difficult to source and more expensive to acquire,": CARB acknowledges the increased upfront costs for ZEE. The commenter does not provide evidence to support its claims that professional-grade ZEE is more difficult to source than SORE equipment.

In response to the statement, "However, we are concerned that the current inability to mass produce zero emission equipment that meets commercial use standards by January 1, 2024, will hinder golf courses and other large green industries' ability to conduct operations that meet the expectations of end users and customers,": The commenter does not state which SORE equipment types it believes cannot be mass produced to meet commercial use standards by January 1, 2024. Many equipment types used to maintain golf courses are powered by engines that are not subject to the SORE regulations. The Proposed Amendments do not require anyone to stop using SORE equipment.

In response to the statement, "battery packs do not currently (nor will they soon) have the power density to replace a gasoline generator. Fuel cells present a clean option, but the technology is costly and requires users to store, and have access to, substantial amounts of hydrogen for fuel," and similar statements: These statements include commenters' opinions. The commenters do not provide evidence to support their claims and conclusions. For example, while the power or energy density of batteries for zero-emission generators may differ from the power or energy density of fuels for SORE, commenters don't provide evidence that a difference in power or energy density precludes the use of zero-emission generators for similar tasks to those for which SORE generators are used. As described on pages 25-26 of the ISOR, methanol is often used as a source of hydrogen for fuel cells. Commenters do not provide evidence to support claims regarding the weight of ZEE or batteries or the ability to mow on slopes and do not demonstrate that ZEE are heavier than SORE equipment. As discussed in the Agency Responses in section IV.A.35, users have options when selecting batteries for ZEE and can select batteries with the capacity and weight that best suit their needs.

In response to the comment that begins, "I am a third generation gardener…": The commenter describes its use of ZEE leaf blowers and assessment of the difference in cost of a

SORE leaf blower and a ZEE leaf blower. The commenter seems to use leaf blowers for more than the average amount of time for landscapers in SORE2020. The economic analysis for the Proposed Amendments includes costs and sufficient batteries to use leaf blowers for the average amount of time for landscapers in SORE2020. As a result, the commenter describes using two backpack batteries to complete a day of work, rather than one backpack battery as assumed in the economic analysis. Upfront costs for landscapers to purchase ZEE are significant, as described in Chapter VII of the ISOR. It is reasonable that some landscapers would purchase more batteries and other landscapers would purchase fewer batteries than what is assumed in the economic analysis. The Proposed Amendments do not require anyone to stop using SORE equipment. The commenter does not provide evidence to support the statements, "Not to mention the increased repair costs and decreased longevity of this option," and, "Another factor is increased labor due to more limited portability. If a job takes slightly longer due to battery run time concerns or we have to be swapping batteries this increases labor." The commenter does not state that specific jobs take longer, but rather poses a hypothetical situation. CARB does not have information to suggest that repair costs are higher for ZEE than for SORE equipment or that ZEE have decreased longevity (which may refer to the lifetime of equipment). As discussed in Chapter VII.A.2 of the ISOR, scheduled maintenance costs are typically lower for ZEE than for SORE equipment. CARB does not have information to suggest that ZEE are less portable than SORE equipment or that swapping batteries takes longer than refilling a fuel tank with gasoline or mixing oil with gasoline and filling a fuel tank with a gasoline/oil mixture. The availability and expense of labor are beyond the scope of the Proposed Amendments.

In response to the statement, "It is also currently more expensive and not less expensive to maintain ZEE equipment. Fellow landscape professionals who have invested heavily in ZEE equipment have shared their frustrations with us with both the entry cost and elevated upkeep costs due to the frequent breakdowns of the equipment," and similar statements: The commenters do not provide information to support its statement regarding the cost to maintain or repair ZEE. CARB does not have information to suggest that maintenance or repair costs for ZEE are higher than those for SORE equipment. Commenters do not provide evidence to support statements that suggest repair shops or dealers could not perform maintenance or repairs on ZEE

Regarding the comment "2028 would give more time to secure transition assistance funds…": Please refer to ISOR section I.F for additional discussion of sources of incentive funding.

In response to the statement, "What's happening here is what has happened time and again. Legislation that is going to be on the backs of small business people, who make up the back bone and fabric of the communities are going to be the first ones to suffer. There are other options. Limiting horsepower under 5 for example," and similar statements: The commenter implies an alternative that would only set emission standards of zero for engines under five horsepower. For an explanation of the necessity for the current rulemaking and why CARB cannot discontinue the rulemaking or exempt some engines, such as those producing five or more horsepower, from the proposed emission standards or emissions durability periods, please refer to the Agency Response in section IV.A.2.2.1. CARB made no change based on this comment.

In response to the statement, "An extension cord for an electric trimmer will only go so far, and can throw sparks into dry grass where cords plug together,": This comment is beyond the scope of the Proposed Amendments. Note that there are many cordless ZEE options and, as

described in ISOR Appendix I section A.5 and Tables G-2 and G-4, CARB's economic analysis assumes that consumers will almost always purchase cordless ZEE.

In response to comments regarding charging batteries and electrical service needs: Landscapers could utilize smart charging switches specifically designed to allow for the charging of multiple batteries at once on one circuit. One such smart charging switch retails for $1,595 and can handle up to 8 chargers. Please refer to the Agency Response in section IV.A.6.1 for additional discussion of charging infrastructure.

In response to comments about battery recycling, battery disposal, and toxic metal and ground water contamination, please refer to section IV.A.6.2.

Please refer to the Agency Responses in section IV.A.1.2 for additional discussion of comments related to incentive funding.

Please refer to the Agency Responses in sections IV.A.2.3 and IV.A.27 for additional discussion of comments related to portable generators.

Please refer to Chapter I.E of the ISOR and the Agency Responses in section IV.A.35 of this FSOR for additional discussion of the technological feasibility of the Proposed Amendments, and Chapter VII of the ISOR and the Agency Responses in sections IV.A.13 and IV.A.35 of this FSOR for additional discussion of the cost-effectiveness of the Proposed Amendments.

Please refer to the Agency Responses in section IV.A.14 for additional discussion of comments related to the CSUF survey and the SORE emissions inventory.

Please refer to the Agency Response in section IV.A.13.3 for discussion of comments regarding equity.

### A.2.4.3. Delay compliance dates for some or all SORE equipment

Comment: CARB is gambling, staff has stated industry will figure out solutions that are equivalent to SORE and zero emissions. They are gambling with the lives and livelihoods of many Californians. Currently there are no alternatives to engines in many categories. The logical decision would have been to require stricter emission requirements in stages. It is feasible. Today it is possible to reduce the emissions of SORE, have it cost less than inadequate performing ZEE, and not induce the other issues of ZEE such as waste, power generation, etc. This is not to say ZEE doesn't have a place, there are several areas where using ZEE is a better alternative, however banning all at one fell swoop is irresponsible. My plead with CARB and its staff is reconsider your approach, where there are no viable alternatives to SORE, tighten emission limits. Please don't gamble Californians lives by "betting on black". (15-Docket)

Comment: With this in mind, I respectfully request the Legislature and CARB postpone efforts to ban small engine powered equipment until the cost and performance of comparable electric/battery powered equipment meet commercial, emergency, and rural residential use needs. In the meantime, I encourage CARB to work with equipment manufacturers to explore additional small engine emission reduction technologies that can be implemented in the near future. (21-Docket)

Comment: With this in mind, I respectfully request the Legislature and CARB postpone efforts to ban small engine powered equipment until cost and performance of comparable electric powered equipment meet commercial, emergency, and rural residential use needs. In the meantime, I

encourage CARB to work with equipment manufacturers to explore additional small engine emission reduction technologies that can be implemented in the near future. (34-Docket) (Form Letter B-Email)

Comment: As a distributor of gasoline and diesel powered lawn mowers, we believe more time is needed for the electric machines to be developed. The power is not there, to operate properly, the price is too high, and the supply chain needs more time to stabilize to support this change. (38-Docket)

Comment: Banning gas powered engines before there are adequate replacements will place a tremendous hardship all business of all sizes. Just in the tree care industry, we will not have adequate replacement for equipment. For example, we will not have saws large enough to cut large fallen trees and large dead trees. Currently there are not comparable electric alternatives in this broad small engine ban. Banning critical resources to maintain properties, the forest and infrastructure before replacement tools are available is very poor planning. (51-Docket)

Comment: 2024 is too short of a time frame to ban small gas power equipment and try to replace them with electric or solar power. Two major problems, one is the electric power does not possess the power and diversity yet to replace some of the larger equipment. The second issue that seems to be ignored is the amount of batteries and disposal issues that will now be caused by an enormous amount of batteries that will be flooding the market. We should continue to manufacture low emission engines and maintain new more efficient motors until the electric motors can fully replace existing equipment. 2028 should be a minimum target date. (58-Docket)

Comment: We are all about transitioning to battery and more eco-friendly options for equipment but the current timeline proposed for this ban is just not reasonable. The technology is not ready for us contractors to successfully perform our work with this equipment. The financial impact of this transition is also very large and would put major stress on our businesses and may even put some businesses out of business. We need more time and a better plan to absorb the cost implications of transitioning our equipment. (66-Docket)

Comment: Based on current technology and productivity of battery powered small equipment this would bring a major cost and quality burden to my business. Give technology a few more years and we will see battery powered equipment advance to a point that this initiative could be successful. (70-Docket)

Comment: You just can not pass a law without realizing the ramifications of your actions. Battery powered equipment are great in certain situations but they can not complete jobs we are given. We use them now whenever we can. (79-Docket)

Comment: As a member of this community, we are not opposed to the need for advancements, change, and taking direct responsibility towards working as a "greener" company. We instead are terrified of how to continue operations during a time of already exponentially increasing costs and dwindling profits while transitioning to a new technology that just hasn't had the proper research and development. Ultimately, we are asking...begging... that additional time be given and that additional resources be allocated towards the development and expansion of "green" technology so that we can all make this transition in a way that is efficient, affordable, and supportive to everyone in our community. We ask for fair and genuine consideration so that small businesses, families of our community, can survive. (99-Docket)

Comment: I would suggest our government looks for more information on implementing electric power for small equipment and will talk with industry leaders in our field to see if the proposed restrictions will work. (102-Docket)

Comment: the technology does not exist to ban all gas engines and will not in 2024. you will simply force those with no solution out of business in your state. Yes in the handheld market their are solutions that are improving. in the construction market which will no doubt be active with the infrastructure bill there is none at this time for many of the gas powered units used in construction. it is also an issue in turf care as well. it would seem to be premature when there is no replacement in many cases. not to mention that the power grid in California has been challenged already. lastly, where does lithium mining and the disposal of batteries do to the environment. it sounds great to go battery but it is still a long way off before it is available in all products and not a biohazard for disposal. there is room for emissions improvement going forward and a common sense tiered approach will be a better path for all. (110-Docket)

Comment: I share Governor Newsom and other Californians. However, a two-year timeline is simply too expensive and fast a transition for residential home owners such as myself to replace all of our equipment. (308-Docket)

Comment: We need electric only leaf blowers! Phase them in so the small gardeners aren't out extra money but get rid of the loud polluting ones asap! (318-Docket)

Comment: Push back the deadline 4 years. (402-Docket)

Comment: PLEASE consider a delay until 2030. (420-Docket)

Comment: Requiring quieter electric blowers should be considered at this time -- and gasoline driven blowers should be discouraged. Other types of motors should not be regulated at this time. (426-Docket)

Comment: If you are going to implement such a radical shift in the course of how businesses and homeowners use such vital things like lawn mowers, chainsaws, generators just to name a few, you must give years for the development of comparable technologies and efficiencies. I am all for lessening the pollution impact on our planet, but you seem to be bent on doing it in a manner most destructive to all of us. Please reassess your approach, and make reasonable plans for a switch to how emissions from these engines are produced and or lessened. (473-Docket)

Comment: I would suggest gradually making the transition as technology and the power grid becomes available. Let start with one type of equipment and see how the transition goes before banning all gas power equipment (510-Docket)

Comment: On behalf of the Tree Care Industry Association (TCIA), I write in response to the California Air Resources Board's (CARB) Notice of Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions. TCIA represents approximately 2,300 businesses engaged in commercial arboriculture (tree care) in the United States, with 250 members located in California. TCIA's members employ more than 150,000 people, or nearly seventy-five percent of all tree care workers in the country. TCIA works to elevate the standards of commercial and utility tree care by developing safety and education programs, standards of tree care practices, and management information for tree and landscape firms around the world. We also

provide continuing education, training, conferences, and publications to promote safe and appropriate practices of tree care. (520-Docket)

TCIA joins with other related industry associations in expressing our concerns with the Proposed Amendments to the CARB SORE regulations, which include accelerated timelines that would set certain SORE product exhaust and evaporative emission limits to zero starting with Model Year (MY) 2024 products. TCIA member companies would be significantly impacted by these regulations as they pertain to chainsaws with displacement of less than 45cc, which our members often use for in-tree operations. TCIA is specifically concerned that, if the proposal shifts tree care equipment manufacturers and businesses away from gas-powered equipment like the in-tree chainsaws in the proposed truncated timeframe, manufacturers will not be able to develop new zero-emission equipment (ZEE) in an efficient, cost-effective manner, which will translate to higher costs for tree care businesses who rely on such products. This will particularly negatively impact smaller tree care businesses, which are less able to absorb increased costs. According to the Small Business Administration, 90% of the tree care industry is considered "small business", and over 80% of the firms in our industry employ 10 people or fewer. (520-Docket)

The Proposed Amendments also currently allow manufacturers to generate exhaust and evaporative emission reduction credits when they produce engines that emit below the emission standards and to bank, use, or trade these credits with other manufacturers, allowing them to produce engines that emit above the emission standards. Despite these opportunities, however, manufacturers currently have limited opportunities to generate such credits, effectively creating a ban on most SORE gas-powered equipment starting with MY 2024. This means that manufacturers will have to shift to produce zero-emission outdoor power equipment by 2024. This rapid transition will impose cost burdens on manufacturers and these costs will necessarily be shared with the tree care businesses that purchase and use their products. If manufacturers are provided additional time to transition, however, they will be better positioned to meet demand, build efficiencies into production, and keep costs down. (520-Docket)

One other consideration is the ongoing costs of operating ZEE equipment, including the costs of batteries and chargers needed for a full day of work, which can easily surpass the cost of gas needed for gas-powered equipment. An Outdoor Power Equipment Institute (OPEI) cost analysis of CARB SORE 2020 performance data estimates that an average landscaper using a chain saw incurs a battery and charger cost per equipment cycle of $3971.29. Considering the heavier use of chain saws by tree care-specific professionals, this number would likely be even higher for typical tree care use. Again, the truncated timelines proposed would only exacerbate these battery and charging equipment shortages and costs. The lower productivity and higher costs will be two burdens for both manufacturers and tree care businesses because of the CARB's Proposed Amendments to accelerate the timeline of ZEE use in California. (520-Docket)

TCIA does recognize and support the opportunities to study SORE equipment emissions reductions, but we believe the current CARB SORE Proposed Amendments with the truncated timelines will harm our industry by decreasing manufacturing and productivity and increasing costs. We hope that CARB will continue to engage with our industry's stakeholders to redevelop an emission reduction strategy that allows continued production and sales of gas-powered SORE equipment in California until we can resolve the anticipated challenges described in this letter. (520-Docket)

Comment: A second alternative emission reduction would be to consider a full market transition to ZEE starting in model year 2028. This alternative is similar to the small business alternative in the Proposed Rule, except that it would include portable generators. Including portable generators is

important as they are the largest emission contributor according to the SORE2020 model. Using SORE2020, a zero-emission limit for chain saws, trimmers, and leaf blowers starting in model year 2028 would result in HC+ $NO_x$ exhaust emission reductions from approximately 36.9 tpd down to 18.2 tpd by 2031 – a reduction of approximately 50%. In combination with additional reductions from ground supported products set to zero, including portable generators, as well as HC evaporative emission reductions realized from the 2017 evaporative amendments, OPEI is confident the SIP SORE goals of 4 $NO_x$ tpd and 36 ROG tpd could be realized by 2031. The Proposed Rule supports this conclusion, reporting estimated reductions of 3.5 $NO_x$ tpd and 28.7 ROG tpd[23] [Footnote 23: ISoR, pg 142] without portable generators or the reductions realized from the 2017 evaporative amendments. This strategy would also provide additional time to understand the technical feasibility of alternative technologies, including ZEE for all business sectors including professional landscapers while significantly reducing the SORE fleet size by 2035. (524-Docket)

Comment: it's easy to take a broad sweeping approach to an incredibly complicated issue that obviously has not had much research done in terms of how it will affect the cleanliness, safety and population base in major areas. I don't have a problem with getting rid of smaller two-stroke engines where there's battery technology to be as equal or better. I have an electric battery powered blower for my home. I can use an electric powered pressure washer at 1500 psi to clean the outside of my house. For my small yard I can use a battery powered lawn mower. But that technology is not available to service large areas, parks for example. (543-Docket)

Comment: **Evaluation of Regulatory Alternatives**
Given that Alternative 2 meets the 2016 State Strategy for the State Implementation Plan for Federal Ozone and PM 2.5 Standards (State SIP Strategy) as required by the federal Clean Air Act, in the interim we urge CARB to reconsider an alternative that would employ a more gradual zero-emission equipment (ZEE) adoption, which is a more technologically feasible pathway. (548-Docket)

Comment: **Subject: CA Bill AB1346 Ban of Small Engine**
There's already a California ban on small garden tractors that are capable of working dirt. While other states have versions of the small garden tractors that are for sale in homeowner stores like Home Depot that have rear equipment hitches, we can not buy them in California. This is important to me since I'm not capable of working the dirt myself and the use of one of these small garden tractors with a rear hitch would save me some backbreaking work. I've been told CARB is responsible for this ban. Now there's a move afoot, AB1346, to ban gas powered garden equipment. I live on a couple of acres and there's no way any electric tool will work. Extension cords that are hundreds of feet long make no sense and having a store room full of batteries also makes no sense. When I hire someone to do work he uses gasoline powered equipment and works eight or more hours a day. Keeping up that pace using battery powered equipment would represent a small fortune in batteries and a charger for all of them. (592-Email)

Comment: **Subject: Support for Regulations to Phase Out SORE's**
I strongly support the adoption of new regulations that will phase out the sale of highly-polluting gas-powered leaf blowers and lawn equipment in California beginning in 2024, and encourage the Board to adopt more stringent regulations to phase out all existing gas-powered blowers no later than 2026. All SORE's produce dangerous noxious emissions, but leaf blowers are particularly hazardous and are especially unnecessary. As your agency's own research has found, the use of gas-powered leaf blowers and lawn mowers in particular emits disproportionate noxious and particulate pollution that causes numerous health problems, greatly contributing to California's role as home to seven of the Top Ten most polluted cities in the nation. These machines are a likely contributor to higher rates of adverse health impacts to communities of color, who are most often the operators of gas-powered

blowers for commercial landscaping companies. CARB's public health benefit analysis determined that these new regulations, if adopted, will result in:

$8.8 billion in monetized health benefits through 2043

892 lives saved from premature deaths

438 fewer emergency room visits for asthma

311 fewer hospitalizations for respiratory and cardiovascular issues (595-Email)

Key to a just transition away from these harmful, polluting machines is funding for small businesses to transition to zero emission landscaping equipment and technical assistance for alternatives to all blowers (since electric blowers still contribute to significant particulate pollution because of the dust and pollens it blows into the air). Fortunately the California Legislature has appropriated $30 million for your agency to distribute to small proprietor landscapers and help them begin to acquire and transition to new, zero emission electric and manual equipment. In addition, air districts around the state are also operating effective buyback and subsidy programs. Funding also must be provided to educate landscapers and residents about better practices to avoid blowing altogether, as even electric blowers have significant adverse impacts because of the dust and other particulate pollution. (595-Email)

California must find better, more environmentally friendly alternatives to constant landscaping maintenance. For the health of our residents, wildlife, and soil, we need to eliminate all gas powered blowers. They have absolutely no place in our more sustainable, healthier, quieter future. Please vote to approve and amend the SORE regulations per the staff recommendation. (595-Email)

Comment: With this in mind, I respectfully request the Legislature and CARB postpone efforts to ban small engine powered equipment until cost and performance of comparable electric powered equipment meet commercial, emergency, and rural residential use needs. A delay in implementation would allow the world's supply chain to recover from the worldwide pandemic that has disrupted production of all types of equipment - including both battery and gas powered; and would allow time to develop solutions for our critical infrastructure workers who require small engine powered equipment for their services. In the meantime, I encourage CARB to work with equipment manufacturers to explore additional small engine emission reduction technologies that can be implemented in the near future. (Form Letter A-Email)

Comment: With this in mind, I respectfully request CARB postpone efforts to ban small engine powered equipment until cost and performance of comparable electric powered equipment meet commercial, emergency, and rural residential use needs. In the meantime, I encourage CARB to work with equipment manufacturers to explore additional small engine emission reduction technologies that can be implemented in the near future. (Form Letter F-Email) (Form Letter H-Email)

Comment: With this in mind, I respectfully request CARB postpone efforts to ban small engine powered equipment until cost and performance of and infrastructure for comparable electric powered equipment meet commercial, emergency, and rural residential use needs. A delay in implementation would allow the world’s supply chain to recover from the worldwide pandemic that has disrupted production of all types of equipment – including both battery and gas powered; and would allow time to develop solutions for our critical infrastructure workers who require gas powered equipment for their services. In the meantime, I encourage CARB to work with equipment manufacturers to explore additional small engine emission reduction technologies that can be implemented in the near future. (Form Letter G-Email)

Comment: My name is Casey Bliss and I am the third generation owner of Bliss Power Lawn Equipment in Sacramento, California. As a company, we applaud the Board for its efforts in reduction of carbon emissions. As a retailer, we support the movement to ZEE. However, we support it with comment and concern. We are actively selling ZEE product in our store and we are seeing significant growth in the homeowner category with overall happy customers. It is our opinion that our industry is not ready at all for the large landowners, landscapers, municipalities, and first responders. We also are very concerned that end users, as stated many times earlier today, will just go to bordering states to buy their products. And we've been a retailer all through the CARB program and it has been demonstrated time and time again of products coming into our store for service warranty that have been purchased outside the state that don't meet our California emission standards.
(3052-Oral Testimony)

**Agency Response:**

Some of these comments suggest CARB consider an alternative to the current rulemaking that would allow more time for all SORE equipment to comply with emission standards of zero, while others request more time for specific uses, such as commercial, remote, rural residential, and/or emergency uses. These comments are substantively similar to many of the comments in section IV.A.2.4.2 that requested more compliance time for SORE equipment used by landscapers and other professionals (commercial SORE equipment), comments in section IV.A.2.3.5 that requested more compliance time for portable generators, and comments in section IV.A.2.5.3 that requested exemptions for other types of SORE equipment needed in rural communities (e.g., chainsaws, pumps, and air compressors). The rationale for why delaying the compliance date for some or all SORE equipment is not a viable alternative for the rulemaking is also the same as the rationales described in sections IV.A.2.4.2, IV.A.2.3.5, and IV.A.2.5.3. CARB made no changes based on these comments. Please refer to the Agency Responses in sections IV.A.2.4.2, IV.A.2.3.5, and IV.A.2.5.3 for discussion of the rationale. Please also refer to ISOR section I.E. and Agency Responses in sections IV.A.35.1 and IV.A.35.2 for additional discussion of the current technological feasibility of ZEE for other equipment types and why more time is not needed for them to comply with emission standards of zero. In addition, please see the Agency Responses in other sections that discuss the technological concerns expressed in the above comments as well as concerns expressed elsewhere in their submissions, including but not limited to: higher upfront costs of ZEE (section IV.A.12); costs for infrastructure to charge ZEE (section IV.A. 6.1); ZEE battery charge capacity (section IV.A. 2.2.1); ZEE battery lifespans (section IV.A. 35.1); ZEE performance/power (sections IV.A.35.1 and IV.A.35.2); lithium mining and battery disposal (section IV.A.6.2); costs for extra batteries and issues associated with transporting extra batteries during a work day (sections IV.A.12 and IV.A.6.2); California's electrical grid and PSPS (sections IV.A.6.3, IV.A.6.4 and IV.A.27); and business hardship (IV.A.13.1.1 and IV.A.13.1.2). Please refer to the Agency Response in section IV.A.1.2 for discussion of $30 million in incentive funding included in the FY21-22 California state budget that will be available to help reduce the upfront costs of ZEE for professional landscaping services in California operated by small businesses or sole proprietors, and ISOR section I.F for additional discussion of sources of incentive funding.

The following response provides clarification and context for several points within the above comments.

In response to the comment, "a two-year timeline is simply too expensive and fast a transition for residential home owners such as myself to replace all of our equipment," and similar comments, the Proposed Amendments do not require anyone to stop using equipment they

already own. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce; residents and professionals can continue to use and repair their current SORE equipment until the end of its life.

In response to comments about supply chain issues because of the COVID-19 pandemic, ISOR section VII.B.1 explains that the economic modeling was adjusted to reflect the impacts of COVID-19. Please refer to the Agency Response in section IV.A.28.2 for additional discussion of supply chain concerns.

In response to comments about the construction market and infrastructure workers, much of the SORE equipment used for construction activities are not subject to California SORE regulations. The federal Clean Air Act, section 209(e)(1) preempts certain SORE from CARB regulation of emission standards, which are new engines used in construction equipment or vehicles or used in farm equipment or vehicles and which are smaller than 175 horsepower. Approximately 11 percent of small off-road equipment in California are construction equipment or vehicles or farm equipment or vehicles which use new engines smaller than 175 horsepower (ISOR, page 5).

In response to comments about SORE equipment used for remote and emergency activities: CARB does not anticipate that the availability of chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters powered by engines with displacement 40 cc and above for remote work, fuel mitigation, and firefighting applications will be adversely affected by this rulemaking. In addition to the preemption of large chainsaws and brush cutters primarily used in firefighting and fire prevention efforts as discussed in the aforementioned sections, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision. For further discussion of concerns related to preempt equipment and availability of SORE equipment for fire prevention and other purposes, please refer to the Agency Responses in sections IV.A.2.5.1, IV.A.2.5.6, and IV.A.29.1.

In response to the TCIA comment:

> "TCIA member companies would be significantly impacted by these regulations as they pertain to chainsaws with displacement of less than 45cc, which our members often use for in-tree operations. TCIA is specifically concerned that, if the proposal shifts tree care equipment manufacturers and businesses away from gas-powered equipment like the in-tree chainsaws in the proposed truncated timeframe, manufacturers will not be able to develop new zero-emission equipment (ZEE) in an efficient, cost-effective manner, which will translate to higher costs for tree care businesses who rely on such products. …"

CARB disagrees with TCIA's claims that manufacturers will not be able to develop zero-emission chainsaws comparable to those powered by engines with displacement less than 45 cc for in-tree operations. Chainsaws used for in-tree operations, often referred to as "top handle chainsaws," are already often battery-powered. There are several ZEE top handle

chainsaws already on the market from popular brands [Stihl, 2022[29]; Husqvarna, 2022[30]; Home Depot, 2022[31]]. The commenter does not provide evidence that suitable ZEE chainsaws for in-tree operations do not already exist. The Proposed Amendments do not require anyone to stop using CARB-certified SORE chainsaws, nor do they prohibit the sale of CARB-certified SORE chainsaws.

Please see the Agency Response in section IV.A.2.6.2 for discussion of TCIA's comment about opportunities to generate emission reduction credits and related comments from other stakeholders. As discussed further in that section and in section II.A.2.c. of this FSOR, CARB made modifications to §§ 2753(c), 2754(a), and 2755 that would allow manufacturers to earn more evaporative emission credits than could occur under the Proposed Amendments described in the ISOR. This modification was included in the March 2022 15-Day Notice released for public review on March 30, 2022.

In response to the statement, "There's already a California ban on small garden tractors that are capable of working dirt," and similar statements: The commenters do not provide evidence to support their claims. The SORE regulations do not prohibit the use or sale of small garden tractors that are capable of working dirt.

In response to the comment, "If manufacturers are provided additional time to transition, however, they will be better positioned to meet demand, build efficiencies into production, and keep costs down," the commenter does not provide additional information to support its statement. As described on pages 5 and 29 of the ISOR, the most recent SORE exhaust emission standards were implemented between MYs 2000 and 2008. The evaporative emission standards were implemented between MYs 2006 and 2013. Since that time, manufacturers have developed many engine and evaporative families with emissions far below the emission standards without requirements to do so. Manufacturers have earned emission reduction credits by certifying engines to limits below the emission standards. Manufacturers may be able to develop lower-emitting engines if given more time, but such a delay would reduce the emission reduction benefits of this rulemaking by delaying the start of benefits. A delay would also jeopardize attainment of NAAQS. Please refer to the Agency Responses in sections IV.A.35 and IV.A.2.6.2. for additional discussion of the current technological feasibility of ZEE, why more time is not needed for them to comply with emission standards of zero, and the necessity of achieving maximum emission reductions at the earliest practicable date. Please refer to the Agency Response in section IV.A.13.1.1 for additional discussion of loss of businesses or jobs.

In response to TCIA's comments, "the ongoing costs of operating ZEE equipment, including the costs of batteries and chargers needed for a full day of work, which can easily surpass the

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[29] Stihl. 2022. MSA 161 T Top Handle Battery Chainsaw. Available at: https://www.stihlusa.com/products/chain-saws/battery-saws/msa161t/. Last accessed April 22, 2022.

[30] Husqvarna. 2022. Best Top Handle Chainsaw for Arborist and Tree Care Pros. Available at: https://www.husqvarna.com/us/chainsaws/top-handle-chainsaws/?web_powersource_sm=Battery. Last accessed April 22, 2022.

[31] Home Depot. 2022. Search Results for top handle chainsaw at The Home Depot. Available at: https://www.homedepot.com/b/Battery/N-5yc1vZ1z0ylm1/Ntk-google/Ntt-top%2Bhandle%2Bchainsaw?NCNI-5&sortby=bestmatch&sortorder=none. Last accessed April 22, 2022.

cost of gas needed for gas-powered equipment," CARB's economic analysis recognizes the higher upfront costs for zero-emission chainsaws and other ZEE compared to SORE equipment (e.g., Table C-23 in ISOR Appendix I). CARB's economic analysis also identifies the savings that can occur from reduced costs for fuel and maintenance and other benefits. For some SORE equipment types such as chainsaws, professional users who purchase ZEE instead of SORE equipment could experience cost-savings within the typical lifetime of the equipment. The commenter does not provide evidence that swapping batteries will take more time or be more frequent than filling fuel tanks with gasoline or mixing gasoline and oil and filling fuel tanks with the mixture of gasoline and oil. The commenter does not demonstrate that the use of ZEE will result in reduced productivity or efficiency. The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[32]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. CARB does not have information to support the commenters' conclusions. Please refer to the Agency Responses in section IV.A.35 for additional discussion of comments related to the cost of ZEE.

Please refer to the Agency Response in section IV.A.14.1 for discussion of out-of-state sales of SORE equipment for use or operation in California.

### A.2.4.4. Delay compliance date for high energy, long run time specialty equipment

Comment: **Summary:** Our business is a family-owned sheet metal fabrication company in Upland, California. We have been in business over 20 years and employ more than 60 highly skilled craftspeople who build a variety of products used by other companies throughout North America in the products that they manufacture. For a large group of these customers we manufacture custom-built fuel and evaporative emission control systems that they incorporate into the purposeful SORE powered agricultural, construction, recreational and commercial equipment that they manufacture. The December 9th, 2021, board agenda item to "Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero-Emission" as presented by CARB staff is overly general and does NOT accurately characterize all the SORE equipment that falls under the SORE regulations (see **Background** below for more explanation). If these amendments are approved as proposed the direct impact to our company would be a minimum 30% loss in revenue and the elimination of at least 20 manufacturing jobs. Our customers will also experience similar losses in revenue and jobs related to the effective ban that the proposed amendments will cause for the SORE powered equipment they manufacture. (558-Docket)

**Request:** Considering this we request that the amendments to the SORE regulations be changed so that certain SORE equipment, that does not have either an existing zero-emission replacement or does not have replacement technology that could be feasibly and cost effectively developed, can be sold in California while its replacement zero-emission technology is developed. (558-Docket )

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[32] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

**Background:** Our company, ECI Fuel Systems, manufactures fuel and evaporative emission systems for customers that build specialty equipment representing less than 1% of California's SORE inventory. This equipment is significantly different in many ways from the consumer- oriented equipment that accounts for the other 99% of the SORE population. Our customers incorporate our fuel systems into a variety of specialized equipment like:

- Large fans and blowers used in agriculture,
- Permanently fixed mounted backup generators often found on recreational vehicles,
- Industrial high-pressure washers and sewer cleaners,
- Commercial carpet cleaners, etc.

Compared to consumer oriented SORE equipment the major differences of these specialty devices are that they are:

- more often used in remote locations without access to grid electrical power,
- expected to operate for multiple weeks between refueling,
- used with larger engines and fuel tanks (30-40 gallons),
- refueled much less frequently due to their larger fuel tanks
- refueled at commercial gas stations rather than from portable fuel containers
- NOT portable (558-Docket )

For certain SORE equipment, the concept of a "transition to zero-emissions" might be realistic. For example, some devices may already have equivalent, existing, zero-emission equipment (ZEE) capable of replacing them. For other devices where ZEE replacements may not yet be available it might be conceivable that replacement ZEE could be developed for them in the timeframe proposed by the amendments. However, considering the specialty equipment that we and our customers manufacture, the proposed amendments are completely ignorant of the small but important group of SORE powered equipment that has no existing equivalent ZEE to replace it and has no feasible or cost-effective replacement technology on the foreseeable horizon. (558-Docket )

Without provisions in the proposed amendments to allow any transition of these devices to zero emissions, they will simply be banned and the work that this equipment does at best will be much harder to do and at worst go undone. Additionally, because of the small amount of these pieces of equipment being manufactured the R&D of replacement technology (smaller, lighter, more energy dense batteries, fuel cells, ???) will have to wait for development by other larger industries (probably automotive) and then adapted to these specialty pieces of equipment. Collective hard work is how emissions from SORE (small off-road engines) have been reduced to the point that SORE powered equipment is now 80% cleaner than it was before these efforts began. This effort involved industry continually migrating solutions usually developed for other internal combustion engine categories (ie: automobiles) to SORE equipment allowing them to meet the ever-increasing emissions standards being established. Rather than banning certain SORE equipment this history should be continued as there are still additional reductions in emissions from these specialty SORE devices that can be regulated while its replacement technology is developed. (558-Docket )

Comment: My name is Greg Mitchell from ECI Fuel Systems. Our 60-employee metal fabrication company has been in Southern California for over 30 years. One group of our customers -- for one group of our customers, we manufacture fuel and evaporative emission control systems for the equipment that they manufacture. After actively participating for over two years with CARB staff and their process, it has become evident that they could not distinguish this equipment from all other small off-road engines. Because of this, I'm asking you to direct CARB staff to expand its proposed

regulations, so that certain high energy, long run time specialty equipment can continue to be powered by internal combustion engines until at least the year 2035 consistent with the Executive Order 79-20. (3015-Oral Testimony)

I echo the same challenges as the pressure washer industry, and the boats, and the recreational vehicles. In each of these situations, a specialized machine powered by a separate small gasoline engine is permanently mounted to a vehicle or trailer. These machines supply large amounts of energy over extended periods of time away from the electrical grid and they currently do not have or in the foreseeable future will have zero-emission replacements. (3015-Oral Testimony)

The proposed SORE regulations will simply ban the sale of this equipment in California. Being ignored in the CARB staff proposal will cause the majority of these machines to be manufactured and sold in other states. They will then be imported along with less regulated emissions that they create back to California. According to CARB staff, their emission reduction program has never been used by SORE manufacturers. This program is not expected to benefit this equipment's transition to zero emissions, because it doesn't incentivize technology or attract innovation for this small fragmented group of machines. Approving the proposed regulations today will not affect emissions from this equipment. It simply bans their sale along with the business and jobs that they create. (3015-Oral Testimony)

**Agency Response:**

These comments describe ECI Fuel Systems' manufacturing operations and concerns regarding the Proposed Amendments. The commenter states that the regulatory proposal is "overly general and does NOT accurately characterize all the SORE equipment that falls under the SORE regulations," and requests a delay in implementation of emission standards of zero for certain equipment types. CARB disagrees with the statement that the Proposed Amendments are overly general and do not account for the equipment the commenter describes. ECI Fuel Systems' evaporative families consist exclusively of generators. Some of those generators are used to power specific pieces of equipment, such as those the commenter describes, while others are used in RVs or more general applications. The Proposed Amendments allow more time for generators to meet emission standards of zero to allow the zero-emission generator market to develop further, as discussed in ISOR section I.E.3.b.

In response to the statement, "According to CARB staff, their emission reduction program has never been used by SORE manufacturers. This program is not expected to benefit this equipment's transition to zero emissions, because it doesn't incentivize technology or attract innovation for this small fragmented group of machines.": Manufacturers, including ECI Fuel Systems, have participated in SORE emission reduction credit programs. As discussed on page 39 of the ISOR, the proposed zero-emission generator credit program would allow manufacturers to offset emissions from SORE generators with emission levels above the proposed emission standards by using credits earned from certifying zero-emission generators.

Note that the ABT emission reduction credit program allows manufacturers to purchase credits from others who may not require them. Consequently, even specialty equipment that is not preempt from California's SORE regulations could continue to be sold in California with credit usage.

Please refer to the Agency Responses in sections IV.A.2.3 and IV.A.2.3.2 for additional discussion of all portable generators and RV generators, respectively. Please refer to the Agency Response in section IV.A.13.1.1 for discussion of comments about potential loss of businesses or jobs. Please refer to the Agency Responses in sections IV.A.14.1 and IV.A.15 for discussion of out-of-state sales of SORE equipment ("leakage").

### A.2.4.5. Include a fleet averaging provision

Comment: Will there be total horsepower fleet levels similar to the off highway diesel & stages to become compliant? (104-Docket)

Comment: The American Rental Association (ARA) represents 354 member companies operating 900 locations in California. ARA members rent equipment to businesses as well as consumers. A significant proportion of equipment covered by the proposed SORE rule is rented to commercial entities engaged in activities that include, but are not limited to, landscaping and yard care, tree services, clearing rights-of-way, construction site preparation and maintaining industrial sites. Many ARA-member companies are small independent businesses that buy, maintain, and rent SORE equipment in locations throughout the state. Many already have battery-powered electric equipment in their inventory. ARB is proposing to require all SORE units, with the exception of generators, sold in California in model year (MY) 2024 and beyond be zero emission units. As with other ARB regulations aimed at reducing air pollution in California, the equipment and event rental industry has been leading the way by adopting clean engine technologies. ARA worked with ARB staff to develop the non-road diesel regulation that has driven the adoption of Tier IV diesel technology in the California diesel fleet. While developing that rule, ARA proposed a fleet averaging provision that allowed fleet owners to more efficiently manage their total fleet emissions and transition their fleets to become almost entirely Tier IV today. ARA's work of the non-road diesel fleet rule is an example of how the equipment and event rental industry has worked with the ARB to meet California's air quality goals. (513-Docket)

Comment: We would additionally suggest that ARB consider provisions like fleet averaging that was part of the non-road diesel rule as a viable transition mechanism to SORE adoption. (513-Docket)

**Agency Response:**

These comments suggest that CARB include a fleet averaging provision in the Proposed Amendments. The commenter's suggestion is beyond the scope of the Proposed Amendments. A fleet averaging provision would require fleet owners to ramp up over multiple years the annual percentage of SORE equipment required to comply with certain requirements. CARB made no changes based on this comment because the current SORE regulations and Proposed Amendments do not require fleet owners to meet requirements and already include provisions that enable greater flexibility for manufacturers while reaching lower emission levels and maintaining enforceability. The following response describes these provisions to provide context for why CARB did not instead include a fleet averaging provision for fleet owners.

As described in ISOR section II.A.2.b, the current exhaust emission regulations include an emission reduction credit averaging, banking, and trading (ABT) program, where manufacturers can generate credits with engines that emit below the emission standards and use them to produce engines that emit above the emission standards. This averaging of emissions gives manufacturers the flexibility to certify those higher-emitting engines. Exhaust

emission reduction credits may be banked for up to five years, to be used later, or may be traded with other manufacturers. The existing evaporative emission reduction credit program only includes averaging and banking. The Proposed Amendments add trading to the evaporative credit program and add new zero-emission generator credit programs, which would allow manufacturers to earn emission reduction credits for zero-emission generators.

The expanded ABT emission reduction credit program allows for maximum flexibility for individual manufacturers. With ABT, manufacturers can decide if they wish to make more lower-emitting gasoline generators, or fewer high-emitting ones. The trading provision allows manufacturers to purchase credits from others who may not require them. Participation in the emission reduction credit program can be precisely tracked. If CARB were to adopt in-use requirements for fleet owners, it would be difficult to verify whether they were truly complying with fleet requirements because, unlike motor vehicles which must be registered by the owner, there are no public records of SORE fleet composition; under fleet averaging provisions, CARB would need to rely on fleet owners' reports of their fleet composition. For these reasons, CARB made no changes based on this comment.

Regarding the commenter's statement, "ARB is proposing to require all SORE units, with the exception of generators, sold in California in model year (MY) 2024 and beyond be zero emission units": as described in sections II.A.1.e and II.A.2.d of this FSOR, in response to 45-day and hearing stakeholder comments and information described in the ISOR about technological feasibility specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers used by professional cleaning services to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for pressure washers using engines with displacement of 225 cubic centimeters (cc) or larger that are the same as those proposed for generators and setting emission standards of zero for MY 2028 and later for these pressure washers. Please refer to section II.A.1. and II.A.2. and the Agency Response in section IV.A.2.4.1. for additional discussion about these modifications. Engines used in other equipment types would be required to meet emission standards of zero. Emission reduction credits may be used to offset emissions from SORE, as necessary, to meet emission standards of zero.

### *A.2.5. Requests for exemptions for specific uses, equipment types, and/or regions*

#### A.2.5.1. Exempt large chainsaws

Comment: California Forestry Association will address separately each specific piece of equipment that we believe should be exempted from the Rule for the purposes of the conduct of Timber Operations (Ref. Public Resources Code (PRC) § 4527) and other fuel hazard reduction projects within the Timberlands (Ref. PRC § 4526):

**Large Chainsaws greater than 2 horsepower** (about 2.44 cubic inch engines) - Forest management, including fuel hazard reduction projects for the purposes of wildfire prevention, require large chainsaws for felling trees as well as lopping and scattering of "slash" (Ref. PRC § 4525.7) or other non-merchantable material created during Timber Operations. While, "Arborist" battery-operated chainsaws, generally less than 2 horsepower with 14" or shorter bars, may be effective alternatives to gas-powered small chainsaws, these tools are not effective in cases where Timber Operations are being conducted. Not only does it become a matter of practicality, this requested exemption also addresses issues of worker safety. (121-Docket)

Comment: A carve-out for these contractors must be given to continue operations of gas-powered equipment. ARB can achieve its goal by limiting homeowners of gas-powered equipment. (477-Docket)

Comment: I have worked directly and indirectly in forestry operations for the past forty-eight years. I worked in Utah, Idaho, Wyoming, Colorado, Arizona, Oregon, Washington State and California. Following graduate school, I worked as a timber faller for 21 years. I wish to relay my hand's-on experience as it relates to your proposed small engine regulations. I commend your Board for seeking alternative, less polluting technology whenever such technology becomes available to the public. Unfortunately, when it comes to professional grade chainsaws, such technology does not exist. This is not to say technology will not get there, but it clearly is not available now. (517-Docket)

Comment: A review of currently available battery powered chainsaws shows an average maximum bar length of 18 inches and a maximum RPM of approximately 3,000. It would be impossible to fell average size trees with a saw that small and those saws would even be inadequate for legally required lopping following timber harvest operations. (517-Docket)

Comment: I have a number of neighbors who own, or are employed by commercial yard and lawn service companies. Some of them use newer electronic tools powered by backpack batteries. The tools are connected to the backpack by electric lines. This would never work in a forested environment and should never be considered for any chainsaw application, even residential. A chainsaw operator must be able to drop the saw immediately and move quickly out of danger. If the connected backpack power cords were to hang up in brush or prevent the operator from safely dropping the saw, this could result in injury or death. A separate battery attached to the chainsaw would be required rather than electrical cord to a backpack. Individual batteries will likely weigh more than 10 lbs, making the saw and battery pack too heavy to safely pack through the woods and use. In addition, individual batteries will likely last less than one hour, hence, 8 or more additional batteries would have to be packed daily in the woods to the work site then back out and recharged at night. (517-Docket)

In providing these comments I am not suggesting that CARB should not investigate cleaner, more efficient equipment. However, efficacy and especially the safety of workers should not be compromised in the process. If your Board and staff are going to consider chainsaw requirements as they relate to professional timber falling, you should first confirm that adequate equipment already exists and is publicly available at reasonable prices. It should also have such equipment field tested prior to finalizing any regulatory requirements. At a minimum, professional battery powered chainsaws should be capable of efficiently operating with a 50 inch bar, have their reliability confirmed by their manufacturers and the total weight of saws and batteries should not exceed the weight of comparable gasoline powered chainsaw equipment by more than 5%. If these standards are not attainable, then current gasoline equipment should be exempted from any regulation until electric technology catches up. (517-Docket)

**Agency Response:**

These comments request a change to the Proposed Amendments, specifically an exemption for certain equipment types and applications. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

These comments request that an exemption to the proposed emission standards be created for large chainsaws for use in timber harvesting and fire prevention operations. The

commenter cites a particular need for chainsaws with engine displacement above 2.44 cubic inches, which is equal to approximately 40 cc. As described in detail in IV.A.2.5.2, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law.

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of equipment used primarily for harvesting wood or management of land in an agricultural or agroforestry context, such as chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters and clearing saws powered by engines with displacement 40 cc and above, will be considered preempt and therefore will not be affected by this rulemaking. As noted on pages 12 and 16 of the ISOR, chainsaws powered by engines with displacement 45 cc and above have generally been found to be preempt. With regards to fire safety applications specifically, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision. As the availability of equipment to address the described need is not anticipated to be affected by the Proposed Amendments, no exemption is necessary for this need to be met.

The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[33]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer.

### A.2.5.2. Exempt multiple preempt equipment types

Comment: The following comments are from the California Forestry Association. California Forestry Association is a trade association whose membership includes California sawmills, veneer mills, several biomass powerplants, private industrial and forest landowners. (121-Docket)

**Exemptions for Consideration for Inclusion in the Proposed Regulatory Amendments dated October 15, 2021:**

The Proposed Rule only provides for the following exemptions:

> "Military tactical vehicles and equipment and military off-road tactical vehicles and equipment, all small off-road engines less than 25 horsepower that are not used to propel a licensed on-road motor vehicle, an off-road motorcycle, an all-terrain vehicle, a marine vessel, a snowmobile, a model airplane, a model car, or a model boat must comply with this proposed Rule (Sec. 2401(44))." (121-Docket)

California Forestry Association believes there are specific pieces of equipment that must be exempted from the Proposed Rule. Those specific pieces of equipment include large chainsaws,

[33] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

water pumps required during the conduct of forest management activities for the purpose of wildfire preparedness, portable pumps relied upon for drafting water to fill water trucks, off-road forestry equipment with water tank and pump for wildfire preparedness, and portable air compressors to service forestry equipment. (121-Docket)

Comment: Associated California Loggers is the trade association representing logging companies, log trucking companies, and log road building companies in California. Our members are at the forefront of fuels reduction, thinning, and biomass collection at a time when California has faced its two worst wildfire seasons in history. This particular period of crisis in California history - with its terrible mix of loss of human life, wildfire carbon emissions, loss of animal life and species habitat, and the destruction of hundreds of homes and millions of acres of timberland - strikes as exactly the wrong time to be targeting chainsaws, water pumps and other "tools of the trade of wildfire prevention and suppression." (466-Docket)

Comment: Moreover, we believe that the rule as proposed simply isn't workable, and that exemptions for specific pieces of equipment must be exempted from the Proposed Rule. Those specific pieces of equipment include large chainsaws, water pumps required during the conduct of forest management activities for the purpose of wildfire preparedness, portable pumps relied upon for drafting water to fill water trucks, off-road forestry equipment with water tank and pump for wildfire preparedness, and portable air compressors to service forestry equipment. (466-Docket)

Associated California Loggers believes that our comments should be considered with an eye towards worker safety and wildfire preparedness. We have been working with the Governor's office on "workforce development" of a young and diverse workforce and we believe that it would be counterproductive for this important work to be rendered impossible to perform due to unrealistic "electric" engine requirements for wildfire work in the woods. (466-Docket)

Comment: Western United Dairies (WUD) appreciates the opportunity to provide comments regarding the Small Off-Road Engine (SORE) Regulation. WUD is the largest dairy farmer trade association in California, with members located throughout the state from Del Norte County to Southern California. Our members operate farms in remote parts of the State where, in some cases, electric power is limited to a small portion of the property. Our members, especially those on the northern coast of California operating small organic dairies, have expressed concern about how this regulation might affect their ability to farm and provide high quality dairy products to Californians who need these nutritious products. SORE are used for many reasons on our member farms and it is important to continue to be able to access new SORE engines and equipment where Zero Emissions Equipment (ZEE) is not feasible or available to provide the work and duty cycles demanded by our member farms. SORE provide vital power to water pumps to protect property from flooding and provide water quality protection, air compressors and welders to service equipment in the field and many other vital roles on our farms. (512-Docket)

We recognize that ARB acknowledges the Federal Preemption on emission controls from SORE in construction and farms in the regulation: Under section 209, subsection (e)(1) of the federal Clean Air Act, “New engines which are used in construction equipment or vehicles or used in farm equipment or vehicles and which are smaller than 175 horsepower” are preempt from CARB’s emission standards and only subject to emission standards from the U.S. Environmental Protection Agency (U.S. EPA). (512-Docket)

However, our interest is in how this regulation and the Federal preemption get implemented such that retailers selling SORE equipment to farms have a straightforward means of accessing, stocking,

and distributing this equipment for farmers in California after the regulation goes into effect. Likewise, it is important that farmers be able purchase SORE that is preempted from this regulation in a timely manner. That process should be straightforward and uncomplicated. It is important that ARB consider this before regulations are adopted that may impede access to SORE that is preempted from this regulation by federal Clean Air Act. If farmers are inhibited from accessing SORE equipment because of impediments created by this regulation, then ARB is not following the intent of the Federal preemption. (512-Docket)

WUD offers to work with ARB to develop a mechanism to ensure that the intent of the Federal preemption is being followed while providing farms reasonable access to SORE. We look forward to working with you as you craft regulations to protect air quality in California, while ensuring that farms that provide open space and healthy, nutritious local products continue to have access to the equipment they need to continue to be sustainable into the future. (512-Docket)

Comment: **Exemptions Are Not Adequate**
As noted by the Initial Statement of Reasons (ISOR),[6] the federal Clean Air Act preempts chainsaws with displacement 45 cc and above, pumps with displacement 40 cc and above, as well as cutoff saws. While certain emergency responders (police and firefighters) are allowed to submit a request to the Executive Officer for approval to procure equipment by non-California certified engines—only if they are unavailable otherwise—this type of equipment is used by a broader range of operators than first responders. County Agricultural Commissioners[7] and County Departments of Public Works for example, can undertake forest health projects along with other community-based organizations or fire safe community alliances that can help prevent high severity wildfire conditions should a disaster ignite. As a foundational issue, the state of California has more to gain in air quality benefits from the transition away from expertly extinguishing fires to preventing high severity wildfire conditions from accumulating through fuels treatment and thinning of small diameter trees. Furthermore, the fact that CARB has not received any request from an emergency response entity to use equipment powered by a non-California certified engine should indicate a flaw in the current design of the exemption itself.[8] [Footnote 6: Initial Statement of Reasons (ISOR), page 12.] [Footnote 7: Placer County, for example, has multi-disciplinary strategies to preserve natural resources and achieve forest health goals under the direction of the County Agricultural Commissioner. https://www.placer.ca.gov/7293/New-forest-coordinator-position] [Footnote 8: ISOR, page 12] (548-Docket)

CARB must exempt chainsaws and other equipment—such as portable water pumps and air compressors—used to conduct fuel hazard reduction projects and to conduct timber operations pursuant to the Public Resources Code.[9] [Footnote 9: See Public Resources Code Section 4526 and 4527, respectively.] (548-Docket)

Comment: According to the final Environmental Analysis, taken together, "there could be potentially significant and unavoidable adverse impacts to aesthetics, agriculture and forest resources, short-term air quality, biological resources, cultural resources, geology and soils, short-term hazards and hazardous materials, hydrology and water quality, noise, transportation/traffic, and utilities and service systems."[13] [Footnote 13: ISOR, page 85.] RCRC would note that many of these "unavoidable adverse impacts" will be concentrated in rural settings. For these reasons, we respectfully urge CARB to consider the unique circumstances of rural communities and create a tailored solution that would not preclude the use of traditional, spark-ignition SORE in a rural application or setting. As currently proposed, the Proposed Amendments would infringe on the progress of a suite of wildfire preparedness activities and put rural residents in a practical, logistical, and financially precarious situation in comparison to their urban neighbors. As a whole, sustainable timber harvest not only

reduces wildfire risk, it also helps rural economies, reduces emissions associated with importing lumber, limits forestland conversion to development, enables carbon sequestration thereby improving air quality, as well as improves water quality and conserves biodiversity.[14] [Footnote 14: California's Wildfire and Forest Resilience Action Plan, page 15.] (548-Docket)

Comment: **Subject: SORE Questions**
I represent Western United Dairies, the largest dairy producer trade association in California. Our members are located throughout the State from the Oregon border to Southern California. I have some questions on the proposed SORE regulations that are currently in development by CARB. Our members have recently expressed concern about these regulations as they rely on small engines for pumps, welders, air compressors, and a variety of other uses. In looking at your website it appears that there is a Federal preemption from regulating new engines used in agriculture. I am wondering how this preemption is being factored into the regulations and what availability of preempt engines might look like for farms under the regulation. I have signed up for the email list for this regulation and look forward to working with you to ensure that our farms can continue to have the equipment they need run their farms, and in many cases protect their property, water quality and the many other uses they have for small engines that are not feasible for ZEE. (574-Email)

**Agency Response:**

These comments request a change to the Proposed Amendments, specifically an exemption for certain equipment types and applications. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

These comments request that an exemption to the proposed emission standards be created for several SORE equipment types, including chainsaws, water pumps both standalone and integrated with off-road vehicles, welders, and air compressors, needed for forest management and fire preparedness applications. Other commenters express a need for several types of equipment for agricultural applications, and express concern regarding the continued availability of suitable equipment under the Proposed Amendments. As described in detail in sections IV.A.2.5.1 and IV.A.29, CARB does not anticipate that the availability of the equipment of concern for the applications described will be affected by this rulemaking. As such, no additional exemption is needed.

One commenter further asserts that the very fact that CARB has not received any requests to purchase non-California certified engines from emergency response agencies indicates that the provision allowing them to do so, when equivalent equipment with a California-certified engine is not available, is flawed. The commenter does not provide supporting evidence for this assertion, and does not elaborate on it. CARB disagrees that this interpretation of the facts is more plausible than CARB's interpretation that the needs of emergency responders are adequately satisfied by a combination of California-certified SORE equipment and preempt equipment.

In response to the statement, "RCRC would note that many of these "unavoidable adverse impacts" will be concentrated in rural settings": The commenter states its opinion regarding the location of unavoidable adverse impacts of the Proposed Amendments. CARB does not have information to support the commenter's statement, and the commenter does not provide evidence to support the statement. Impacts may occur throughout California. Please refer to the Agency Response in section IV.A.15 for additional discussion of the environmental analysis for the Proposed Amendments.

In response to the statement, "We recognize that ARB acknowledges the Federal Preemption…We look forward to working with you as you craft regulations to protect air quality in California, while ensuring that farms that provide open space and healthy, nutritious local products continue to have access to the equipment they need to continue to be sustainable into the future,": The comments express the commenter's awareness, and note CARB's acknowledgement, of the federal preemption of new engines used in farm and construction equipment and vehicles under 175 horsepower, as described in detail in section IV.A.29.1.1. The commenter provides no evidence to support its statement that farmers may not be able to obtain the preempt equipment they need. Equipment purchasers do not need permission or approval from CARB to purchase preempt equipment or CARB-certified SORE equipment. Equipment sellers do not need permission or approval from CARB to access, stock, distribute, or sell preempt equipment. The Proposed Amendments do not affect retailers' ability to sell preempt equipment.

### A.2.5.3. Exempt rural areas and/or attainment areas

Comment: This bill will hurt all of rural California, be it farms, ranches, logging, construction and home owners. (28-Docket)

Comment: On behalf of the Rural County Representatives of California (RCRC), I write to raise several concerns with the Proposed Amendments to the Small Off-Road Engine (SORE) Regulations, Transition to Zero Emissions. RCRC is an association of thirty-seven rural California counties, and our Board of Directors is comprised of one elected county supervisor from each member county. RCRC member counties have unique landscapes and our communities and workforce needs differ greatly from those found in many urban and suburban areas where the discussion of gas-powered SORE, primarily leaf-blowers, is reduced to an abatable nuisance. RCRC member counties historically are considered among the more compliant areas in the state for meeting air quality standards. While we do not dispute the significant smog-forming emissions produced by small, spark-ignition engines, it is very unfortunate that unreliable electricity in rural areas would greatly complicate the use of zero-emission SORE equipment in rural counties. (548-Docket)

Comment: RCRC strongly believes the California Air Resources Board (CARB) must create a pathway for the use of spark-ignition SORE in rural communities, especially in High or Very High Fire Hazard Severity Zones and State Responsibility Areas.[1] While the Governor's September 2020 Executive Order (EO) N-79-20 is cited as one of the driving factors in this rulemaking,[2] the EO's goal to transition off-road vehicles and equipment to zero-emission by 2035 includes an important caveat of where feasible (and cost-effective). At the least, an exemption should be implemented in places that meet air quality attainment status so important vegetation management work with chainsaws and other small, portable equipment can continue into the future without disrupting the pace and scale of work needed to sustain healthy forests. [Footnote 1: Office of the State Fire Marshall, Fire Hazard Severity Zones https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/wildfire-prevention-engineering/fire-hazard-severity-zones/#:~:text=What%20is%20%E2%80%9CState%20Responsibility%20Area,for%20fire%20prevention%20and%20suppression.] [Footnote 2: The SORE Pre-Rulemaking Schedule began with its first workshop in September 2019, one year prior to the Governors EO N-79-20.] (548-Docket)

Comment: The Proposed Amendments Do Not Account for Rural Challenges
RCRC member counties contain the majority of California's forested lands, including more than 70 percent of the state's national forest system lands. These areas are more prone to wildfires due to

a combination of inadequate vegetation management practices on public lands to maintain the resiliency and health of California's forested and heavily vegetated lands, exacerbated by climate change. In the wake of the devastating fires of 2017 and 2018, including the Thomas Fire, the Tubbs Fire, and the Camp Fire, electric investor-owned utilities (IOUs) have begun using Public Safety Power Shut-off (PSPS) events as a means of preventing wild fire ignitions, which can last several days. Furthermore, the installation and calibration of new fast-trip mechanisms instantly stop the flow of electricity when an object comes in contact with a power line; in some instances, light rain or small wildlife have triggered unplanned power outages which require time-consuming inspections prior to re-energization. (548-Docket)

We disagree with the generalization that PSPS events are becoming shorter in duration and less frequent.[3] [Footnote 3: ISOR, page 26. Moreover, we would also note that microgrids have been underutilized as a greater resiliency tool] In a May 20, 2021 letter to the California Public Utilities Commission, Pacific Gas & Electric Company (PG&E) detailed the threefold increase of de-energization events in rural counties as a result of broadened decision-making criteria based on the risk of trees or limbs that could fall on distribution lines in high-fire threat communities.[4] [Footnote 4: https://www.rcrcnet.org/sites/default/files/useruploads/Documents/Barbed_Wire/May_21_2021/PG%26E%20Overstrike%20Workshop%20Followup%20Response_Attachment_5-20-21.pdf] Furthermore, in late July 2021 PG&E initiated what is now called "Enhanced Powerline Safety Settings" which have triggered hundreds of unplanned power outages in fire-prone areas.[5] [Footnote 5: https://www.pge.com/en_US/residential/outages/enhance-powerline-safety-settings/enhance-powerline-safety-settings.page?] These outages can be triggered by light rain or contact with wildlife, and do not come with the benefit of advanced notice. De-energization events—planned or programmed—to prevent wildfires is an activity that certainly will not be going away in the near future and we urge CARB to recognize that unfortunate reality and adjust the proposed regulations to account for PSPS events. (548-Docket)

Comment: Additionally, portable generators must be continuously available and affordable. RCRC is concerned with the proposed phase-in of more stringent emissions standards beginning with model year (MY) 2024, and zero-emission standards being implemented in MY 2028. In rural communities where de-energization events and other unplanned power outages are common, many health and safety risks arise when residents are without power, and is exacerbated for the elderly, medically vulnerable, or others on low- and fixed incomes including:

- Life support equipment, including breathing apparatuses and oxygen, dialysis machines, asthma nebulizers, or electric wheelchairs are rendered inaccessible;
- Chronic illnesses are threatened, such as the inability to refrigerate medications like insulin;
- Hunger is exacerbated by the loss of frozen and perishable foods; and
- Households dependent on groundwater wells cannot pump drinking water for consumption and personal hygiene. (548-Docket)

While rural Californians would prefer continuous power without service interruptions, many are left with no choice but to use portable gas-powered generators, which are far more financially viable than stationary whole-house generators and do not require electricity to recharge. (548-Docket)

Comment: CARB Must Balance Competing State Directives and Priorities
In January 2021, the Governor's Forest Management Task Force—now the Wildfire and Forest Resilience Task Force—released a comprehensive strategy and call to action to mitigate the state's growing forest health and wildfire crisis. The state has entered into Memorandums of Understanding

(MOUs) with the USDA Forest Service to implement fuels reduction projects, amidst a myriad of other comprehensive tactics, that would address the drivers of catastrophic wildfires that put communities and ecosystems at risk.[12] [Footnote 12: California's Wildfire and Forest Resilience Action Plan, January 2021. https://fmtf.fire.ca.gov/media/cjwfpckz/californiawildfireandforestresilienceactionplan.pdf] (548-Docket)

RCRC has repeatedly urged CARB to address the escalating wildfire problem as part of the Scoping Plan since the very first iteration of the document in 2008 and has continued to request the inclusion of wildfire emissions as climate change has amplified the need for better forest management practices on both state and federal lands. Now that CARB has begun modeling annual greenhouse gas emissions (GHG) from wildfires, we are disappointed that these emissions continue to be excluded from the analysis of the state's overall SLCP emissions inventory, and that CARB may hinder the ability for large and small landowners to manage healthy forests in the future. A statewide transition of SORE to zero-emission is another disjointed effort that is neither practical nor feasible. Improving air quality and reducing emissions must be done holistically. (548-Docket)

**Evaluation of Regulatory Alternatives**
Given that Alternative 2 meets the 2016 State Strategy for the State Implementation Plan for Federal Ozone and PM 2.5 Standards (State SIP Strategy) as required by the federal Clean Air Act, in the interim we urge CARB to reconsider an alternative that would employ a more gradual zero-emission equipment (ZEE) adoption, which is a more technologically feasible pathway. However, we strongly urge CARB to explore a third regulatory alternative that would account for the differences in use and application of SORE in rural settings. As discussed above, RCRC strongly believes there must be a pathway for the use of spark-ignition SORE in rural communities that would account for our unique challenges and circumstances. At the very least, specific SORE equipment such as chainsaws, pumps, air compressors and generators should be exempted from the Proposed Amendments. (548-Docket)

**Economic Analysis**
Cost of living increases on rural homeowners continue to escalate. If rural homeowners cannot keep up with defensible space because of the high cost of new ZEE or perform the completion of necessary work on the battery life of the ZEE, homeowners can expect home insurance costs and cancellations to continue to surge. Since 2010, the number of residential insurance policy non-renewals has increased dramatically in high wildfire risk areas. (548-Docket)

Comment: Power outages in rural areas are frequent, can last for several days, and are becoming more common. Forcing moderate to low income rural residents to do without power for extended periods to achieve small emission reductions in these areas that are already in attainment is unconscionable. (3028-Oral Testimony)

Comment: My name is Ben Granholm on behalf of the Western Propane Gas Association. Thank you for the opportunity to comment today. WPGA would like to align ourselves with the comments made by a number of previous speakers working to clean California's air and help the State meet its emissions reduction goals. WPGA, along with many others, are strong supporters of clean energy, and appreciate the time and effort that the Board and staff have dedicated to the SORE regulation. Unfortunately, the amendments before you today do not fully appreciate the fact that spark-ignited portable generators are a unique product used primarily for emergency home back-up power, unlike other SORE equipment and zero-emission generators, which are primarily used for discretionary activities. (3044-Oral Testimony)

Comment: This is Jeff Brown, Amador County Supervisor. I would like to say that I live in the high country and I also have a portable generator that takes care of my house. Last year of 2020, I was out of power at my home for over 20 days, not consistently, but up to about five days during the wintertime. Solar and other situations will not be available, because I have trees around my house in the up-country. Like right now, it's snowing at my home, so there would be no access to electricity. You asking me to not to have a portable generator is like you asking PG&E to give us 99 percent reliability at my home, and that is just -- it can't happen. (3047-Oral Testimony)

**Agency Response:**

These comments request a change to the Proposed Amendments, specifically exemptions for SORE for use in rural areas or areas in attainment of ambient air quality standards. Commenters request or imply that chainsaws specifically should be exempt for these applications, and some reference also pumps, air compressors, and portable generators. Commenters also include introductory remarks that describe the commenters' organizations. CARB made no changes based on these comments.

The Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce, and do not affect use of existing equipment. No exemption specifically allowing the use of SORE in rural or attainment areas is required.

CARB does not regulate SORE on a regional basis. An exemption cannot be created allowing sales of new equipment in rural or attainment areas. There is no mechanism under CARB's authority by which sales of equipment in rural or attainment areas can be restricted only to those who will use them in the same areas.

The Proposed Amendments allow additional time for portable generators to meet the emission standards of zero, as described on pages 160-168 and 223-225 of the ISOR. Please refer to the Agency Response in section IV.A.2.3.5 for discussion of additional comments about portable generators. CARB Resolution 21-28, dated December 9, 2021, states, in part, "Be it further resolved that the Board directs CARB staff to review annually the status of the implementation of the proposed amendments and to conduct a technological review in the 2025 to 2026 timeframe to assess the progress towards the MY 2028 zero-emission standards for portable generators and any other engine or equipment category that may be newly subject to the MY 2028 zero-emission standards." Such technological review is beyond the scope of the Proposed Amendments to the SORE regulations for this rulemaking. However, it will be an important component of implementing the Proposed Amendments.

Most other equipment primarily used for fire mitigation and maintenance of defensible space, including pumps powered by engines with displacement 40 cc and above, air compressors, and chainsaws powered by engines with displacement 45 cc and above, are typically not subject to CARB's SORE regulations. As described in detail in IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law. As described in more detail in sections IV.A.2.5.1, IV.A.29.1.1 and IV.A.29.1.3, CARB does not anticipate that the availability of the equipment of concern for the application described will be affected by this rulemaking, and no exemption is needed.

Regarding the comment, "RCRC has repeatedly urged CARB to address the escalating wildfire problem as part of the Scoping Plan … A statewide transition of SORE to zero-emission is another disjointed effort that is neither practical nor feasible," this comment includes

expressions of the commenter's opinions and conclusions regarding potential conflicts between the Proposed Amendments and programs that are beyond the scope of this rulemaking, such as California's Scoping Plan and Short-Lived Climate Pollutant Reduction Strategy. CARB disagrees with the commenter's conclusions that the Proposed Amendments are infeasible or in conflict with other programs. CARB made no change based on this comment.

The comment, "Given that Alternative 2 … in the interim we urge CARB to reconsider an alternative that would employ a more gradual zero-emission equipment (ZEE) adoption…," is discussed in the Agency Response in section IV.A.2.4.3.

Comments related to cost of living and home insurance are beyond the scope of this rulemaking.

### A.2.5.4. Exempt SORE used solely in competition

Comment: Regarding the youth motorsports, we utilize a small gas powered engine designed for lawn mowers that is recognized nationally, if we are unable to purchase/own/run these engines, then the sport will die out in California. Quarter midgets have been around since before World War II, Capitol Quarter Midget Association in California has operated a dirt track for quarter midgets since 1954, where Jeff Gordon raced. Please consider moving the date to help everyone adjust and reach the same goals. (287-Docket)

**Agency Response:**

This comment requests a change to the Proposed Amendments, specifically an implementation delay to ensure that SORE engines used in certain youth-oriented racing vehicles continue to be available. CARB made no changes based on this comment. The following response provides clarification and context for several points within the above comment.

Per §§ 39048 and 43001 of the California Health & Safety Code, vehicles used solely for competition and not operated on public highways are exempt from California mobile source emission standards. Under the Proposed Amendments, existing engines can still be owned and operated in racing vehicles, and new engines not meeting the proposed standards can continue to be available to purchase exclusively for use in vehicles used solely for competition and not operated on public highways. The availability of engines to power vehicles for youth-oriented racing purposes is not expected to be affected by the Proposed Amendments.

### A.2.5.5. Exempt other specific uses, equipment types, and/or regions

Comment: Thus, we respectfully request that any regulations adopted to replace SORE with ZZE exempt SORE that will be used to build, maintain, repair or improve trails (and associated areas such as trailheads, parking, information centers, and visitor centers) used by hikers, equestrians and mountain bikers. Perhaps one day, improvements battery technology will lead to the development of ZEE that is truly the equivalent of SORE in weight, power, and running time, but that day has not yet arrived. (1-Docket)

Comment: **Issue Two – Air Pollution – Formation and Retention of Air Pollution**
According to the San Joaquin Valley Air Pollution Control District, the basin is a narrow bowl

bordered by mountain ranges on both the sides and southern boundary. This land mass is "conducive to the formation and retention of air pollutants. The bowl-shaped Valley collects and holds emissions caused by the activities of the Valley's four million residents and their three million vehicles, as well as vehicles from other areas traveling on Highway 99 and Interstate 5. In addition, pollutants are also transported into the Valley from the Bay Area and the Sacramento Valley. These characteristics cause the San Joaquin Valley to be unusually susceptible to significant air pollution problems." (8-Docket)

The idea that AB1346 is based on protecting the air we breathe but is now compromising the land we walk-on is a contradiction that requires a reality check. It is more than a "tit for tat" scenario but one that requires an understanding that AB1346 is short-sided as it was based on erroneous data that sounded convincing but lacked objectivity. A review of the San Joaquin Valley Air Pollution Control District's "Frequently Asked Questions" site lists numerous contributing factors and the list is lengthy. Therefore, the "one size fits all" approach must be re-evaluated to insure that moving forward legislation doesn't put individuals in harm ways or limit an individual's ability to defend/protect property or ties the hands of agencies to look out for the public's interests. The State must walk-back the tone and content of AB1346 to allow those impacted by the legislation to support a Bill that will contribute and not undercut individuals, businesses and end-users from utilizing gas powered outdoor power equipment. (8-Docket)

Comment: I am a believer in reasonable environmental laws but the proposed SORE regulations are not practical in CALFIRE's State Responsibility Areas, areas governed by PRC 4291. We have 4.5 acres adjacent to the Sierra National Forest. We've lost 45 mature ponderosa pines to the bark beetle infestation along with numerous large oaks. It would be impossible to clear and remove these fire hazards with battery powered chainsaws. Since we are adjacent to the Sierra National Forest where no land clearing or management has occurred it is incumbent upon us to weed eat our 4.5 acres to provide a margin of safety to our home. A battery powered weed eater does not have the horsepower necessary, or the battery life, to complete this task and comply with CALFIRE's requirements. We respectfully request an exemption from SORE regulations for residents residing in State Responsibility Areas of California." (19-Docket)

Comment: My recommendation is if banning small gas engines is non negotiable, then banning personal/home use engines and make licensed commercial businesses exempt from this. Electric applications are good, but not in the case of commercial usage. The environment will be much worse by this new proposed law and you will find sanitation to be the biggest issue, second being aesthetics. I strongly urge you to consider these issues because if they aren't dealt with prior to the law being in effect, I'm afraid you will be addressing them at a later date. If you have any questions, please contact me. (20-Docket)

Comment: Yes I am a professional landscaper and I support the ban of gas power tools ASAP. Exceptions could include tools with low emissions and lower sound pollution. (59-Docket)

Comment: The only reason gas should be used is huge weed eating and fire clearance work. The batteries just don't have the capacity for acres of mowing. (100-Docket)

Comment: III. Emergency provisions should be included for aquisistion of portable generators for use in emergency situations beyond 2028. CARB allows an Emergency Use Exemption for noncompliant vehicles to be used to respond to an emergency. Support for these emergency events are exempt if they are dispatched under contract with public agencies such as the Federal Emergency Management Agency (FEMA), California Governor’s Office of Emergency Services, or California Department of Forestry and Fire Protection (CAL FIRE). Transfer Flow asserts that a similar emergency use exemption

should be applied for the acquisition of portable generators in response to emergencies such as when FEMA used generators in Paradise, California directly following the Camp Fire. Transfer Flow is requesting CARB to consider an emergency exemption for the acquisition of portable generators for use in emergency situations. (487-Docket)

Comment: If we find that the equipment is unsafe and unable to meet our needs in the backcountry, we respectfully request that the PCTA be considered for an exemption similar to what police and fire are granted with an emergency use authorization as we operate under the authority of a MOU with government partners, and the maintenance of the trail is a matter of public safety and access (508-Docket)

Comment: This is not viable for our work in the back country. These real-world impacts would limit our ability to use battery-powered tools in the back country and we ask that trail crews be allowed to continue to use gas-powered tools. (3041-Oral Testimony)

Comment: My name is Matthew Blaine. I'm part of the California Mountain Biking Coalition and our members are the local trail groups who do maintenance on trails throughout the state of California. It's done by thousands of volunteers, staff, hand tools, electrical tools, and gas tools. And we're big supporters of the environmental advantages of zero-emissions equipment and are generally supportive of this regulation. However, we're also concerned that the zero-emissions equipment is not ready for all users today and in the timeline specified. Our particular concern is remote use, similar to a concern exposed -- expressed by the PCTA earlier. Some of our members work in urban areas where you can plug things in easily, but many work in remote areas, where you actually have to hike for hours to get to equipment. So understand that the current gas is about ten times as dense as batteries. So imagine today you have to pack in 20 pounds of gas to work for a day, instead you'd have to pack in 200 pounds of batteries. So while these tools are small in number, they're an essential importance for keeping these opportunities open for recreation in remote areas and also for trail -- for firefighting and prevention needs. So I hope that the Board and the staff if they actually need some experience, I recommend going out for a day with one of these voluntary organizations or some of these professional organizations who talked to you today. And we hope that there's a mechanism in the adopted proposal to evaluate the availability of tools in a time frame, such that if they're not ready in the 2024 time frame, of if they are, there's a way to reevaluate to make it possible to continue our work. (3065-Oral Testimony)

**Agency Response:**

These comments suggest CARB consider exempting SORE equipment from the emission standards of zero for specific uses and equipment, such as: All SORE equipment used by commercial users; chainsaws and other equipment used in professional timber falling, municipality and utility tree trimming, backcountry trail maintenance, and firefighting and fire prevention; chainsaws, pumps, air compressors, generators and other SORE used in rural communities; and acquisition of portable generators for use in emergency situations. One of the comments includes proposed chainsaw design and field-testing requirements to confirm that adequate zero-emission chainsaws exist for efficacy and safety of professional timber falling workers. In addition, one of the comments requests that a specific organization be considered for an exemption similar to the provision in section 2403(f) of the exhaust emission regulations as it operates under the authority of an MOU with government partners to maintain trails for public safety and access. Other than the 15-day modifications related to pressure washers using engines with displacement of 225 cc or larger, CARB made no changes to the Proposed Amendments based on these comments. The commenter’s claims of number

of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[34]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. The following paragraphs provide clarification and context for several points within the above comments.

The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. California residents and professionals can continue to use and repair their current portable generators and other SORE equipment until end of its life. As described in sections II.A.1.e and II.A.2.d of this FSOR, in response to stakeholder comments about technological feasibility specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers typically used by professional cleaning services, maintenance companies, other businesses to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for pressure washers using engines with displacement of 225 cc or larger that are the same as those proposed for generators and setting emission standards of zero for MY 2028 and later for these pressure washers. These modifications are expected to reduce impacts to businesses that would have occurred under the Proposed Amendments as they were defined in the ISOR. Please refer to section II.A.1.e and II.A.2.d and the Agency Response in section IV.A.2.4.1 for additional discussion about these modifications.

CARB made no changes based on the comment requesting an exemption for acquisition of portable generators for use in emergency situations. As explained in ISOR sections I.E and II.A, the Proposed Amendments already include a longer timeframe for portable generators to comply with emission standards of zero. The Proposed Amendments do not require anyone to stop using a SORE generator, whether it is in an emergency situation or not, nor do they prohibit the sale of CARB-certified SORE generators. Additionally, fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available, as described in section 2403(f) of the exhaust emission regulations. Please refer to the Agency Response in section IV.A.2.3.5 for additional discussion about portable generators.

In response to the comments about chainsaws and other equipment used for timber falling, municipality and utility tree trimming, trail maintenance, firefighting, and fire mitigation, and the proposed exemption for an organization that conducts trail maintenance for public safety and access: as described in sections IV.A.2.5.1, IV.A.20.4 and IV.A.29, chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters, clearing saws, and pumps powered by engines with displacement 40 cc and above, as well as air compressors, that are used primarily for tree and brush removal are considered preempt and not subject to California emission standards. Fire and police departments, and other entities

[34] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available, as described in section 2403(f) of the exhaust emission regulations. As described on pages 13-21 of the ISOR, ZEE equivalents generally give similar performance to SORE that are not preempt.

In response to the comments about exemptions for all landscaping equipment, or landscaping equipment with low emissions and lower sound pollution: As described in detail in ISOR section I.E, the level of performance, number of brands, and number of landscaping and other types of zero-emission equipment options for both residential and professional use have increased greatly and continue to do so today. Battery and electric motor technology have advanced rapidly in recent years, while costs have declined. For the most common types of SORE equipment, there are ZEE equivalents available in the market with similar or better performance characteristics and lifetime. Please refer to ISOR section I.E. and Agency Responses in sections IV.A.35.1 and IV.A.35.2 for discussion of the current technological feasibility of ZEE and why exemptions are not needed for landscaping equipment to comply with emission standards of zero. In addition, please see the Agency Responses in other sections that discuss the technological concerns expressed in the above comments as well as concerns expressed elsewhere in their submissions and similar submissions that requested a delay in the compliance dates, including but not limited to: higher upfront costs of ZEE (section IV.A.12); ZEE battery charge capacity (section IV.A.2.2.1); costs for extra batteries and costs and other issues associated with transporting and switching out batteries during work day (sections IV.A.12, IV.A.6.2, and IV.A.13.1.2); and ZEE battery lifespans (section IV.A.35.1).

In response to the comment, "we hope that there's a mechanism in the adopted proposal to evaluate the availability of tools in a time frame, such that if they're not ready in the 2024 time frame, … there's a way to reevaluate to make it possible to continue our work,": The potential actions the commenter describes are beyond the scope of this rulemaking. The commenter seems to envision a potential future rulemaking that could delay implementation of emission standards of zero. Chapter I.E. discusses the technological feasibility of the Proposed Amendments. The transition to ZEE that will occur under the Proposed Amendments is technologically feasible.

In response to the comment that discusses the geography of the San Joaquin Valley and related air quality problems: The commenter implies opposition to AB 1346. The Proposed Amendments are not AB 1346 and are not a bill to be considered by the Legislature. The Legislature passed AB 1346, and the Governor signed it. The Proposed Amendments meet the requirements of AB 1346. The comment includes expressions of the commenter's opinions and discussion of topics related to air quality but beyond the scope of the Proposed Amendments. CARB disagrees that the Proposed Amendments compromise the land in California or are otherwise contradictory to the goals of improving public health and reducing emissions from SORE. The Proposed Amendments do not require anyone to stop using SORE equipment. Please refer to the Agency Responses in section IV.A.29 for discussion of comments about defending or protecting property and clearing space to prevent wildfires. Fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available, as described in section 2403(f) of the exhaust emission regulations.

### A.2.5.6. Exempt SORE used in emergency response and other dangerous operations

Comment: In conclusion, Healthy trees clean and make oxygen that all mammals breath. Healthy forests that are kept up and funds spent properly on programs to do just that. Help us mammals breath fresh clean air. Trees clean air quality every day that they are alive. When controllable wild fire are allowed to destroy millions of acres of uncleaned forests that is a shame. We have the resources we have the people we have the equipment we have an amendment that will end all of this! This is a bad amendment towards the health of humankind. Reconsider per county, per sq acre of forest, per population, it can be done with honest non bought politicians. We the people want our voice heard we are the funds that pay the way for politicians and we want our money spent differently! (108-Docket)

Comment: I believe that the need for equipment that can perform for a 10 hour day will not be readily available at reasonable pricing for municipalities to be able to continue to offer emergency response services (113-Docket)

Comment: Please consider adopting an exemption application protocol and policy for business that must utilize non altered emissions systems on small engines in hazardous life and death situations. The dive harvest commercial fishing industry utilizes small engines to power "Air Breathing compressors" in salty, humid, wet often very rough weather marine environments. Implementation of strict emissions and exhaust controls or mandating battery powered small engines in the aforementioned conditions can quickly render them very unreliable and extremely dangerous during dive operations. Please note: Compromises to performance with small engines in favor of emissions in hazardous conditions could lead to injury or death in some occupational fields such as in commercial fishing operations. By banning or limiting accessibility of small engines in the State of California you would inadvertently force the use of inferior parts, aftermarket or illegal replacement units which again can unnecessarily put life in jeopardy in the event of failure. SOME INDUSTRIES NEED TO BE EXEMPTED FROM THIS REGULATION/LAW. (493-Docket)

Comment: **Subject: Proposed SORE Amendments**
...the PCTA currently has about seven chainsaws/brush cutters that would fall under the proposed regs. I understand that we will still be able to use them, just not purchase new ones in California, based on the regulations. However, I am curious if we may be able to obtain an exemption under an emergency use authorization similar to what police/fire may have. Really, just want to learn more about the proposed regulation to make sure we fully understand it and to share the concerns the PCTA has and why ZEE may not work for some of the work that we do on state and federal lands as part of an MOU between the US Forest Service, US Park Service, BLM, and CA State Parks. (575-Email)

Comment: Moreover, the proposed rule does not adequately address emergency use by with wildland firefighters, utility companies, and farmers, who need non-exempt products to protect Californians from natural disaster. The draft does not adequately address who will qualify for a waiver or how they will purchase products if the equipment is not available in the state. (3032-Oral Testimony)

Comment: FWEDA also shares concerns previously expressed about equipment for -- supplied for first responders. Managing the phase-out of gas-powered equipment and the phase-in of ZEE is a substantial burden for dealers who sell across the different equipment sectors CARB regulates and intends to phase out over the next several years, and some that are not yet feasible for ZEE. (3045-Oral Testimony)

**Agency Response:**

These comments express doubt regarding the continued availability of certain equipment and include requests for exemptions for certain users or equipment types related to emergency response, wildland fire fighting and mitigation, and commercial fishing and dive operations. They are similar to comments in section IV.A.33.1. Section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision. Please refer to the Agency Response in section IV.A.33.1 for additional discussion of the availability of equipment used in emergency response, firefighting, forest management, farming, and construction. Please also refer to the Agency Response in section IV.A.29.1.1 for discussion of the availability of air compressors used by dive harvest commercial fishing operations. CARB does not anticipate that the availability of the equipment of concern for the applications described will be affected by this rulemaking. As such, no additional exemption is needed.

The comments' recommendations are beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comments. The scope of the rulemaking described in the October 2021 45-Day Notice does not include making changes that would affect equipment that are not subject to CARB's SORE regulations. The following response provides clarification and context for several points within the above comments.

In response to requests for equipment from certain industries to be exempt from CARB's SORE regulations found in California Code of Regulations, title 13, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision.

In response to the statement, "By banning or limiting accessibility of small engines in the State of California you would inadvertently force the use of inferior parts, aftermarket or illegal replacement units which again can unnecessarily put life in jeopardy in the event of failure," the Proposed Amendments do not require anyone to stop using the SORE they already own. The commenter provides no evidence to support its conclusions or claims and CARB has no evidence to support them, either. The Proposed Amendments do not prohibit the repair of SORE. Replacement parts and certified-aftermarket parts could still be provided under the Proposed Amendments.

In response to the statement, "Moreover, the proposed rule does not adequately address emergency use by with wildland firefighters, utility companies, and farmers, who need non-exempt products to protect Californians from natural disaster," the commenter does not specify which equipment they believe these users need that may not be preempt and which would not be available under the Proposed Amendments. The comment presents a criticism of the Proposed Amendments but does not request a specific change.

CARB did not make any change in response to the comment suggesting an alternative to the Proposed Amendments because it would not achieve the goals of this rulemaking.

In response to the statement, "Managing the phase-out of gas-powered equipment and the phase-in of ZEE is a substantial burden for dealers who sell across the different equipment sectors CARB regulates and intends to phase out over the next several years,": The Proposed Amendments do not require dealers to stop selling CARB-certified SORE equipment or

preempt equipment powered by small engines. The commenter does not provide evidence to support its claims.

#### A.2.5.7. Exempt boat engines

Comment: I understand there may be new rules for the emissions for my boat. I have a 1975 Sea Ray that I have restored during this COVID time. I do not use it every day. Maybe a dozen times a year. The boat is well maintained and I am hoping to use this boat to time with my family. I feel that some day I would like to upgrade to a newer boat but for now I would like to use it and enjoy it. I also feel that it contributes so little to our air that when in the ocean it is it would be hard to measure the effects. (125.078-Docket)

**Agency Response:**

This comment was included in a form letter submitted November 11, 2021, that requested CARB to delay the deadline for implementation of emission standards of zero for commercial usage of landscape equipment. This comment seems to request that CARB also exclude engines used to propel marine vessels from the current rulemaking. CARB made no changes based on the comment. Such an exemption is beyond the scope of the rulemaking described in the October 2021 45-Day Notice. The scope of the rulemaking focuses only on amendments to California's SORE regulations. The definition of "small off-road engine" excludes engines used to propel marine vessels. Engines such as that described by this comment are not subject to California's SORE regulations. The agendas for November 2021 and March 2022 Board meetings included a hearing for proposed amendments to the Commercial Harbor Craft Regulation, but there were no comment periods for regulations related to recreational boat engines during the comment period for the Proposed Amendments to the SORE regulations.

### *A.2.6. Requests for alternative test procedures, emission standards, fuels and/or technologies*

#### A.2.6.1. Alternative test procedures

Comment: The Proposed Amendment would require hot soak plus 24-hr diurnal emission testing for handheld equipment, which is unjustifiable for this limited period of time. The introduction of certification procedure CP-902 and test procedure TP-902 for handheld products (less than or equal to 80cc) is unnecessary and disproportionate, as the sale of combustion engines is in any case limited in time by the use of exhaust emission credits. Therefore, STIHL proposes test procedure TP-901 as an alternative to test procedure TP-902 for engines with displacement of less than or equal to 80cc certified during MY 2023 or earlier, if the application is in dry weight below 12 kg or for multi-position engines, to exclude generators, who are not handheld. (509-Docket)

**Agency Response:**

This comment states the commenter's opinions regarding evaporative emission testing and proposes an alternative substantially similar to current evaporative emission requirements for engines with displacement less than or equal to 80 cc. Engines with displacement less than or equal to 80 cc use TP-901 and do not use TP-902 for certification under the current SORE regulations. As described in section II.A CARB made modifications to §§ 2753(c), 2754(a),

and 2755 to allow an applicant to certify an evaporative emission control system for engines with displacement less than or equal to 80 cc to the diurnal emission standards in § 2754 in lieu of the permeation emission standards in § 2755 and follow the certification procedures outlined in CP-902, adopted July 26, 2004, and amended September 18, 2017. This modification is described in the March 2022 15-Day Notice and in section II.A of this FSOR. CARB made no change based on this comment. Please refer to the Agency Response in section IV.A.17 for discussion of similar comments.

### A.2.6.2. Alternative emission standards

Comment: As a leading manufacturer of outdoor power equipment, the worldwide STIHL Group ("STIHL") designs, manufactures and sells millions of battery, electric and combustion engine powered equipment each year. STIHL is committed to sustainability and environmental responsibility, and is continuously developing new technologies and innovations that support the transition to low emission technologies. As a technology front-runner, STIHL has a vital interest in moving its product portfolio to new technologies in order to fight climate change, support sustainability, foster biodiversity and respond to customers' expectations. Our core values for business strategies are leading the handheld equipment industry by innovations. Indeed, STIHL has invested more than 680 Mio USD to develop low emission products, most recently resulting in thirty-two (32) CARB certified emission families in California and fifty-seven (57) EPA-certified emission families. (509-Docket)

STIHL Incorporated, the STIHL Group's U.S. headquarters and manufacturing facility manufactures over 75% of STIHL products sold in the United States, and employs almost 2,500 employees nationwide and distribute STIHL products to more than 10,000 US dealers. STIHL Inc. and Andreas STIHL AG & Co., KG (STIHL Inc.'s founding company and developer of STIHL products) are both active members of the Outdoor Power Equipment Institute ("OPEI"), the industry trade group responsible for advocating for the outdoor power equipment industry that represents more than 85% of the U.S. market for all outdoor power equipment categories. (509-Docket)

Comment: STIHL encourages additional cooperation and discussion between CARB and industry members to meet the 2016 SIP goals with a more holistic approach that addresses small business, consumer, and industry needs, while furthering the goal of a transition to ZEE technology. STIHL is concerned that CARB's current Proposed Amendment focuses too narrowly on the outright ban of a single type of product (combustion engines) without considering other alternatives that may still meet CARB's goals[1] and encourage the development of more advanced ZEE technology, and without recognizing the need for SORE products in certain professional applications. [Footnote 1: As explained in greater detail in OPEI's comment, multiple alternative technologies exist that, in combination, could meet the 2016 SIP goal, including use of alkylate fuels and other regenerative fuels, delayed implementation of the current Proposed Amendment, emissions reduction to 35/50 g/kW-hr HC+ $NO_x$ (as explained herein), or even, a professional 4-stroke engine compromise that takes advantage of cleaner 4-stroke engine technology, while still meeting professional needs.] (509-Docket)

Comment: Lastly, there is currently no ABT program in place or proposed for handheld evaporative emissions. Therefore, a zero HC evaporative standard would prohibit the sale of gas-powered handheld equipment starting in 2024, despite available exhaust emission ABT credits that had been earned by companies through investments in sustainable technologies. At a minimum, handheld

equipment standards should be retained on a design-based certification to allow manufacturers to continue using existing exhaust emission credits. (509-Docket)

Comment: **Comment 3: Harmonization to future European exhaust emission standard 35/50 g/kW-hr HC+$NO_x$ for Non Road Mobile Machinery for professional use**
STIHL proposes the following phase-in emission reduction approaches:

1. *A zero emission standard for combustion engines with EDP 50/125 hrs in 2024*
   Replacing combustion engines with moderate (50 hrs) and intermediate (125 hrs) EDP by 100% battery driven equipment will result in an additional significant emission reduction. Only for STIHL this will result in an emission reduction of approx. 30% beginning in 2024 (value based on the credit forecast for MY 2021). Analyzing the MY 2020 EPA certification database for handheld equipment, a replacing of engines with moderate (50 hrs) and intermediate (125 hrs) EDP will result in approx. 60% less engine families in total. In addition, this will lead to a tremendous push in a market shift to battery driven equipment for moderate and intermediate use. (509-Docket)
2. *Introduction of 35/50 g/kW-hr for HC+ $NO_x$ for professional use (EDP of 300 hrs) in 2027*
   The current international development of limit values including best available technology is published by several organizations such as the Joint Research Center (JRC) of the European Commission as outlined in "In-service monitoring for small utility engines" published 2018.[4] We do understand that Europe and California have different emission averaging, banking & trading schemes. The proposed European standard of 35/50 g/kW-hr HC+ $NO_x$ - without any compensation scheme - are based on best available technology: these values would give a reasonable emission reduction of 30% to meet the 2016 State Implementation Plan and 2031 federal air-quality standards. STIHL proposes to introduce 35/50 g/kW-hr HC+ $NO_x$ limit values including the existing EDP value of 300 hrs in 2027 to align internationally and avoid hardships for manufacturers. [Footnote 4: In-service monitoring for small utility engines: Pilot programme for procedure development; JRC; European Commission; 2018] (509-Docket)

Both scenarios result in a total reduction of more than 50% HC+ $NO_x$ reduction and this does not yet include a possible mandatory introduction of alkylate fuel, which contains additional high reduction potential for the relevant ROGs.[5] [Footnote 5: See OPEI's comment for further explanation regarding alternatives to reduce emissions that should have been explored by CARB.] (509-Docket)

Comment: As other jurisdictions worldwide (e.g. Europe) have successfully proven, the 35/50 g/kW-hr HC+ $NO_x$ solution would be an appropriate approach. CARB's new SORE emission legislation should be synchronized with the CARB's Non-Road Mobile Machinery Regulation sets the phase-out for combustion engines beyond 2035.[9] Until then, all technical solutions should be realized to reduce exhaust emissions in a speedy manner. [Footnote 9: 2020 Mobile Source Strategy; published in October 7th 2020] (509-Docket)

Comment: The Proposed Amendments also currently allow manufacturers to generate exhaust and evaporative emission reduction credits when they produce engines that emit below the emission standards and to bank, use, or trade these credits with other manufacturers, allowing them to produce engines that emit above the emission standards. Despite these opportunities, however, manufacturers currently have limited opportunities to generate such credits, effectively creating a ban on most SORE gas-powered equipment starting with MY 2024. This means that manufacturers will have to shift to produce zero-emission outdoor power equipment by 2024. This rapid transition will impose cost burdens on manufacturers and these costs will necessarily be shared with the tree care businesses that purchase and use their products. (520-Docket)

Comment: 1. Introduction
The Truck and Engine Manufacturers Association ("EMA") hereby submits its comments in opposition to the "Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions" (the "Proposed SORE Amendments") that the California Air Resources Board ("CARB") staff has proposed to present to the Board for initial consideration at a hearing scheduled for December 9, 2021. (521-Docket)

EMA and its members have attempted for several years to engage with CARB staff regarding the development of CARB's rulemaking to achieve additional significant emission reductions from small off-road engines ("SORE"). Notwithstanding the industry's good faith efforts, the scope of the proposed SORE Amendments has expanded well beyond what was described in the 2016 State SIP Strategy as the next-tier mitigation measure for SORE. Instead, what staff are now proposing amounts to an overly-aggressive interpretation, not of the underlying 2016 State SIP Strategy, but rather of the Governor's recent Executive Order directing the transition of off-road mobile sources in California to zero emissions by 2035 – a goal that CARB proposes to accelerate by more than a decade in this case, to 2024 for all SORE except portable generators. Moreover, staff are proposing to mandate that dramatically accelerated transition to zero-emission equipment without having undertaken the necessary analysis of the technical feasibility and cost effectiveness of doing so. As a result, the pending proposal is neither reasonable nor implementable. (521-Docket)

Comment: EMA previously submitted comments regarding CARB's potential amendments to the SORE regulations in response to CARB's prior solicitation of alternatives and pre-rulemaking workshops in June of 2020, and March of 2021.[1] [Footnote 1: Sore Amendments; Pre-Rulemaking Workshops, Comments Of The Truck And Engine Manufacturers Association.] As detailed again in our comments below, and especially with regard to Class 1, Class 2 and > 825cc SORE engines and equipment (hereinafter referred to as "non-handheld products"), the Proposed SORE Amendments are cost-prohibitive, infeasible, unenforceable, and invalid. In that regard, the Proposed Amendments do not address any of the serious overarching concerns that EMA and many other stakeholders detailed in their earlier workshop comments. (521-Docket)

Comment: EMA and its members acknowledge the significant ozone air quality attainment problems that persist in California, particularly in the South Coast Air Basin, and we recognize the need for additional cost-effective reductions of SORE-generated ROG and $NO_x$ emissions, along with related regulatory improvements. To that end, our members have been and remain willing to develop and introduce cost-effective technology solutions to effect meaningful ROG and $NO_x$ reductions. As evidence of that, and as detailed later in these comments, EMA has developed and proposed an alternative program that provides California with ROG and $NO_x$ reductions equivalent to or exceeding those reasonably expected from the Proposed SORE Amendments, at a fraction of the cost. As it stands, the Proposed Amendments will lead to significant adverse results for all stakeholders and, more importantly, California's air quality. (521-Docket)

Comment: The Proposed SORE Amendments are cost-prohibitive because, as confirmed by independent expert analyses and reports (see NERA, Trinity, and AIR Reports, discussed infra), the costs of the potential incremental reductions of $NO_x$ and ROG emissions from the non- handheld SORE products at issue will exceed $304,000/ton. If the expected market impacts and responses are factored in, the anticipated reductions of $NO_x$ and ROG will be at least 15% less due to the likely decrease in the scrappage rate of existing SORE, coupled with the related leakage from increased out-of-state purchases. In contrast, the EMA alternative program achieves equal or greater emission reductions at a fraction of that cost – approximately $7,000/ton. That will render the Proposed

Amendments even more cost-prohibitive on a relative basis, and so invalid on that ground as well. (521-Docket)

Comment: There is a far more cost-effective alternative to the Proposed Amendments for non-handheld products, which is an additional factor establishing the unreasonable nature of the Proposed SORE Amendments. (521-Docket)

Comment: Cost-prohibitive, infeasible, unenforceable, and federally-preempted regulations do not reflect sound public policy, cannot be sustained, and should not be approved by the California Air Resources Board. (521-Docket)

Comment: In comparison, EMA's alternative proposal would achieve greater lifetime emissions when market effects are taken into account, at a fraction of the cost (i.e., 62% emission reductions from the baseline at an incremental cost of approximately $7000/ton). (521-Docket)

Comment: 7. EMA Has Proposed a More Cost-Effective Regulatory Alternative
EMA has proposed a more cost-effective alternative to CARB's cost-prohibitive and infeasible SORE Amendments. EMA's alternative proposal is inherently more reasonable because it recognizes the fact that ZEE products will not be available over the nearer-term for a wide variety of non-handheld products, and so should not be mandated across-the-board. Thus, and unlike CARB's Proposed Sore Amendments, EMA's alternative "Tier IV" proposal is both realistic and implementable. EMA's proposal is also California-specific and tailored to address the unique air quality concerns in California that are distinct from the rest of the United States. (521-Docket)

Both AIR and NERA/Trinity have assessed the relative efficacy of EMA's proposal as compared with the Proposed SORE Amendments. The AIR comparison includes a partial inclusion of the "leakage" that will result from CARB's SORE Amendments, but does not factor-in the decreased "scrappage" that also is likely to occur. The NERA/Trinity comparative analysis includes both the reasonable anticipated "scrappage" and "leakage" impacts. As explained below, AIR's analysis reveals that even when leakage and scrappage are not fully accounted for, EMA's proposal is largely equivalent to the Proposed Amendments at a fraction of the cost. The NERA/Trinity analysis demonstrates that when leakage and scrappage impacts are both factored-in, EMA's proposal will be more effective than the Proposed SORE Amendments, both in terms of emission reductions and costs. (521-Docket)

Under EMA's alternative proposal, emission standards for ROG + $NO_x$ would be set at 6 g/kw-hr for Class 1 engines starting with the 2025 model year, and 3 g/kw-hr for Class 2 and > 825 cc engines starting with the 2026 model year. The durability period for Class 1 engines would be 500 hours, and for Class 2 and > 825 cc engines the durability period would be 1000 hours. Those proposed alternative exhaust emission standards match CARB's proposed standards for generators for model years 2024-2027. EMA's proposal also includes a zero-emissions standard for residential lawnmowers starting in model year 2025, and a special category for "fixed mount" generators – generators that are intended for installation in a vehicle, vessel or other similar mobile application for the purpose of providing energy for functions other than propulsion, and that are integrated into the vehicle's mechanical and electrical systems -- which would be subject to the same exhaust standards and durability periods as Class 1, Class 2 and > 825 cc engines. (521-Docket)

a. AIR's comparative analysis
AIR used CARB's SORE 2020 model emissions to estimate the benefits of the EMA proposal in comparison with CARB's Proposed SORE Amendments, with some modifications. First, AIR modified CARB's estimated running-loss emissions for generators and diurnal and resting-loss emissions for

lawnmowers (and for other equipment types that utilize those estimates of evaporative emissions) to reflect more up-to-date emission factors, since CARB's analysis used non-representative data from a 1995 and a 2022 model engine. Next, AIR used updated annual-use estimates to evaluate both the CARB and EMA proposals. For the EMA proposal, exhaust and evaporative emissions for residential lawnmowers were set to zero starting with model year 2025. Exhaust emissions for all other non-handheld equipment were set to the same emissions estimated by CARB for generators during the 2024-2027 time period. (See Exhibit "A.") (521-Docket)

The ROG + $NO_x$ emission inventories resulting from the EMA proposal in comparison to the CARB proposal are shown in Figure 6 below (reproduced from AIR's Report). This inventory analysis uses the updated AIR annual-use estimates. AIR found that EMA's proposal would reduce ROG + $NO_x$ emissions from non-preempted, non-handheld equipment to about 11 tpd in 2045. (521-Docket)

**Figure 6**

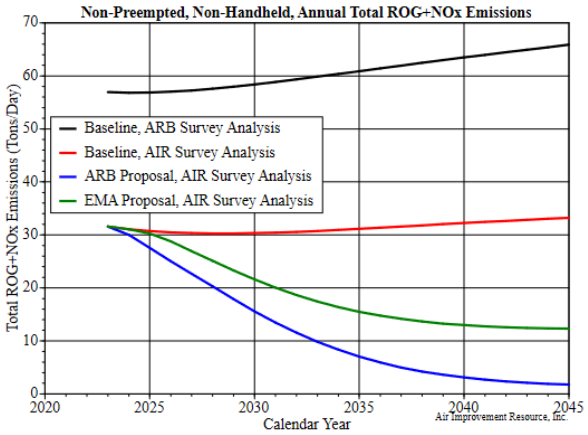
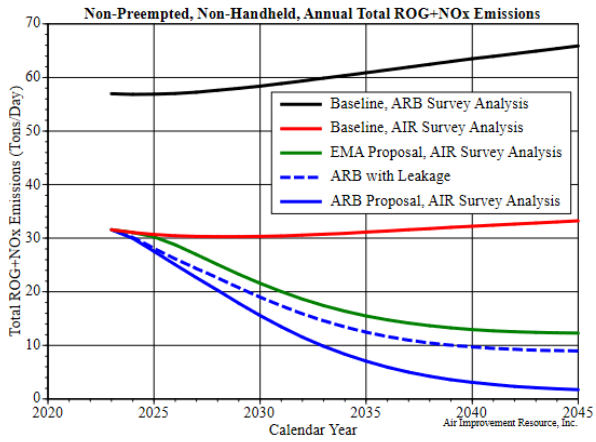



Figure 7 (also reproduced from AIR's Report) shows the comparative emission reductions if reasonably anticipated "leakage" impacts are taken into account. More specifically, Figure 7 factors-in the impact of assuming that 50% of commercial landscapers' new SORE purchases and 10% of residential SORE purchases will be made out-of-state in response to CARB's ZEE mandates for SORE, starting in 2024. Significantly, Figure 7 does not include the impact from slower fleet turnover (reduced "scrappage"), which is another expected outcome from CARB's proposal, and which will further reduce the putative benefits of that proposal. As reflected in Figure 7, EMA's alternative proposal would largely match CARB's proposal with respect to anticipated ROG + $NO_x$ reductions, but would do so at a fraction of the cost and without the large market dislocations and disruptions that CARB's Proposed Amendments will cause. (521-Docket)

**Figure 7**




Comment: b. NERA/Trinity's comparative analysis
The NERA/Trinity comparative analysis included the reasonably anticipated leakage and scrappage impacts that likely would result from the implementation of the Proposed SORE Amendments. (See Exhibit "B.") ERA/Trinity found that the likely emission increases associated with the increased leakage and reduced scrappage rates that would result from the Proposed Amendments would "more than offset the emission reductions expected from the ZEE standards for new equipment resulting in the CARB staff ZEE Proposal achieving fewer emission reductions than would occur if the other [EMA] proposal were adopted instead." (Exhibit 'B," p. ES-1.) The more specific findings from the NERA/Trinity analysis include the following:

(i) The EMA proposal will achieve a 62% reduction of emissions from the current baseline at an average cost of approximately $7,000 per ton.

(ii) CARB's proposal, if the market impacts of leakage and scrappage are excluded, could achieve an additional 33% more emission reductions than the EMA proposal, but at an incremental cost of $304,100 per additional ton, which is more than 43 times as expensive as the EMA proposal.

(iii) When reasonably anticipated increased leakage and reduced scrappage impacts are included, the EMA proposal would reduce emissions by 60% from the current baseline, while the CARB proposal would only reduce emissions by 49% from the current baseline – a smaller net reduction than EMA's proposal.

(iv) Since CARB's proposal would yield fewer emission reductions than EMA's proposal when reasonably anticipated market impacts are more fully accounted for, CARB's proposal would result in negative incremental cost-effectiveness. (See Exhibit "B," pp. ES-2 through ES-4, ES-6, 16-17, 20-23, and 26.) (521-Docket)

Comment: Consequently, it is clear that EMA's proposal represents a more reasonable and cost-effective regulatory alternative, and is one that the Board should direct staff to consider in this case. It also establishes that CARB's Proposed SORE Amendments are inherently unreasonable. (521-Docket)

Comment: As a part of its comments on the ISOR, EMA is offering to meet reduced exhaust emission standards of 6 g/kw-hr for Class 1 engines and 3 g/kw-hr for Class 2 and > 825 cc engines starting with model year 2025 for Class 1, and 2026 for Class 2 and > 825 cc engines.[5] [Footnote 5: EMA is

also proposing that fixed mount generators installed on DMV licensed motor vehicles and trailers transition to ZEE on the date the vehicle or vehicle pulling the trailer transitions to ZEE (2035 used for modeling purposes).] In addition, EMA is offering to meet the Class 1 standard at a durability period of 500 hours and the Class 2 and > 825 cc standard at a period of 1000 hours. These exhaust emission standards are the same as ARB's proposal for generators for model years 2024-2027. Finally, EMA is agreeing to a zero emissions standard for lawnmowers in model year 2025. (521-Docket)

Comment: 5. EMA's proposal provides significant emission reductions without the impacts of equipment leakage or slower fleet turnover. (521-Docket)

Comment: 5. EMA's Tier IV proposal provides significant emission reductions without increasing equipment leakage or slower fleet turnover. (521-Docket)

As a part of its comments on the ISOR, EMA is offering to meet reduced exhaust emission standards of 6 g/kw-hr for Class 1 engines and 3 g/kw-hr for Class 2 and > 825 cc engines starting with model year 2025 for Class 1, and 2026 for Class 2 and > 825 cc.[12] [Footnote 12: EMA is also proposing that fixed mount generators installed on DMV licensed motor vehicles and trailers transition to ZEE on the date the vehicle or vehicle pulling the trailer transitions to ZEE (2035 used for modeling purposes).] In addition, EMA is offering to meet the Class 1 standard at a durability period of 500 hours and the Class 2 and > 825 cc standard at a period of 1000 hours. These exhaust emission standards are the same as ARB's proposal for generators for model years 2024-2027. Finally, EMA is agreeing to a zero emissions standard for lawnmowers. (521-Docket)

Comment: OPEI is an international trade association representing more than 100 manufacturers and their suppliers of gas and electric-powered outdoor power equipment, golf cars, and personal transport and utility vehicles. OPEI member products are ubiquitous in California households and businesses, including equipment such as lawnmowers, garden tractors, grass trimmers, brush cutters, lawn edgers, chain saws, snow throwers, tillers, leaf blowers, utility vehicles and other similarly powered lawn and garden and vehicle applications. Representing more than 85% of the U.S. market shipments in nearly all outdoor power equipment categories, OPEI reflects a majority of the stakeholders regulated by the CARB's SORE emissions rules. OPEI members are responsible manufacturers, committed to complying with emission regulations. OPEI and its members have been working with CARB to develop a reasonable regulatory landscape, cooperatively helping California meet air quality standards through the introduction of low and zero- emissions technology solutions for over three decades. (524-Docket)

The Proposed Rules look to set zero-emissions limits for most SORE starting in Model Year 2024. The Proposed Rule relies on unsupported and unproven, data and assumptions and lacks sufficient evidence of technical feasibility (the term "technical feasibility" as used throughout these comments includes cost-effectiveness). The Proposed Rule overestimates benchmark/baseline emissions and emission reductions expected from the Proposed Rule based on the aforementioned unreliable data. Rulemaking benefits, including emissions, cost and health related benefits, are directly proportional to the difference (delta) between benchmark/baseline emissions versus reductions modeled from the Proposed Rule. As a result, overestimates in benchmark/baseline emissions result in overestimates of all benefits outlined in the Proposed Rule. (524-Docket)

The Proposed Rule fails to consider multiple other scenarios that would provide the reductions needed to meet the 2016 State Implementation Plan (SIP) and 2031 federal air-quality standards, without compromising the technology, performance and product availability needs of residential and professional equipment users. Additional scenarios must be further evaluated with consideration of

the technology challenges, the impact of the COVID-19 pandemic on the supply chain, and the cost needed to support incentive programs to transition to Zero Emissions Equipment or ZEE for the applications and uses which are currently technology feasible. (524-Docket)

Comment: Comment 6 – The Proposed Rule does not comprehensively consider alternative solutions to meet federal air quality standards. The Proposed Rule is technology forcing, resulting ultimately in a "ban" of engine-powered equipment. In doing so, the Proposed Rule lacks consideration of existing and future technologies that may not only offer the reductions needed to meet federal air quality standards, but also may ultimately result in product life-cycle emission benefits beyond ZEE, including in areas of greenhouse gas reductions and related climate change benefits through product life cycle analysis (LCA). (524-Docket)

The Proposed Rule offers just three alternative solutions, which staff rejected based on the emissions and cost benefits determined by the SORE2020 emissions overestimates. Rejection of these technologies based on the flawed SORE2020 is a significant concern for OPEI. Setting aside SORE2020 emissions overestimates, OPEI is concerned the Proposed Rule failed to consider several alternative solutions that could result in reductions needed to meet the 2031 federal air quality standards without compromising today's performance needs and/or future technologies that may result in product life-cycle emission benefits beyond ZEE. (524-Docket)

CARB staff met with one major manufacturer of both SORE and ZEE in January 2020 to discuss reduction strategies. These strategies included consideration of lower emission limits, alternative fuels, and potential ZEE programs. The Proposed Rule does not consider these strategies. In addition, OPEI used SORE2020 (despite its shortcomings) to analyze multiple strategies that would meet 2031 federal air quality standards without equipment bans and/or through later transition dates. These strategies would allow time for additional ZEE development and opportunity to evaluate technology feasibility for many uses. (524-Docket)

One alternative emissions reduction strategy would be to lower handheld product emissions from 50 (> 50cc displacement category) and 72 g/kW.hr (50 – 80cc displacement category) to 35 and 50 g/kW.hr, respectively. Using SORE2020, a 35/50 emissions standard for chain saws, trimmers, and leaf blowers starting for model year 2025, would result in HC+ $NO_x$ exhaust emission reductions from approximately 36.9 tpd to 27.5 tpd by 2031 – a reduction of approximately 25%.[22] In combination with additional reductions from ground supported products, as well as HC evaporative emission reductions realized from the 2017 evaporative amendments, OPEI is confident the "as published" SIP SORE goals of 4 $NO_x$ tpd and 36 ROG tpd could be realized by 2031. This strategy would provide additional time to understand the technical feasibility of alternative technologies, including ZEE. [Footnote 22: OPEI developed the SORE2020 model in excel format for ease of modeling different emission reduction scenarios. This model uses SORE2020 populations and emissions factors, including summer adjustments. For simplicity, the OPEI excel-based replica does not apply some fuel adjustment factors, however these factors are negligible when comparing OPEI's model to the SORE2020 output. Furthermore, the factors would consistent across all modeling, therefore would not significantly impact the percent change.] (524-Docket)

Comment: **Comment** 19-6: There is no evaporative ATB program for handheld products. As a result, gas-powered handheld products would be banned from 2024, regardless of a manufacturers exhaust emissions credit bank. In the absence of a handheld evaporative emissions ATB strategy, the Proposed Rule should be updated to reinstate current handheld product evaporative emissions procedures and limits (similar to CO). E10 Validation Study results suggest handheld products are

compliant with existing standards. Exhaust credits will ultimately limit sales gas-powered products after 2024. (524-Docket)

Comment: OPEI members are responsible manufacturers, committed to complying with emission regulations. OPEI and its members have been working with CARB to develop a reasonable regulatory landscape, cooperatively helping California meet air quality standards through the introduction of low and zero-emissions technology solutions for over three decades. OPEI supports ZEE as one key emission reduction strategy where technology feasibility has been demonstrated. However, there is currently no one-size-fits-all ZEE approach to satisfy the full range of SORE powered equipment and use cases. The Proposed Rule poses numerous technical feasibility, economic, and implementation challenges for many industry stakeholders. These challenges are currently insurmountable and will result in significant and unnecessary hardships for manufacturers, retailers and end-users, culminating in an early market shortfall of products with high consumer need and demand. Industry looks forward to continuing this dialogue to achieve our common goal of a thoughtful and measured emission reduction strategy, developed with consideration of all technical solutions, including ZEE and enhanced engine technologies, to help California meet Federal ambient air quality standards while avoiding unnecessary product bans and market disruption. (524-Docket)

Comment: The Manufacturers of Emission Controls Association (MECA) would like to provide comments in response to the California Air Resources Board's (CARB) proposed rulemaking to amend the Small Off-Road Engine (SORE) standards and transition to zero emissions. We commend CARB's ongoing leadership in the effort to reduce the environmental footprint of transportation to meet the state's SIP and climate goals, including technology advancing regulations that provide pathways to reduce emissions from SORE. We acknowledge the directive to fully electrify this sector of equipment by 2035, where feasible, in compliance with Executive Order N-79-20 and AB-1346. However, we offer a pathway for this category of engines and equipment, similar to staff's Alternative 2, that utilizes a balanced approach to achieve feasible near-term emission reductions while transitioning the small engine sector to electric equipment on a timeline that recognizes the economic challenges for suppliers and end users. This modified timeline continues to drive electrification of small commercial and residential equipment, where it is already more cost-effective, and allows low emission engines in the hardest to electrify (e.g., larger horsepower, commercial) categories. Extending the end-of-sale of combustion SORE to 2030 would provide industry an opportunity to recover the investment made to develop and deploy the low emission technology. We believe that an important opportunity exists for California to demonstrate lower emissions from SORE and provide a blueprint for federal standards to follow. (550-Docket)

MECA is an industry trade association of the world's leading manufacturers of clean mobility technology. Our members have nearly 50 years of experience and a proven track record in developing and commercializing emission control, efficiency and electric technology for a wide variety of on-road and off-road vehicles and equipment in all world markets. Our members provide the engine and aftertreatment technologies that enable small off-road engines to meet stringent $NO_x$, HC, CO and PM emission standards and battery materials and power electronics to enable CARB's electrification goals. Our industry has played an important role in the environmental success story associated with all mobile sources in the United States by offering a complete portfolio of emission control and electric technology. For 45 years, MECA has continually supported CARB's efforts to develop innovative, technology-advancing, regulatory programs to deal with air quality and climate challenges. (550-Docket)

Hundreds of millions of people in the U.S. still breathe unhealthy air, and many live in California, including 12 million residents in regions that are in ozone and/or PM nonattainment that would

benefit from a lower $NO_x$ limit on SORE. Furthermore, SORE operate in all communities and result in localized exposure to air pollution. Because a large part of the emissions inventory from SORE is represented by commercial equipment emissions, it is imperative that cost effective strategies are explored. To this end, when the SORE regulatory activities began over five years ago, MECA and our members supported the technical demonstration work and the regulatory process with hardware and information. (550-Docket)

Comment: **MECA Proposal for SORE**
We believe that currently available engine technologies and aftertreatment can be deployed by 2025 to meet the tight emission limits proposed by staff in Alternative 2. Extensive experience in meeting these lower limits derives from the automotive and LSI sectors, and we believe that the emission limits presented at the June 2020 workshop and included as part of Alternative 2 in the proposal, are achievable for the equipment that may be difficult to electrify by 2024. Furthermore, MECA previously worked with the Consumer Product Safety Commission to demonstrate the ability of generators to meet low CO emission limits through the application of closed-loop EFI, engine calibration and catalysts. These generators are commercially available today and can serve as examples how other types of equipment can meet more stringent emission standards. (550-Docket)

Following the last CARB SORE workshop, MECA provided an alternative proposal (Table 1) to CARB staff in response to the timeline associated with Alternative 2 in the SRIA and ISOR. With the exception of the handheld equipment, we believe that the emission limits are achievable at current maximum durability requirements for each category of engine beginning with MY 2025. We continue to suggest that CARB consider interim emission standards for certain SORE that are challenging to electrify, such as the larger horsepower equipment, evidenced by low levels of ZEE penetration. We requested an additional year (MY 2025 start) to begin implementing the tighter emission standards as well as an extension of the zero-emission compliance date to MY 2030. During this time, a parallel path of further market penetration of ZEE is likely as consumer preferences continue to shift and cost parity is achieved for additional equipment types. This start of implementation is consistent with our request for a minimum of three years after finalization of the regulation before the new standards take effect. This lead time is necessary for suppliers of engine components and catalysts to work with their customers (SORE OEMs) to perform the necessary engineering analysis, component design and durability testing validation to commercialize the engines and aftertreatment systems to deliver emission reductions. (550-Docket)

Table 1. Emission Standard and Durability Concept for Consideration (550-Docket)

| Engine Displacement | Current emissions standards (g/kWh for exhaust; g HC/day for evap) | | | New emissions standards (g/kWh for exhaust; g HC/test for evap) | | |
|---|---|---|---|---|---|---|
| | HC+NOx Exhaust | Diurnal | Durability (hours) | HC+NOx Exhaust | Diurnal + Hot Soak | Durability (hours) |
| <50 cc, handheld | 50 | NA | 50/125/300 | 25 | 0.50 | 300 |
| 50-80 cc, handheld | 72 | NA | 50/125/300 | 15 | 0.60 | 300 |
| <225 cc, non-handheld | 10 | 1.0 | 125/250/500 | 6 | 0.60 | 500 |
| 225-825 cc | 8 | 0.95+ 0.056 *capacity | 125/250/500/1000 | 3 | 0.70 | 1000 |
| ≥825 cc | 8 | 1.20+ 0.056 *capacity | 125/250/500/1000 | 0.8 | 0.70 | 1000 |

We believe both new SORE emission standards as well as ZEE sales requirements should be phased in, based on the model that CARB has followed for all other mobile source regulations. For example, the Low-$NO_x$ Omnibus provisions strike a suitable balance between stringency and phase-in time to allow suppliers and OEMs to design, develop and demonstrate technology that is durable and feasible. CARB's Advanced Clean Truck Regulation complements the Omnibus by providing a phase-in timeline for sales of zero-emission heavy-duty equipment. Recently, CARB staff have indicated in the Advanced Clean Cars II workshops that light-duty cars will be subject to tighter emission standards while increasing sales of ZEVs will be required between 2026 and 2035. A phase-in approach and slight extension of the final implementation date for ZEE SORE will allow CARB to address the Governor's EO and achieve $NO_x$ reductions from all SORE equipment while recognizing small business challenges to adopting ZEE in all commercial applications by 2024. (550-Docket)

Costs to Meet Alternative 2 Emission Limits

The use of EFI along with advanced catalyst technology have been documented as readily available and cost effective technologies to reduce emissions from small engines in the proposed rulemaking by the Consumer Product Safety Commission (CPSC) in 2016 (https://www.govinfo.gov/content/pkg/FR-2016-11-21/pdf/2016-26962.pdf). The CPSC rulemaking proposed low-CO engines and provided estimates for technologies and costs to achieve reduced CO emission limits. The docket cites EPA cost estimates for EFI for Class I and one- and two-cylinder Class II generator engines as $94, $79 and $85, respectively, while accounting for cost savings due to removal of the carburetor on the conventional generator. Catalyst costs for generator engines were estimated in the same proposed rulemaking as $10-$20. We have confirmed these costs in discussions with MECA members. (550-Docket)

Although the CPSC rulemaking was focused on low CO emissions through the use of oxidation catalysts to reduce personal exposure in poorly ventilated spaces, the application of three-way catalysts (TWC) together with closed-loop controlled EFI has been effectively used to reduce NMHC+$NO_x$ emissions to ultra-low levels in passenger cars. Similarly, fuel injection and TWC technology combined with air aspiration for cooling has been demonstrated to be effective at reducing emissions from small engines. For the SORE Alternative 2 proposal, we approximate the cost of catalysts needed to meet the emission limits proposed by CARB in Alternative 2 (or in our Table 1 above). Catalyst costs scale with the size of SORE. For example, catalysts for handheld

equipment engines are projected to cost less than $10 while riding mower engine catalysts are projected to cost less than $100. Overall, the cost to add EFI and advanced catalysts to meet the emission targets in CARB's Alternative 2 would be approximately $200 for the largest SORE. This is in the ballpark of costs reported by CPSC in their 2016 regulatory proposal. (550-Docket)

Finally, an example of a currently available generator and low-CO version of a generator with the same specifications was found to corroborate the cost estimates above. The low-CO generator with EFI and closed loop control has an MSRP of $1165 (https://www.ryobitools.com/products/details/46396022912) while the standard generator has an online price of $1059 (https://www.homedepot.com/p/DEWALT-7-000-Watt-Gasoline-Powered-Electric-Start-Portable-Generator-PM0167000-02/303467252). For an additional comparison, a slightly lower powered Ryobi generator, which is the same make as the low-CO generator shown above, has an online price of $849 (https://www.homedepot.com/p/RYOBI-6-500-Watt-Gasoline-Powered-Portable-Generator-with-CO-Shutdown-Sensor-RY906500S/305311298). The cost difference between the low-CO generator and the other two generators ranges from $106 to $316, which is equivalent to a 10-37% increase in cost. (550-Docket)

Comment: In contrast to previous CARB rulemakings, the SORE SRIA does not include cost estimates based on a bottom-up analysis of incremental technology installed on a baseline engine in order to meet proposed stringent emission standards. In the justification for this proposal, SORE staff applied a different methodology based on comparing manufacturer suggested retail prices (MSRP) of the most comparable currently available equipment. Available models were used to represent either baseline or future, low emissions equipment, representative of Alternative 2. Furthermore, where categories of professional SORE equipment that met Alternative 2 standards were not available, a single adjustment factor across different SORE equipment categories was used. The disparity in cost estimation methodologies between this proposal and prior analyses has resulted in a significant incremental difference of greater than an order of magnitude (e.g., $200 (CPSC) versus $6,000 (CARB) for commercial generators). (550-Docket)

Because the same incremental cost factor derived for a generator was applied to several other types of equipment, the cost to meet Alternative 2 was overestimated, and this likely led staff to conclude that Alternative 2 was less cost effective than the proposed alternative. This resulted in staff rejecting Alternative 2. MECA suggests that CARB staff determine if a review of Alternative 2 is warranted given these industry-provided cost estimates are much lower than those assumed in the original analysis. (550-Docket)

**Conclusion**
MECA appreciates CARB's standard regulatory development process that allows for stakeholder input over the course of the rulemaking. Given the diversity of SORE, especially for the commercial equipment sector, as well as the economic considerations for small businesses, we support a balanced SORE regulation based on Alternative 2 with a modified timeline, as outlined in our comments. Such an approach would quickly electrify equipment that is already cost effective in the market, such as residential SORE, while reducing emissions starting in 2025 from the harder to electrify, larger horsepower equipment. This would provide time for these challenging applications to evolve to being fully electric by 2030. We believe that such a parallel approach achieves near term emission reductions more cost effectively than Alternative 1 while making significant progress toward the 2035 electrification goals of EO N-79-20 and AB-1346. MECA members are committed to supplying components that deliver emission reductions and electrification through a slightly extended implementation timeline that supports the technology investment and transition. Finally, we believe

that CARB has an opportunity to set more stringent emission standards for gasoline-powered SORE that could serve as an example for EPA to develop federal standards. (550-Docket)

Comment: I am Patricia Hanz, here on behalf of the Truck and Engine Manufacturers Association (EMA). EMA and its members have a long history of working cooperatively with CARB and other regulatory agencies worldwide to reduce emissions from their products utilizing cost effective and technically feasible technology. We hope to continue those efforts into the future. My comments today are limited to the impacts of the Proposed Amendments on the manufacturers of Class 1, Class 2 and > 825 cc engines which power non-handheld outdoor power equipment. EMA understands the need to improve air quality in California, the sense of urgency to move forward with significant reductions, and the role that zero emission technology can play. EMA members are actively engaged in applying zero emission technology to non-handheld outdoor power products. Indeed, for certain applications, EMA members have electric or battery powered products available today. However, EMA has multiple concerns with the Proposed Amendments which are describe in detail in our written comments. My comments today are focused on an alternate proposal. *Our Alternate Proposal, detailed in our comments, will achieve equivalent, if not greater, emission reductions than the Proposed Amendments, at a fraction of the cost. And, importantly, it avoids the enormous negative effect the Proposed Amendments will have on the thousands of small businesses that utilize outdoor power equipment.* EMA is committed to working with you to achieve meaningful emission reductions which are both technically feasible and cost effective. Our Alternate Proposal does that by providing a cost effective and technologically achievable program for manufacturers and their customers which can be implemented in a manner that maintains manufacturers ability to provide products which meet customers' needs, including life cycle performance and total cost of ownership, while zero emission technology continues to develop and be introduced to the category. (2011-Docket)

Comment: I am Patricia Hanz here on behalf of the Truck and Engine Manufacturers Association. EMA and its members have a long history of working cooperatively with CARB and other regulatory agencies worldwide to reduce emissions from their products utilizing cost effective and feasible technology. We hope to continue those efforts into the future. My comments today are limited to the impacts of the proposed amendments on the manufacturers of Class 1, Class 2, and larger than 825 cc engines, which power non-handheld outdoor power equipment. EMA understands the need to improve air quality in California, the sense of urgency to move forward with significant emissions and the role that emission -- that zero-emission technology can play. EMA members are actively engaged in applying zero-emission technology to non-handheld outdoor products. Indeed, for certain applications, EMA members have electric or battery-powered products available today as Mr. Coad mentioned. However, EMA has multiple concerns with the proposed amendments, which are described in detail in our written comments. My comments today are focused on an alternate proposal. Our alternate proposal, also detailed in our comments, will achieve equivalent if not greater emission reductions than the proposed amendments at a fraction of the cost. And importantly, it avoids the enormous negative effect that the proposed amendments will have on the thousands of small businesses that utilize outdoor power equipment. EMA is committed to working with you to achieve meaningful reductions, which both -- are technical feasible and cost effective. Our alternate proposal does that providing a cost-effective and technologically- achievable program for manufacturers and their customers that can be implemented in a manner which maintains the manufacturer's ability to provide products meeting customers' needs, including lifecycle performance and total cost of ownership, while zero-emission technology continues to develop. We ask that the Board direct staff to work with us and other stakeholders to develop an implementable alternative

program that can and will provide the benefits that CARB is seeking, but at a lower cost and without undue market disruption. (3016-Oral Testimony)

Comment: I'm the Vice President of Sales for the Zama Group. Zama is a worldwide operating group producing 15 million carburetors, six million oil pumps, and other high precision machine parts every year. Zama supplies emission control components to almost all major manufacturers in the industry. To carburetor manufacturers, the key performance indicators are lead time and cost for the development of electronic emissions control units. Before 2031, it is highly unrealistic that battery-powered products should replace existing technology. Consequently, there would be a lack of outdoor power equipment for maintaining roadway signage visibility and fuel mitigation to reduce wildfires. Zama encourages CARB to consider alternatives, which if used in connection with restrictions for homeowner SORE products would easily achieve CARB's SIP goals while avoiding significant impacts on small businesses and professional users. Developing state-of-the-art limit values shall be considered as an appropriate approach. (3031-Oral Testimony)

Comment: The current international development of limit values, including best available technology, is continuously published by several organizations, including the European Joint Research Center. Although Europe and California have different emission ABT schemes, the proposed European standard of 3550 gram kilowatt hours HC plus $NO_x$ without any compensation scheme are based on best available technology. These values would give the emissions reductions needed to meet the 2016 SIP goals and 2031 federal air quality standards. (3031-Oral Testimony)

Comment: My name is Casey McGrath and I'm Director of Pacific Stihl, a California branch of Stihl, Inc., that distributes gas and battery-powered equipment to independent authorized dealers throughout California. Stihl, Inc. understands CARB's effort to improve air quality throughout California and supports a transition to ZEE, but we are concerned that the accelerated timeline is not feasible for professional products. It does not take into consideration the true impact to professional users and cannot be sustained by the manufacturers that supply the market. We request adjusting implementation of the proposed rule for professional products to allow for additional cooperation between industry and CARB to successfully transition to ZEE. (3032-Oral Testimony)

It will be costly for professionals to transition a full fleet of products from gas over to high quality long lasting professional ZEE. Professional products that are compatible to gas products could cost as much as 10 times more and have fewer product offerings at this time. For many small businesses, the up-front cost of this transition will force them out of business. Thirty million in funding is simply not enough. We are also concerned about the timing of implementation given the current supply chain challenges that appear to be getting worse every day and will only increase in 2024.
(3032-Oral Testimony)

Demand for ZEE products is at an all-time high, while raw materials are gobbled up by the large industries like car -- cars and electronics. Electronic modules and lithium are in short supply causing backorders throughout industry. In fact, the Center for Automotive Research anticipates significant shortages of lithium-ion battery sales and will not resolve until 2029. Moreover, the proposed rule does not adequately address emergency use by with wildland firefighters, utility companies, and farmers, who need non-exempt products to protect Californians from natural disaster. The draft does not adequately address who will qualify for a waiver or how they will purchase products if the equipment is not available in the state. For these reasons and as more specifically outlined in Stihl and OPEI's written comments, Stihl requests that the implementation of the proposed rule be delayed for professional equipment, so that industry can consider alternatives and work with -- together with CARB to develop a successful plan to meet market demands for ZEE transition. (3032-Oral Testimony)

Comment: My name is Michael Geller, Deputy Director of the Manufacturers of Emission Controls Association. MECA represents manufacturers of combustion emission controls we well as electric technologies that reduce both criteria and greenhouse gas emissions from all mobile sources. Our members include companies that provide the engine and after-treatment technologies that enable small off-road engines to meet stringent criteria emission standards and battery materials that power electronics to enable CARB's electrification goals. We appreciate staff's work in developing this rule, including meeting with MECA and other stakeholders, who submitted written comments. Today, I would like to highlight a few points for the Board's consideration. (3042-Oral Testimony)

MECA supports a compliance pathway based on a slightly modified version of staff's Alternative 2 proposal. For this rule, we suggest CARB consider the proven effective regulatory strategy for new heavy-duty trucks and light-duty passenger cars, which phase in tighter emission standards, along with phased in zero-emission requirements. Our suggested alternative would enable small businesses to reduce emissions from their fleets while investing for the transition to ZEE. It would also allow more time for the larger more challenging-to-electrify equipment to overcome performance and utility issues that may delay immediate introduction of ZEE into the commercial sector.
(3042-Oral Testimony)

**Agency Response:**

These comments summarize some of the commenters' concerns regarding the Proposed Amendments, which are discussed at length in other comments, as noted below and in a footnote,[35] and request that CARB consider alternative rulemaking scopes that would result in CARB adopting less stringent emission standards and delaying implementation dates compared to the Proposed Amendments. Commenters also include introductory remarks that describe the commenters' organizations. The scope of the current rulemaking is to achieve SORE emission reductions expected under the 2016 State SIP Strategy, to meet the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible, and to meet the requirement of California Assembly Bill (AB)1346 (Chapter 753, Stats. of 2021) to adopt cost-effective and technologically feasible regulations by July 1, 2022, to prohibit engine exhaust and evaporative emissions from new small off-road engines. Further, Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from all mobile source categories

[35] Regarding the comment "5. EMA's proposal provides significant emission reductions without the impacts of equipment leakage or slower fleet turnover.": This bulleted statement was included in a list of conclusions in the "Introduction" section of the attachment to EMA's November 29, 2021, comment letter, "Comments on the Non-handheld Equipment Inventories in ARB's Small Engine Initial Statement Of Reasons (ISOR)" by Air Improvement Resource, Inc. (AIR). Earlier in its introduction section, AIR defines EMA's proposal with this text: "As a part of its comments on the ISOR, EMA is offering to meet reduced exhaust emission standards of 6 g/kw-hr for Class 1 engines and 3 g/kw-hr for Class 2 and > 825 cc engines starting with model year 2025 for Class 1, and 2026 for Class 2 and > 825 cc engines.[5] [Footnote 5: EMA is also proposing that fixed mount generators installed on DMV licensed motor vehicles and trailers transition to ZEE on the date the vehicle or vehicle pulling the trailer transitions to ZEE (2035 used for modeling purposes).] In addition, EMA is offering to meet the Class 1 standard at a durability period of 500 hours and the Class 2 and > 825 cc standard at a period of 1000 hours. These exhaust emission standards are the same as ARB's proposal for generators for model years 2024-2027. Finally, EMA is agreeing to a emission standard of zero for lawnmowers in model year 2025."

under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards at the earliest practicable date.

To fulfill these requirements, the Proposed Amendments would set emission standards for smog-forming pollutants to zero beginning with MY 2024 for all SORE except portable generator engines and pressure washer engines with displacement of 225 cc or larger. A delayed phase-in for generator and pressure washer engines would allow time for the zero-emission generator and pressure washer markets to further develop. The Proposed Amendments would set more stringent emission standards for portable generator engines and pressure washer engines with displacement of 225 cc or larger beginning with MY 2024, and emission standards of zero beginning with MY 2028.

In contrast, EMA's alternative would delay the implementation date for more stringent emission standards by one or two years, depending on displacement. EMA further states that its proposal includes zero-emission standards for residential lawn mowers in 2025. However, this is not reflected in the table of proposed standards in EMA's comments on specific provisions provided in Exhibit F attached to its November 29, 2021, comment letter and in row B-6 in Attachment B to this FSOR. EMA's proposed alternative does not explicitly establish a date by which any other SORE category would be expected to transition to zero emissions.

Similarly, OPEI's alternative would set more stringent emissions standards for handheld SORE starting in MY 2025 without explicitly establishing a date to transition to emission standards of zero.

MECA's alternative would set an emission standard of zero starting in MY 2025 for all residential equipment and other equipment types where ZEE is cost-competitive with SORE. "Harder to electrify, larger horsepower equipment" would be subject to more stringent emission standards starting in MY 2025, and to emission standards of zero starting in MY 2030. MECA contends that this proposal is similar to CARB's Alternative 2 described in the ISOR that would set more stringent standards for all SORE displacement categories in MY 2024 and then set the emission standard to zero in MY 2026 for all equipment except generators. MECA's proposal would be less stringent than Alternative 2, as more stringent emission standards would be implemented one model year later and emission standards of zero would be implemented four years later than under Alternative 2.

Stihl's alternative would set emission standards of zero for MY 2024 and later for handheld SORE with moderate (50 hrs) and intermediate (125 hrs) emissions durability periods (EDP). Stihl proposes the European limits of 35/50 g/kWh for HC + $NO_x$ for "professional" handheld SORE (with EDP of 300 hours) starting in MY 2027. The Zama Group similarly proposes delayed implementation for professional SORE and use of the European limits for professional SORE in California.

The commenters' proposed alternatives fail to maximize emission reductions and associated health benefits that could be achieved and would make less progress towards meeting the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible, and other mandates. For example, with emission standards of zero not being implemented until MY 2030 under MECA's alternative, the percentage of SORE that would be ZEE in 2035 would be even lower than that in Alternative 2. The commenters' proposals would not maximize emission reductions because ZEE is a viable, technologically feasible alternative to SORE equipment, as described on ISOR pages 11-21. Portable generators and pressure washers with displacement

of 225 cc or larger have a longer time frame to meet emission standards of zero. The Proposed Amendments' more stringent standards for MYs 2024 through 2027 are technologically feasible, as there are currently engines on the market that meet those standards. The proposed alternatives would make it more difficult for California to meet its SIP commitments by delaying or not ever requiring implementation of zero-emission technologies. As described in the ISOR (sections II.A.1 and III.A.3), current SORE regulations will not achieve emission reductions expected under the 2016 State SIP Strategy due in part to noncompliance. The noncompliance rate with current evaporative emission standards is high (~40 percent since 2015, see ISOR section II.A.1), so previously expected emission reductions will not be realized. Potential emission impacts from ongoing noncompliance would still not be addressed if implementation of the Proposed Amendments' emission standards of zero were delayed or abandoned. For these reasons, CARB made no changes to the Proposed Amendments based on these comments. For discussion of similar proposals that would exempt or delay implementation for SORE equipment used by professionals, please refer to section IV.A.2.4.2.

CARB disagrees with some of the commenters' assertions that HC + $NO_x$ emission standards of 35 grams per kilowatt-hour and 50 grams per kilowatt-hour for engines with displacement less than 50 cc and 50-80 cc, inclusive, respectively, represent the best available technology and would maximize emission reductions. As the commenters mention, European standards do not allow for emissions above the emission standards. As discussed on page 165 of the ISOR, and as demonstrated by manufacturers' certification test data, currently-certified engine families in these displacement categories have emissions below the commenters' suggested emission standards and below the emission standards in the Proposed Amendments. The use of credits allows for some engine families to have emissions above the emission standards, providing flexibility for manufacturers. CARB rejected the alternative suggesting HC + $NO_x$ emission standards for engines with displacement less than or equal to 80 cc that are less stringent than those in the Proposed Amendments because it would fail to maximize emission reductions and health benefits, as required by Health and Safety Code sections 43000 and 43018.

CARB also disagrees with the assertions that the Proposed Amendments do not include averaging, banking, and trading (ABT) provisions for handheld products. Amendments to § 2754.1, certification averaging, banking, and trading for evaporative emission credits, are discussed on pages 229-236 of the ISOR. All engines certified to the diurnal or hot soak plus diurnal emission standards specified in § 2754(a) may participate in the ABT program for evaporative emissions. Please refer to Agency Response 37 in Attachment A to this FSOR.

CARB disagrees with the assertions that emission standards of zero would prohibit sales of gas-powered handheld products from 2024. The SORE regulations do not prohibit the sale of CARB-certified SORE, nor do they require sales to be completed by any deadline. For example, CARB-certified MY 2023 engines could be sold by a retailer after 2023.

In response to the statement, "There is no ABT program currently … for handheld evaporative emissions," CARB made modifications to §§ 2753(c), 2754(a), and 2755 to allow an applicant to certify an evaporative emission control system for engines with displacement less than or equal to 80 cc to the diurnal emission standards in § 2754 in lieu of the permeation emission standards in § 2755 and follow the certification procedures outlined in CP-902, adopted July 26, 2004, and amended September 18, 2017. This modification is described in the March 2022 15-Day Notice and in section II.A of this FSOR. This modification is intended to allow manufacturers of engines with displacement less than or equal to 80 cc, which are often

used in handheld equipment, to earn evaporative emission credits through MY 2023. Engines with displacement less than or equal to 80 cc are not currently subject to the diurnal emission standards. This modification allows manufacturers to earn more evaporative emission credits than could occur under the Proposed Amendments in the ISOR.

In response to EMA and OPEI comments about the SORE2020 emissions inventory estimates, CARB disagrees with their assertions that the SORE2020 emissions inventory model overestimates SORE emissions. As discussed in section IV.A.14, the SORE2020 emissions inventory model is based on the best available data. Comparison of the final activity estimates used in the SORE2020 emissions inventory model to the U.S.EPA NONROAD model and past models developed by CARB, as well as lawn and garden surveys do not indicate any overestimation of annual usage or emissions by the SORE2020 emissions inventory model [CARB, 2020, Appendix J[36]]. Even if emissions were overestimated in the inventory, it would not mitigate the need for maximum emission reductions from SORE. Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from SORE by the earliest practicable date. Achieving emission standards of zero is feasible for SORE, regardless of the SORE emissions inventory. For discussion of the comments regarding the SORE2020 emissions inventory and its basis, as well as comments about "leakage" and "scrappage," please see the Agency Responses in sections IV.A.14 and IV.A.15. Please refer to the Agency Responses in sections IV.A.14, IV.A.15, and IV.A.35.2 for discussions specific to the EMA AIR analysis and EMA NERA/Trinity analysis.

EMA's comments include an introduction that describes EMA's actions prior to publication of the ISOR, states EMA's opinions regarding the Proposed Amendments, the 2016 State SIP Strategy, and EO N-79-20, and states EMA's opposition to the adoption of the Proposed Amendments.

In response to the statement, "Instead, what staff are now proposing amounts to an overly-aggressive interpretation, not of the underlying 2016 State SIP Strategy, but rather of the Governor's recent Executive Order directing the transition of off-road mobile sources in California to zero emissions by 2035 – a goal that CARB proposes to accelerate by more than a decade in this case, to 2024 for all SORE except portable generators": CARB disagrees with the commenter's characterization of the Proposed Amendments. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. The Proposed Amendments would not require people to stop using their current CARB-certified SORE equipment. People can continue to use and repair their CARB-certified SORE equipment until the end of its life. The Proposed Amendments will implement the SORE SIP Strategy measure, as described in Chapter V of the ISOR, and will result in 93.2 percent of the small off-road equipment subject to the SORE regulations being ZEE in 2035, as described in section II.A.7 of this FSOR.

In response to the statement, "staff are proposing to mandate that dramatically accelerated transition to zero-emission equipment without having undertaken the necessary analysis of the technical feasibility and cost-effectiveness of doing so. As a result, the pending proposal is

[36] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

neither reasonable nor implementable,": The technological feasibility of the Proposed Amendments is discussed in Chapter I.E of the ISOR and in the Agency Responses in section IV.A.35 of this FSOR. The cost-effectiveness of the Proposed Amendments is discussed in Chapter VII of the ISOR and in the Agency Responses in sections IV.A.13 and IV.A.35 of this FSOR. CARB disagrees with the commenter's statements and conclusions. The commenter does not provide evidence that the Proposed Amendments are not reasonable or that they cannot be implemented. EMA's other comments are discussed throughout Chapter IV of this FSOR.

In response to the statement, "As detailed again in our comments below, and especially with regard to Class 1, Class 2 and > 825cc SORE engines and equipment (hereinafter referred to as "non-handheld products"), the Proposed SORE Amendments are cost-prohibitive, infeasible, unenforceable, and invalid. In that regard, the Proposed Amendments do not address any of the serious overarching concerns that EMA and many other stakeholders detailed in their earlier workshop comments,": Comments EMA submitted prior to publication of the ISOR were among those that staff considered when developing the ISOR Proposed Amendments. The commenter does not provide evidence that the Proposed Amendments are cost-prohibitive, infeasible, unenforceable, or invalid.

In response to the statement, "our members have been and remain willing to develop and introduce cost-effective technology solutions to effect meaningful ROG and $NO_x$ reductions. As evidence of that, and as detailed later in these comments, EMA has developed and proposed an alternative program that provides California with ROG and $NO_x$ reductions equivalent to or exceeding those reasonably expected from the Proposed SORE Amendments, at a fraction of the cost. As it stands, the Proposed Amendments will lead to significant adverse results for all stakeholders and, more importantly, California's air quality,": CARB disagrees with the commenter's statements that EMA's alternative would result in emission reductions equivalent to or exceeding those from the Proposed Amendments and that the Proposed Amendments will lead to significant adverse results for all stakeholders and California's air quality. The commenter does not provide evidence to support its conclusions. EMA's comments detailing its proposal are addressed in this Agency Response, in the Agency Responses in section IV.A.35 and throughout this Chapter IV of this FSOR.

Exhibit B in EMA's comments, titled "Effectiveness and Cost-Effectiveness of Alternative SORE Emission Standards," Truck & Engine Manufacturers Association, dated November 23, 2021, discusses National Economic Research Associates, Inc.'s (NERA) and Trinity Consultants, Inc.'s (Trinity) evaluations of the effectiveness and cost-effectiveness of (a) EMA's proposal, (b) a combination of EMA's proposal and the Proposed Amendments, and (c) the Proposed Amendments in achieving the goals of the rulemaking. It is available on CARB's website: https://www.arb.ca.gov/lists/com-attach/912-sore2021-VzICaVw8Ag4EYQdo.zip. The evaluations use data from four engine manufacturers to determine strategies for manufacturers to minimize their costs. The Report measures effectiveness in terms of emission reductions and cost-effectiveness in cost per ton of emission reductions and includes evaluations that ignore the authors' assessments of market price effects and that include the authors' assessments of market price effects, which the authors describe as "leakage" and "scrappage."

The results for the evaluation excluding market effects indicate the greatest emission reductions would result from the Proposed Amendments, and the cost per ton of emission reductions is highest for the Proposed Amendments. The results for the evaluation including market effects indicate the Proposed Amendments would achieve the fewest emission

reductions. The authors state their estimates of cost-effectiveness for the EMA proposal and the combination of the EMA proposal and the Proposed Amendments, but state, "Because the Staff ZEE Proposal leads to lower emissions reductions than the other alternatives, its incremental cost-effectiveness is negative and cannot be meaningfully shown on the figure." The authors calculate emission reductions and a cost of emission reductions but do not divide the cost by the emission reductions to estimate cost-effectiveness. The authors state that some users would retain their equipment longer than they would in the absence of the Proposed Amendments (the "scrappage" effect) and that some users would travel out of California to purchase equipment (the "leakage" effect). The authors state, "These results indicate that the Staff ZEE Proposal is clearly inferior to the other two proposals when market impacts are included, as both of the other proposals lead to greater emissions reductions at substantially lower cost."

The report includes comments on the alternatives considered in Chapter VIII of the ISOR, stating, "Evaluating alternatives with a range of stringency is recommended by economists and policy analysts to provide decision makers with full information on the choices before them, and for good reason. The lack of alternatives that differ in final stringency deprives the CARB of important information as they decide on SORE standards."

CARB disagrees with the commenters' conclusions presented in EMA's Exhibit B. Statements regarding "leakage" and "scrappage" are conclusory, with the authors citing themselves as the authorities on these topics without supporting their claims. The commenters provide an overview of a methodology for the analysis as a whole but do not explain their assumptions for costs or provide details of their cost calculations. Some of the values the authors use in their analysis are omitted from the report. The reason the authors provide is to "avoid disclosing confidential information." EMA's members may not share sales information with each other since they are competitors. The omission of data from the report may be due to certain members being the only ones to produce engines among EMA's membership for certain applications. The opacity of the authors' analysis precludes detailed assessment of the assumptions and calculations. The NERA/Trinity analysis does not demonstrate that CARB's economic analysis is insufficient or inappropriate or that EMA's alternative would be less burdensome than and equally effective as the Proposed Amendments. The NERA/Trinity analysis uses circular arguments, declaring that the Proposed Amendments would suffer from leakage and scrappage effects, while claiming the EMA proposal would not suffer from those same effects, to conclude that the EMA proposal would be more effective and cost-effective than the Proposed Amendments. CARB disagrees with EMA's claim that the Proposed Amendments would result in fewer emission reductions than EMA's proposal. EMA's claim is based on its unsupported assumptions regarding "leakage" and "scrappage." EMA does not demonstrate that these effects would be real or that setting less stringent emission standards (as in EMA's proposal) would result in greater emission reductions than setting more stringent emission standards (as in the Proposed Amendments). CARB disagrees with the commenters' statement that the Proposed Amendments are inferior to EMA's proposal. Please refer to the Agency Responses in sections IV.A.14.1 and IV.A.15 for additional discussion of comments on "leakage."

OPEI's comments include an introduction that describes OPEI as an organization, discusses OPEI's members and their products, states opinions and conclusions regarding the support for the Proposed Amendments in the ISOR, including the reliability of the data CARB used and the benefits of the Proposed Amendments, and states opinions regarding potential alternatives to the Proposed Amendments. The comments do not suggest a change to the Proposed Amendments. The commenter's more specific comments regarding its opinions and

conclusions are addressed throughout this FSOR. Please refer to the Agency Responses in section IV.A.35 for additional discussion of comments related to technological feasibility and cost-effectiveness of the Proposed Amendments.

In response to the statement, "The Proposed Rule does not comprehensively consider alternative solutions to meet federal air quality standards," and similar statements: These comments state commenters' opinions and do not provide evidence to support those claims. CARB disagrees with statements suggesting the Proposed Amendments lack consideration of existing and future technologies. The commenters do not support such statements with evidence. The Proposed Amendments are inherently technology neutral because they specify emission standards of zero and do not specify a particular energy source or technology. For example, as noted on ISOR page 24, hydrogen fuel cell powered equipment are considered ZEE under the Proposed Amendments. The Proposed Amendments do not prohibit the use or certification of SORE. Rather, the Proposed Amendments set emission standards that must be met. Emission reduction credits may be used to offset emissions from SORE as necessary. Commenters do not provide evidence that a certain technology would result in greater life-cycle emission benefits than those that will occur with ZEE. While the Proposed Amendments would reduce greenhouse gas emissions and petroleum use, they are specifically designed to achieve the expected NOx and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20, and would reduce emissions of pollutants that have multiple known adverse health effects. Please refer to the Agency Response in sections IV.A.6.3 and IV.A.6.4 for additional discussion of emissions from electricity generation and statewide demand for electricity. Comments regarding the SORE2020 emissions inventory are discussed in the Agency Responses in section IV.A.14. Alternatives to the Proposed Amendments are discussed in Chapter VIII of the ISOR. No alternative proposal was found to be less burdensome and equally effective in achieving the purposes of the Proposed Amendments in a manner that ensures full compliance with the authorizing law being implemented or made specific by the Proposed Amendments. The Board has not identified any reasonable alternatives that would lessen any adverse impact on small business. Commenters did not provide evidence that any alternative would be less burdensome and equally effective in achieving the purposes of the Proposed Amendments in a manner that ensures full compliance with the authorizing law being implemented or made specific by the Proposed Amendments.

MECA's comments include an introduction that describes MECA as an organization, discusses MECA's members and their products, and discusses California's air quality and emissions from SORE. In response to MECA's comments about the inputs to the economic analysis and how they affect the cost-effectiveness of Alternative 2: Since ZEE for all major equipment types already exist, CARB conducted the analysis based on existing equipment prices. CARB recognizes the volatility of prices in the outdoor power-equipment sector, and did not limit the pricing analysis to manufacturer suggested retail prices. Prices used for many pieces of equipment were actual point of sale prices from stores. This analysis is a valid method of determining costs associated with the Proposed Amendments. MECA claims that Alternative 2 may be more cost-effective if a bottom-up analysis were conducted that would estimate the potential cost of emissions controls necessary for existing equipment to meet more stringent emission standards. Even if this were the case, CARB would reject this alternative for failing to maximize emission reductions and the other reasons listed above.

For additional discussion of comments regarding technological feasibility and cost-effectiveness, please refer to the Agency Responses in section IV.A.35. Comments regarding

costs to manufacturers and equipment purchasers are further discussed in Agency Responses in section IV.A.13.2.

For discussion of comments related to alternative technologies and fuels, please refer to the Agency Response in section IV.A.2.6.3.

For discussion of comments regarding supply chain and incentives, please see sections IV.A.28.2 and IV.A.1.2, respectively.

Please refer to the Agency Responses in section IV.A.33.1 for discussion of comments related to maintaining road sign visibility and fuel mitigation to reduce wildfires.

### A.2.6.3. Alternative fuels and technologies

Comment: Aether Catalyst Solutions, Inc. is a developer of catalysts for automotive emissions abatement. We have recently investigated the application of our technology to the challenging environment of small motors and our work has led to the development of a catalyst capable of removing $NO_x$ from the exhaust gas stream of a range of small motor products. Recent field tests with ride-on mowers used by a nearby municipality have shown that the unoptimized catalyst can reduce the $NO_x$ emissions from a Ferris Pro Cut S by a minimum of 50%. Our catalyst can be installed in the muffler of many small motor products and thus lends itself to a simple aftermarket solution for the large inventory of existing SORE products owned by California residents. In the same way, the catalyst could easily be integrated into the existing supply chain by the OEMs. Historically, with platinum group metals the only viable option for exhaust remediation, catalytic converters were too expensive for wide-spread use in SORE. The existing aftermarket products for SORE emissions reduction all suffer from this issue. Aether's solution, a catalyst using no platinum group metals, is cost effective; typically offering an order of magnitude cost reduction. Battery technology offers homeowners excellent alternatives to gasoline power for occasional use equipment. However, due to the weight and space requirements of extra batteries, this technology is still not practical for most commercial users. In the power generation segment, battery packs do not currently (nor will they soon) have the power density to replace a gasoline generator. Fuel cells present a clean option, but the technology is costly and requires users to store, and have access to, substantial amounts of hydrogen for fuel. (461-Docket)

Aether believes that its technology aligns strongly with CARB's proposed amendments to the SORE regulations in that the technology can significantly lower the $NO_x$ emissions of SORE products right now, in the most economically benign way. Although the technology will not achieve the proposed zero NMHC+$NO_x$ goal, it could offer, in the interim, a major, significant step forward from the current regulations and can address both new and existing products. Many experts have said that tomorrow is too late to prevent climate change. Aether is committed to offering practical, economical solutions to today's climate and air quality challenges, bridging the gap between today and a zero emissions future. (461-Docket)

Comment: Suburban Propane Partners, L.P. ("Suburban Propane") writes in regards to the proposed amendments to the Small Off-Road Engine ("SORE") regulations. Suburban Propane has been serving customers for more than 90 years and is the nation's third-largest propane retailer with operations in 41 states. In California, Suburban Propane distributes propane and renewable propane to more than 60,000 residential, commercial, industrial, agricultural, and government customers. We employ over 200 people at 71 locations throughout the state. In 2020, we made a strategic investment in Oberon Fuels, a California company producing renewable dimethyl ether ("rDME"). With the support of

Suburban Propane, Oberon Fuels became the world's first, and currently only, commercial producer of rDME. In the first quarter of 2022, we will begin commercially selling Propane+rDME, a revolutionary new fuel made of renewable propane blended with rDME that is remarkably low-carbon and has the potential to evolve into a carbon- negative fuel. Suburban Propane supports the goal of reducing SORE equipment emissions. However, mandating the use of zero-emission equipment ("ZEE"), which prioritizes electricity over all other energy sources, ignores available and developing low-carbon and carbon-negative technologies that can achieve the State's goals using existing LPG infrastructure and without potentially harming small businesses along the way. The need to significantly and immediately reduce emissions means that California will need to rely on all available tools, including traditional propane, renewable propane, and rDME. (475-Docket)

As currently drafted, the proposed amendments would require most new SORE equipment to emit zero exhaust and evaporative emissions for model year 2024 and all subsequent model years; exhaust emissions for portable generators will also be set to zero beginning in 2028. While not expressly stated in the proposed amendments, it clearly prioritizes electricity under the implied assumption that it will be the option with the lowest carbon intensity in 2024 and beyond. However, this assumption is incorrect. According to CARB's own analysis, grid electricity used as transportation fuel has a carbon intensity ("CI") score of 75.93.[1] Meanwhile, renewable propane has a range of CI scores from 43.5 to 20.5,[2] and Propane+rDME is estimated to have an even lower CI score. [Footnote 1: See https://ww2.arb. ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities (accessed November 22, 2021).] [Footnote 2: Id.] (475-Docket)

The Initial Statement of Reasons, published in conjunction with the proposed amendments, states that the goal is to transition SORE equipment to ZEEs, which are primarily electric. Electricity is one tool for reducing the state's carbon emissions, but rapid electrification of most SORE equipment is not the most efficient or productive way to lower carbon emissions as it neglects other currently available options, including traditional and renewable propane. (475-Docket)

Comment: We encourage the Board not to focus on promoting electric energy, but rather to take a technology- neutral approach that focuses on the end goal of reducing carbon emissions. The Board could incorporate SORE emissions into its highly successful Low Carbon Fuel Standard program. The regulatory framework and technical details of establishing a CI score are well tested and have led to a 10.9 percent reduction in transportation sector emissions from 2006.[5] [Footnote 5: See https://ww2.arb.ca.gov/applications/greenhouse-gas-emission-inventory-0 (accessed November 22, 2021)] For the reasons above, we urge the Board to permit SORE equipment be powered by low carbon and carbon negative renewable fuels, such as traditional propane, renewable propane, and rDME. We would appreciate the opportunity to discuss with you how such energy sources can play a role in lowering California's carbon footprint. Thank you for your consideration. (475-Docket)

Comment: **Comment 5: The Proposed Amendment does not provide technology openness**
The current rule-making proposal from CARB is based on a single drive technology only. STIHL expects a "fair of share" of emission targets that guarantee a future-orientated openness to technology. Global warming needs pluralism of technology e.g. Hydrogen, Carbon Capture and Reuse (CCR), Hydrogen based synthetic fuels in which also the combustion engine has its justification for mobile source applications. (509-Docket)

STIHL proposes a technology open regulation approach including:

1. *Alkylate fuels:*
The benefits of alkylate fuel should be considered, as they have a significant reduction potential regarding Reactive Organic Gases (ROGs), without necessitating a straight ban of a wide range of essentially needed products. According to the study of William P. L. Carter et al, the analysis of an alkylate manufacturer showed a reduction potential of approximately 60% in ROG. In addition, alkylate fuels are fully compatible with older products that are already on the market, which will be un-impacted by the SORE regulations as written - on the other hand, encouragement of alkylate fuel would result in reductions of ROGs in new and existing equipment. Indeed, if 100% of the entire SORE fleet was converted to alkylate fuel from 2022, based on 2016 State SIP Strategy for SORE (Baseline Scenario emissions in 2016: 108 tpd of ROG), there would be ROG savings of approximately 65 tpd. (509-Docket)

Alkylate fuel is a near drop-in for today's SORE technology and offers short term and long- term emission reductions, plus other customer-friendly benefits such long shelf life and increased engine performance. Use of alkylate fuel has been adopted, and even mandated, in other regions of the world, and is readily available throughout the United States. In Switzerland, for example, alkylate fuel is mandatory for certain use-cases. Customers are well informed about the environmental and quality benefits, resulting in a majority of users switching to alkylate fuel in their small engines. Market acceptance of alkylate fuel for small engines in California would likewise not require the development of any new technologies, or the wasteful replacement of existing equipment. Alkylate fuels are already available on the shelves of local dealers and retail stores throughout California, priced reasonably, and well accepted by sophisticated users. Given the significant environmental benefits, ease of implementation and reasonably low burden it would impose on users, retailers and manufacturers. (509-Docket)

CARB should have thoroughly explored alkylate fuels like the European Commission, as an alternative to its proposed regulations. By its availability and effectiveness the introduction of alkylate fuel alone would exceed the required emission reduction goal according to the 2016 SIP. Blowers, brush cutters and split-booms in particular are suitable for use with low-emission 4- stroke engines. An example is STIHLs BR 800 with a HC+$NO_x$ FEL 13 g/kW-hr. In combination with an alkylate fuel that is already available for many years, this blower significantly undercuts ROG+$NO_x$ less than 10 g/kW-hr without technical modification. (509-Docket)

2. *Regeneratively produced fuel such as E fuels or other synthetic fuels:*
To address global warming variety of energy sources and technologies are needed. Including wind, solar and hydrogen as well as hydrogen based synthetic fuels. We would like to urge CARB not to ban combustion engines running on hydrogen and hydrogen based synthetic fuels. These technologies would be necessary to allow the transition to a de-fossilized or decarbonized society. We therefore propose a waiver procedure or exemption to allow combustion engines running on hydrogen, ammonia or other synthetic fuels. Similar exemption is built in the EU Exhaust Emission Regulation for Non-Road Mobile Machinery[7] for new technology engines. The use of hydrogen, ammonia and hydrogen based synthetic fuels would be necessary to fully benefit from new technologies' potential to significantly reduce emissions. This would allow an efficient and effective transition to a de-fossilized or decarbonized society. [Footnote 7: Regulation (EU) 2016/1628 of the European Parliament and of the Council of 14 September 2016 on requirements relating to gaseous and particulate pollutant emission limits and type- approval for internal combustion engines for Non-Road Mobile Machinery, amending Regulations (EU) No 1024/2012 and (EU) No 167/2013, and amending and repealing Directive 97/68/EC] (509-Docket)

We therefore propose to allow combustion engines running on hydrogen, ammonia or other synthetic fuels. A similar differentiation has been successfully integrated in several other constituencies. (509-Docket)

Comment: **Conclusion:** Sustainability is an integral part of a long tradition at STIHL, where continuity and long-term thinking have always been key elements of our business approach. We feel a special sense of obligation to our staff, the environment and society. Our sense of responsibility has evolved over a period of decades and is firmly rooted in our corporate culture, as reflected in STIHL's significant investment in ZEE and other sustainable technologies. Against this backdrop, we are convinced that the above-mentioned measures would guarantee the 2016 State Implementation Plan and 2031 federal air-quality standards to be met. (509-Docket)

The abrupt shift from combustion engines to ZEE products would come at a high cost – without sufficient justification or analysis. The biased approach to bet on electric machinery only is arbitrary and capricious and ignoring the potential of alternative ready-to use technologies. The Clean Air Act (CAA) is explicitly referring to technologies like synthetic fuels because i) synthetic fuels carry an enormous potential to reduce emissions with the existing fleet and ii) synthetic fuels are an accepted alternative across the globe. That way, CAA take the principle of proportionality into account whilst fostering global harmonization at the same time. For this reasons, EPA might not be in a position to grant the waiver. (509-Docket)

To be clear and transparent, STIHL wholeheartedly supports the transition towards zero-emission equipment. In order to make the transition a success, the potential underlying regulatory framework needs to be technology-neutral and the feasibility of the transition must be adequately examined and prepared to ensure market acceptance and supply chain capabilities. (509-Docket)

Comment: In combination with the above solutions, the benefits of alkylate fuel and other future regeneratively produced fuels should have been considered, as they have the potential to significantly reduce ROGs without necessitating a ban of a wide range of needed essential products. According to William P. L. Carter's assessment[24] prepared for CARB, the analysis of an alkylate manufacturer showed a ROG reduction potential of approximately 60%. In addition, alkylate fuels are fully compatible with older products that are already on market,[25] which will be un-impacted by the SORE regulations as written. On the other hand, encouragement of alkylate fuel would result in reductions of ROGs in new and existing equipment. Indeed, if 100% of the entire SORE fleet were converted to alkylate fuel from 2022, based on 2016 State SIP Strategy for SORE (Baseline Scenario emissions in 2016: 108 tpd of ROG), there would be a ROG savings of approximately 55 tpd of ROG. [Footnote 24: "Updated Maximum Incremental Reactivity Scale and Hydrocarbon Bin Re-activities for Regulatory Applications"; Prepared for California Air Resources Board Contract 07-339 by William P. L. Carter; College of Engineering; Center for Environmental Research and Technology University of California, Riverside, CA 92521; Revised January 28, 2010] [Footnote 25: Alkylate fuel is, in fact, much more suitable for SORE products than standard fuel available at a local gas station. Small engine manufacturers recommend using alkylate fuels first; only if they are not available should regular gas station fuel be used.] (524-Docket)

Alkylate is a near drop-in for today's SORE technology and offers short term and long-term emission reductions, plus other customer-friendly benefits such long shelf life and increased engine performance. Use of alkylate fuel has been adopted, and even mandated, in other regions of the world. In Switzerland, for example, alkylate fuel is mandatory for certain uses; and end users are well informed about the environmental and quality benefits, resulting in a majority of users switching to alkylate fuel in their small engines.[26] Market acceptance of alkylate fuel for small engines in California

likewise would not require the development of any new technologies, or the wasteful replacement of existing equipment. Alkylate fuels are already available on the shelves of local dealers and retail stores throughout California, priced reasonably, and well accepted by sophisticated users. Given the significant environmental benefits, ease of implementation and reasonably low burden it would impose on users, retailers and manufacturers, CARB should have thoroughly explored alkylate fuel as an alternative to its proposed regulations. [Footnote 26: See, e.g., Einsatzfelder und Nutzen Des Alkylatbenzins - Ein Lagebericht (Fields of Application and Benefits of Alkylate Petrol - A Situation Report); Bafu und Smu; Switzerland; 2008. In Switzerland, alkylate fuel is mandatory in forestry for certain certified wood (e.g. Forest Stewardship Council (FSC) and in certain counties. (524-Docket)

Comment: In an attempt to help combat climate change, the propane industry has invested heavily in the development of renewable propane, derived from sustainable sources like beef tallow or used cooking oil. In terms of cost, renewable propane is also completely fungible with current propane-fueled technologies, allowing consumers to use renewable propane as a drop-in solution without the burden of purchasing new equipment to help reduce emissions. In addition, there is already enough renewable propane available in the United States today to displace 10% of the fossil propane consumed in the state's propane transportation sector. WPGA is dedicated to helping California meet its decarbonization goals and has made a sustainability commitment to supply 100% renewable propane in California by 2030. (539-Docket)

Comment: Propane generators should be embraced by this regulation with an analysis life-cycle emissions. These life cycle emissions should account for how electricity is generated and the source of new emerging fuels like renewable propane. (539-Docket)

Comment: *[WPGA respectfully asks that CARB:…]* Perform life cycle emissions analysis on the proposed regulated equipment that includes embedded emissions associated with electricity generation; (539-Docket)

Comment: **Technologies are Commercially Available**
Engines and aftertreatment systems can be designed and optimized to simultaneously reduce emissions of HC, NOx, CO and PM. The types of technologies that will enable these lower emission limits to be met include electronic fuel injection (EFI), improved spark control, secondary air introduction, and advanced catalysts based on experience from passenger car formulations. Larger engines in the SORE category can benefit from the use of oxygen sensors and closed loop control of air-to-fuel ratios. In some cases, this will involve redesign of engines from today's carbureted fuel delivery. Catalyst technology for small spark-ignited (SI) engines draws from the years of successful experience in the U.S. with three-way catalytic converters applied to light-duty gasoline cars and trucks. Catalyst technology has also been successfully applied to a wide variety of non-handheld equipment and generators (e.g., lawn mowers, motor scooters, and marine generators). In many cases, these catalyst systems have been specifically engineered to provide high reductions of HC and $NO_x$ emissions, as well as reductions in CO emissions. The successful application of catalysts to these smaller gasoline engines has required the engineering of exhaust systems that effectively manage exhaust component temperatures, provide for efficient packaging of the catalyst within the exhaust system, include consideration for the safe operation of the engine in the environment, and have adequate mechanical and catalytic durability. New catalyst formulation and volume adjustments can be designed for each engine application as well as reducing oil consumption to ensure catalysts meet new emission standards at today's maximum durability requirements. (550-Docket)

There is a wide range of electric small equipment technology in the market place for residential applications, and the preference of non-commercial users to buy this technology, based on its

convenience and low maintenance, has resulted in relatively high penetration (>50%) of residential ZEE. Conversely, CARB's survey conducted by Cal State Fullerton has shown a much smaller penetration (1%) of commercial ZEE. This demonstrates that businesses face challenges in meeting all their commercial needs with the use of ZEE. Given there are several models of commercial ZEE available for purchase, the low penetration is not because it is not technologically feasible, but rather it is likely due to the inability of the equipment to fully perform the needed tasks for an entire day of work while meeting the capital cost requirements for (especially small) businesses. (550-Docket)

Comment: Furthermore, MECA previously worked with the Consumer Product Safety Commission to demonstrate the ability of generators to meet low CO emission limits through the application of closed-loop EFI, engine calibration and catalysts. These generators are commercially available today and can serve as examples how other types of equipment can meet more stringent emission standards. (550-Docket)

Comment: Under the original regulatory scope CARB staff outlined and initiated a demonstration program to define two important elements needed to inform the SORE ISOR. First, SORE equipment would be retrofitted with engine and aftertreatment technology to demonstrate technological feasibility to meet more stringent emission standards. Second, zero emission equipment would be benchmarked to demonstrate the ability of various equipment types to meet the performance and durability needs of end users, especially commercial landscapers. Unfortunately, the two-year pandemic combined with decommissioning the El Monte laboratory made this task difficult within the timeframe of the rule. (550-Docket)

Over the past 50 years, demonstration programs, research and targeted testing have been used to provide necessary data that form the backbone of every regulatory effort at both CARB and EPA. These data give industry and end-users the confidence that technologies will be available and will be cost effective while meeting the performance needs of customers. Demonstration programs also provide industry with examples of technology pathways that can be used to estimate the costs of meeting more stringent standards. Prior CARB and federal SORE rulemakings included equipment teardowns to develop incremental technology costs of tighter emission standards. (550-Docket)

Comment: The good news is that we may have a potential alternate conversion that could be reviewed immediately as part of a phase in approach while our engineering teams ramp up R&D on battery pack options for our newly segmented industrial/commercial category.

- First of all we could immediately start the process to retrofit most engines currently in use as well as all new production units moving forward once the approval is given and all tests are performed to established criteria. With the assistance and guidance of the California Air Resource Board we could establish a realistic and fair date to implement as we gear up research and development for the electric 10-20KW battery power source.
- We could acquire great results just not zero emissions, but we could accomplish zero evap and eliminate up to >95% of $NO_x$, >98% Carbon Monoxide, >95% Hydro Carbons using **LP (liquid propane) conversion kits**. (559-Docket)

Comment: Cleaner fuel technologies are not represented in the cost/benefit reward: No equipment or vehicle is "zero- emissions" as life cycle costs produce emissions throughout manufacturing, transport, marketing and sales to end users illustrate. Advancing a narrative that "ZEE" is the only option is misleading. Additionally, research from the Public Policy Institute of California in 2020 shows jobs affected by this proposal are among the hardest hit by the mass exodus <hyperlink:

https://www.ppic.org/blog/whos-leaving-california-and-whos-moving-in/> from the state over the past few years (2001-Docket)

Comment: An additional observation. The proposed amendment focuses too narrowly on the outright ban of a single type of product, without considering effective and efficient alternatives. The Clean Air Act explicitly refers to technologies like synthetic fuels or eFuels, because they carry an enormous potential to reduce emissions with the existing fleet. We'd also like to mention alkylate fuel could reduce ROG emissions up to 60 percent. We therefore propose an exemption to allow combustion engines running on alternative fuels. A similar exemption is built in the EU emissions regulation. To conclude, Stihl supports the transition to ZEE, but we are concerned that the current transition time is too ambitious, especially for professional users. In addition, the biased approach to bet on ZEE only is arbitrary and capricious and ignores the potential of ready-to-use alternatives. (3038-Oral Testimony)

Comment: While residential ZEE have seen a natural progression to upwards of 50 percent penetration, the commercial sector lags in the uptake of electric models. We believe that this is an opportunity for existing emission control technologies to significantly reduce emissions from non-electric equipment. Cost effect technology, such as electronic fuel injection, advanced catalysts, and evaporative system components can be applied to SORE for under $200 per unit as estimated by U.S. EPA and the Consumer Products Safety Commission in a recent rulemaking for portable generators. To conclude, MECA thanks CARB staff for their efforts. We believe there is an important opportunity to pragmatically clean up SORE through a combination of strategically deploying cost-effective emission controls while simultaneously transitioning the SORE fleet to zero emission. This will allow a few more years for the largest ZEE equipment to improve its utility and performance to meet the needs of many small businesses. Our industry is committed to commercialize the technologies that will help enable this goal. (3042-Oral Testimony)

Comment: Innovation in the industry has resulted in alternative fuels providing greater reliability, affordability, and resiliency to residents, while also providing greater fuel -- full fuel cycle emission reductions than that of electric. Specifically, the propane industry has invested heavily in the development of renewable propane, derived from sustainable sources like beef tallow or used cooking oil. Renewable propane is also completely fungible with current propane fuel technologies, allowing consumers to use renewable propane as drop-in solution without the cost burden of purchasing new equipment to help reduce emissions. (3044-Oral Testimony)

**Agency Response:**

These comments request that CARB consider rulemaking alternatives that would focus on low-carbon and carbon-negative technologies and fuels, new technologies to reduce $NO_x$ emissions, and other alternative fuels such as alkylate fuels to reduce ROG emissions. Some of the comments request that these be considered as interim measures, and others request that they be long-term measures, to improve cost-effectiveness compared the Proposed Amendments that require zero-emission technologies. Commenters also include introductory remarks that describe the commenters' organizations and operations. Some of the comments state that implementation of these low-emission technologies and fuels would achieve the emission reductions expected under the 2016 State SIP Strategy and therefore should have been considered as an alternative in the ISOR. Also, some of the comments claim that the Proposed Amendments are not "technology-neutral." CARB made no changes based on these comments for several reasons. The following response describes those reasons and provides clarification and context for several points within the above comments.

First, CARB disagrees with the comments that claims the Proposed Amendments are not technology-neutral, do not provide "technology openness," or otherwise prioritize electricity over all other energy sources. The Proposed Amendments are inherently technology neutral because they specify emission standards of zero and do not specify a particular energy source or technology. For example, as noted on ISOR page 24, hydrogen fuel cell powered equipment are considered ZEE under the Proposed Amendments.

Indeed, because the Proposed Amendments are technology neutral, there is no need to further amend the SORE regulations to allow or require the use of low-emission technologies and fuels. The existing SORE regulations and Proposed Amendments would allow "all available tools, including traditional propane, renewable propane, and rDME" under the ABT emission reduction credit program to help significantly and immediately reduce emissions. Manufacturers may use emission reduction credits to offset emissions from engines which use low-emission technologies and fuels. As discussed on pages 3 and 39 of the ISOR, implementing emission standards of zero [0.00 grams of hydrocarbons (HC) + $NO_x$ per kilowatt-hour, or $g \cdot kWh^{-1}$, for exhaust emissions and 0.00 grams per test for evaporative emissions] does not necessarily mean that all new sales of small off-road equipment would be ZEE. Banked emission reduction credits could be used to offset emissions from low-emission SORE for up to five model years after the credits were generated. Also, engines or equipment emitting below 0.005 $g \cdot kWh^{-1}$ or $g \cdot test^{-1}$ could be certified to meet emission standards of zero. The effective use of credits could enable continued certification of generator engines beyond MY 2027 and other SORE beyond MY 2023. Lower-emitting engines would require fewer credits than higher-emitting engines, so more lower-emitting engines could be certified.

Second, an alternative to require low-emission technologies instead of zero-emission technologies was not evaluated in the ISOR because, even if such a rulemaking scope could achieve emission reductions expected under the 2016 State SIP Strategy, it would not comply with other mandates for CARB that define the scope of the Proposed Amendments described in the October 2021 45-Day Notice and ISOR. As discussed on page 2 of the ISOR, California Health and Safety Code section 43018 requires CARB to "endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the state standards at the earliest practicable date." Allowing emissions to continue for SORE equipment that have feasible zero-emission options would fail to comply with requirements under Health and Safety Code section 43018. In addition, the commenters' proposed alternatives would make less progress towards meeting the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible, and would fail to maximize health benefits as required by California Health and Safety Code section 43000, subsection (b). Their proposed alternatives also would make it more difficult for California to meet its SIP commitments by delaying or not ever requiring implementation of zero-emission technologies. As described in detail in the ISOR (sections II.A.1 and III.A.3), current SORE regulations will not achieve emission reductions expected under the 2016 State SIP Strategy due in part to noncompliance. The noncompliance rate with current emission standards is high (~40 percent since 2015, see ISOR section II.A.1), so previously expected emission reductions will not be realized. For these reasons, CARB made no changes to the Proposed Amendments.

In response to the comment, "While not expressly stated in the proposed amendments, it clearly prioritizes electricity under the implied assumption that it will be the option with the lowest carbon intensity in 2024 and beyond,": CARB intentionally made no statements—direct or implied—in the Proposed Amendments nor the ISOR about carbon intensity because the Proposed Amendments are not specifically designed to reduce carbon emissions. Rather, the

Proposed Amendments are specifically designed to achieve the expected $NO_x$ and ROG emission reductions in the 2016 State SIP Strategy for SORE and the goals of Executive Order N-79-20. As described in Chapter I of the ISOR, emissions of $NO_x$ and ROG from SORE contribute to three criteria air pollutants—ozone, PM, and $NO_2$—that have adverse health effects. Health benefits of the Proposed Amendments for California residents include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease.

Regarding the comment, "Market acceptance of alkylate fuel for small engines in California would likewise not require the development of any new technologies, or the wasteful replacement of existing equipment": to clarify, the Proposed Amendments would not require people to stop using their current SORE equipment. The current SORE regulations and the Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. People can continue to use and repair their SORE equipment until the end of its life (e.g., until the SORE equipment breaks or people decide to upgrade equipment). There is no scheduled date of elimination for SORE equipment that California residents and businesses currently own.

WPGA's request for CARB to perform life cycle emissions analysis on the proposed regulated equipment and FWEDA's comments regarding life cycle emissions are beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comment. The scope of the rulemaking described in the October 2021 45-Day Notice does not include performing life cycle emissions analysis.

In response to the statement, "Advancing a narrative that "ZEE" is the only option is misleading. Additionally, research from the Public Policy Institute of California in 2020 shows jobs affected by this proposal are among the hardest hit by the mass exodus <hyperlink: https://www.ppic.org/blog/whos-leaving-california-and-whos-moving-in/> from the state over the past few years,": CARB disagrees with the commenter's conclusions. The Public Policy Institute of California article linked in the comment does not discuss the Proposed Amendments or indicate individuals with certain types of jobs leave California; the content of the article is beyond the scope of this rulemaking.

Regarding MECA's comments about catalysts and fuel injection technologies and demonstration programs: CARB recognizes the effect that implementation of catalysts and fuel injection can have on small off-road engines. Additionally, CARB recognizes that the utilization of a catalytic converter and fuel injection may be useful for manufacturers certifying engines to meet the more stringent emission standards that will be implemented beginning with MY 2024. As it relates to concerns about the adoption of ZEE by landscapers and demonstration projects, please see Agency Responses in section IV.A.35 and the discussion in the ISOR X.E regarding the ZEE Roadshow.

Regarding the comment, "However, due to the weight and space requirements of extra batteries, this technology is still not practical for most commercial users,": The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the

SORE2020 emissions inventory report [CARB, 2020[37]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. Please refer to the Agency Response in section IV.A.2.4.2 for discussion of similar comments about ZEE batteries for commercial use.

For Agency Responses specific to the comments about fuel cells, and battery packs and power density related to generators, please refer to the Agency Responses in sections IV.A.2.3.1 and IV.A.2.3.2.

For discussion of the other alternatives referenced by some of these comments, please see the Agency Responses in sections IV.A.2.4.2, IV.A.2.4.3, IV.A.2.6.1, and IV.A.2.6.2. For discussion of issues related to the Clean Air Act and waivers, see the Agency Response in section IV.A.10.

For additional discussion of comments regarding technological feasibility and cost-effectiveness, please refer to the Agency Responses in section IV.A.35.

## A.3. AB 1346 requirements

### *A.3.1. Availability of zero-emission portable generators*

Comment: Executive Order (EO N-79-20), section 1 states, "It shall be further a goal of the State to transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible." Section 2 states "In implementing this Paragraph, the State Air Resources Board shall act consistently with technological feasibility and cost-effectiveness." The EO clearly and specifically accommodates off-road equipment like generators that do not have a technologically feasible replacement and allows sufficient time for the potential development of technology that does not yet exist within the framework of the EO's stated goals and 2035 timeline. There are no suitable replacements available, or even realistically projected to be available in the next 10 years that would be a feasible and cost-effective ZEE replacement for a Gasoline Generator. In the event of a power outage (whether unplanned power outage or PSPS) it is essential to have access to electrical power. Operating lifesaving home medical equipment and having heat and/or air conditioning are not mere conveniences, they are lifesaving necessities to vulnerable populations. Having the ability to refrigerate food, cook food, have running water, have lights for safety are all necessities, not luxuries. This is even more true in the case of Gasoline Marine Generators. When a boat is underway at sea, or at anchor, there is no access to shore power, often for extended periods of time. (507-Docket)

Comment: **III. The Proposed Amendments Are Neither Technologically Feasible Nor Cost-Effective**
The Proposed Amendments have been in process at CARB for more than two years. Assembly member Berman introduced Assembly Bill ("AB") 1346 in March 2021 and originally simply tracked what CARB was already doing, "adopt cost-effective and technologically feasible regulations to prohibit engine exhaust and evaporative emissions from new small off-road engines, as defined by the state board." But the legislature felt that what CARB was already doing was not protective enough of people who rely on portable generators in emergencies, recognizing that converting portable generators to zero emission will be difficult. The legislature therefore amended AB 1346 in

[37] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

the Senate to specifically require that CARB consider the "expected availability of zero-emission generators" when determining technological feasibility. (515-Docket)

Multiple senators assured their colleagues that CARB would ensure that ZEE portable generators would be available before enacting amendments to the SORE regulations. Senator Allen stated that "the amendments that have been taken in this house [regarding portable generators] really make this bill sensible and workable."[18] [Footnote 18: Senator Ben Allen, Senate Floor Session Debate on AB 1346 (Sept. 8, 2021).] He then added that "there is built in flexibility into this bill … so as to be able to track the development of technology in the space in real time."[19] [Footnote 19: Id.] His comments imply that CARB would provide for a process to continue to track the availability of ZEE generators prior to mandating their sale. But CARB did not change the Proposed Amendments after the legislature enacted AB 1346 to reflect this type of procedure. In fact, CARB staff finalized the Proposed Amendments less than one month after the Governor signed AB 1346 into law. Thus, it is impossible that CARB engaged in the type of analysis that the legislature demanded regarding the availability of portable generators. (515-Docket)

Senator Hertzberg, who voted for AB 1346 said the following: "I am happy about the amendments with respect to generators because the comments made by my colleagues reek with common sense. If you have power shutoffs or other things, you have to have a power source in the interim to generate power."[20] [Footnote 20: Senator Robert Hertzberg, Senate Floor Session Debate on AB 1346 (Sept. 8, 2021).] Senator Hertzberg then stated, "If there are any folks from CARB listening to this … please, as you implement regulations understand and listen to the legislature and the comments they are making and what guidance they are giving you as you move forward."[21] [Footnote 21: Id.] As described below, CARB has failed to do so. (515-Docket)

Comment: Zero-emissions portable generators are not readily available, not affordable, and cannot be easily recharged in the event of a power outage, meaning the proposed amendments are not in compliance with AB 1346. (3057-Oral Testimony)

Comment: The ISOR does not provide evidence that any of these key factors will improve by 2028. In passing AB 1346, the Legislature recognized the limited availability of zero-emission portable generators. It amended the bill in the Senate to specifically require that CARB consider the expected availability of zero-emission generators. As stated by Senator Hertzberg on the floor of the Senate, and I quoting, "If there are any folks from CARB listening to this, please, as you implement regulations, understand and listen to the Legislature, and the comments they are making, and what guidance they are giving you as you move forward". But staff did not listen and proceeded with its previous proposal less than one month after AB 1346 was signed into law. The staff proposal does not reflect the guidance provided by the Legislature. (3058-Oral Testimony)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The comments describe the commenters' assessments of the requirements of AB 1346 and the Proposed Amendments' compliance with those requirements. The following response provides clarification and context for several points within the above comments.

In response to the statement, "The EO clearly and specifically accommodates off-road equipment like generators that do not have a technologically feasible replacement and allows sufficient time for the potential development of technology that does not yet exist within the framework of the EO's stated goals and 2035 timeline,": CARB agrees that AB 1346 provides

for CARB to determine that some equipment may need more time to comply with emission standards of zero. The Proposed Amendments allow more time for generators to meet emission standards of zero and do not require anyone to stop using their SORE generator.

In response to the statements, "[Senator Allen's] comments imply that CARB would provide for a process to continue to track the availability of ZEE generators prior to mandating their sale. But CARB did not change the Proposed Amendments after the legislature enacted AB 1346 to reflect this type of procedure. In fact, CARB staff finalized the Proposed Amendments less than one month after the Governor signed AB 1346 into law. Thus, it is impossible that CARB engaged in the type of analysis that the legislature demanded regarding the availability of portable generators," and "staff did not listen and proceeded with its previous proposal less than one month after AB 1346 was signed into law. The staff proposal does not reflect the guidance provided by the Legislature,": CARB acknowledges the comments from members of the Legislature during the Legislature's consideration of AB 1346. The Proposed Amendments comply with the requirements of AB 1346, including the requirement to consider the "expected availability of zero-emission generators and emergency response equipment," in determining technological feasibility. This is one of the reasons the Proposed Amendments allow more time for generators to meet emission standards of zero. CARB followed the development of AB 1346 and was aware of the requirements contained therein prior to its passage in the Legislature and signature by the Governor. CARB's publishing the ISOR shortly after signature of AB 1346 does not indicate that the Proposed Amendments do not comply with the requirements of AB 1346. CARB disagrees with the commenters' conclusions. The Proposed Amendments do not require sale of zero-emission generators; they require new engines to meet more stringent emission standards, including emission standards of zero.

Please refer to the Agency Responses in sections IV.A.2.3, IV.A.27 and IV.A.35 for discussion of comments related to the portable generators and the technological feasibility and cost-effectiveness of the Proposed Amendments.

### *A.3.2. Evaluation of residential and commercial uses*

Comment: **III. AB 1346 and Legislative Intent**
We also believe CARB has a statutory requirement to further analyze this difference between residential and commercial use. In March 2021, Assembly Berman introduced Air Pollution: Small Off-Road Engines (AB 1346[16]) which codified much of what CARB had detailed in a March 2021 workshop. NALP and CLCA worked with members of the California Legislature to make amendments to reduce the harm on landscape professionals. In the Senate the following amendments were added in August 2021[17]. [Footnote 16: CA AB 1346 Chapter No. 2021-753 (Approved by the Governor October 9, 2021)] [Footnote 17: CA AB 1346 Amendments Adopted August 26, 2022]

(2) In determining technological feasibility pursuant to paragraph (1), the state board shall consider all of the following:

(A) Emissions from small off-road engines in the state.

(B) Expected timelines for zero-emission small off-road equipment development.

(C) Increased demand for electricity from added charging requirements for more zero- emission small off-road equipment.

(D) Use cases of both commercial and residential lawn and garden users.

(E) Expected availability of zero-emission generators and emergency response equipment. (533-Docket) (533-AppA-Docket) (542-Docket)

We believe these amendments require CARB to further examine both commercial and residential lawn and garden uses. Furthering this legislative intent at an April 28, 2021 hearing on AB 134 Assembly Member Luz Rivas spoke candidly about her support for the bill but that the legislation should take into consideration the concerns raised in the analysis regarding commercial application. Assembly Member Ruiz also stated concerns over those that also need to make a living specifically the large number of landscapers and gardeners that live in her district that use lawn equipment and potentially could not afford the new ZEE technology. (533-Docket) (533-AppA-Docket) (542-Docket)

Considering that Governor Newsom did not sign this bill into law until October 9th, just three days before the release of the ISOR we don't feel a proper analysis of the technical feasibility was conducted, nor were alternatives like our proposal to extend only commercial/professional grade equipment properly explored and vetted. (533-Docket) (533-AppA-Docket)

Comment: The landscape industry relies on this equipment to support their employees, customers and families and their concerns must be considered. (533-Docket)

Comment: Governor Newsom signed AB 1346 into law just three days before the release of the ISOR and in talking with CARB staff, we don't feel the analysis of the technical feasibility to the degree mandated by AB 1346 was conducted, nor were alternatives, like our proposal to extend only commercial/professional grade equipment, properly explored and vetted. (542-Docket)

CHAPTER 753

An act to add Section 43018.11 to the Health and Safety Code, relating to air pollution.

[Approved by Governor October 9, 2021. Filed with Secretary of State October 9, 2021.]

LEGISLATIVE COUNSEL'S DIGEST

AB 1346, Berman. Air pollution: small off-road engines.

Existing law imposes various limitations on the emissions of air contaminants for the control of air pollution from vehicular and nonvehicular sources. Existing law assigns the responsibility for controlling vehicular sources of air pollution to the State Air Resources Board.

This bill would require the state board, by July 1, 2022, consistent with federal law, to adopt cost-effective and technologically feasible regulations to prohibit engine exhaust and evaporative emissions from new small off-road engines, as defined by the state board. The bill would require the state board to identify and, to the extent feasible, make available funding for commercial rebates or similar incentive funding as part of any updates to existing applicable funding program guidelines to local air pollution control districts and air quality management districts to implement to support the transition to zero-emission small off-road equipment operations.

*The people of the State of California do enact as follows:*

SECTION 1. (a) The Legislature finds and declares all of the following:

(1) Small off-road engines (SORE), which are used primarily in lawn and garden equipment, emit high levels of air pollutants, including oxides of nitrogen (NOx), reactive organic gases (ROG), and particulate matter (PM). NOx and ROG together contribute to formation of ozone, a criteria pollutant with a national ambient air quality standard set by the United States Environmental Protection Agency (U.S. EPA) and a California ambient air quality standard and that has adverse impacts on health. Currently, California exceeds U.S. EPA and state standards for ozone in many areas, including the South Coast Air Basin, the San Francisco Bay area, and the County of Sacramento. NOx also contributes to formation of PM, which, along with directly emitted PM, has direct negative health impacts. PM also has an air quality standard set by the U.S. EPA and the state. Many areas in California also currently fail to meet PM standards, including the South Coast Air Basin and the San Joaquin Valley Air Basin.

(2) In 2020, California daily NOx and ROG emissions from SORE were higher than emissions from light-duty passenger cars. SORE emitted an average of 16.8 tons per day of NOx and 125 tons per day of ROG. Without further regulatory action, those emission levels are expected to increase with increasing numbers of SORE in California. Regulations of emissions from SORE have not been as stringent as regulations of other engines, and one hour of operation of a commercial leaf blower can emit as much ROG plus NOx as driving 1,100 miles in a new passenger vehicle.

(3) Currently, there are zero-emission equivalents to all SORE equipment regulated by the State Air Resources Board. The battery technology required for commercial-grade zero-emission equipment is available and many users, both commercial and residential, have already begun to transition to zero-emission equipment.

(4) The Governor's Executive Order No. N-79-20 of September 23, 2020, directs the state board to implement strategies to achieve 100 percent zero emissions from off-road equipment in California by 2035, where feasible and cost-effective. The state will not achieve that goal without further regulation of SORE, including a mandate to transition all sales of new equipment to zero-emission equipment.

(b) It is the intent of the Legislature to encourage the state board to act expeditiously to protect public health from the harmful effects of emissions of small off-road engines.

SEC. 2. Section 43018.11 is added to the Health and Safety Code, to read:

43018.11. (a) (1) By July 1, 2022, the state board shall, consistent with federal law, adopt cost-effective and technologically feasible regulations to prohibit engine exhaust and evaporative emissions from new small off-road engines, as defined by the state board. Those regulations shall apply to engines produced on or after January 1, 2024, or as soon as the state board determines is feasible, whichever is later.

(2) In determining technological feasibility pursuant to paragraph (1), the state board shall consider all of the following:

(A) Emissions from small off-road engines in the state.

(B) Expected timelines for zero-emission small off-road equipment development.

(C) Increased demand for electricity from added charging requirements for more zero-emission small off-road equipment.

(D) Use cases of both commercial and residential lawn and garden users.

(E) Expected availability of zero-emission generators and emergency response equipment.

(b) Consistent with the regulations adopted pursuant to this section and relevant state law, the state board shall identify, and, to the extent feasible, make available, funding for commercial rebates or similar incentive funding as part of any updates to existing, applicable funding program guidelines



for districts to implement to support the transition to zero-emission small off-road equipment operations.

(542-Docket)

Comment: NALP lobbied to have language included in AB 1346 to consider differences between residential and commercial uses, and we do not believe the ISOR adequately fulfills this directive. (3034-Oral Testimony)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments. The comments describe the commenters' assessments of the requirements of AB 1346 and the Proposed Amendments' compliance with those requirements.

In response to the statement, "We believe these amendments require CARB to further examine both commercial and residential lawn and garden uses," and similar statements: The Proposed Amendments comply with the requirements of AB 1346, including the requirement to consider the "Use cases of both commercial and residential lawn and garden users," in determining technological feasibility. CARB considered the impacts of the Proposed Amendments on individuals and businesses, including landscaping businesses. CARB followed the development of AB 1346 and was aware of the requirements contained therein prior to its

passage in the Legislature and signature by the Governor. CARB's publishing the ISOR shortly after signature of AB 1346 does not indicate that the Proposed Amendments do not comply with the requirements of AB 1346. CARB disagrees with the commenters' conclusions. Chapter I.E of the ISOR discusses technological feasibility of emission standards of zero for commercial and residential lawn and garden equipment. Chapter VII discusses costs for commercial and residential lawn and garden equipment.

Other laws, such as Health and Safety Code 43018, require technological feasibility analyses and assessments of economic impacts to CA businesses, which include commercial landscapers. The Proposed Amendments meet the requirements of AB 1346. CARB made an addition to the analyses presented in the ISOR: an electricity demand analysis was released separately for public comment and Board consideration. Please refer to section IV.A.2.4 for additional discussion of lawn and garden equipment and alternatives proposed by some of the commenters.

### *A.3.3. Questions about actions to comply with AB 1346*

Comment: **Subject: SORE Amendment & AB 1346 Clarification**
I recently received the Public Hearing announcement, which also involves SORE equipment. AB 1346 sets a July 2022 deadline, but the directives to CARB staff appears to be covered by the recent regulatory efforts and the upcoming consideration of the SORE regulatory amendments. Is my understanding correct? Or are there additional efforts that CARB will be required to pursue by July 2022 with the recent approval of AB 1346? (565-Email)

Comment: **Subject: California AB 1346 and CARB's projected implementation**
I have three questions regarding the California's bill AB 1346, which, depending on the California Air Resources Board (CARB), is projected to ban the sale of Small Off- Road Engines (SOREs) in January 2024. The state has budgeted $30 Million to help gardeners transition to cleaner greener equipment. Questions:

1) When will the effective date of the ban be finalized by CARB?

2) How long before the effective date will the budgeted funds be available to gardeners?

3) Will the funds be disbursed by the local California Air Boards to gardeners?

If you do not have the answers to these questions now, do you know when the information will be available to the public? (590-Email)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The comments include questions from commenters about the requirements of AB 1346 and the Proposed Amendments' compliance with those requirements. The following response provides clarification and context for several points within the above comments.

The Proposed Amendments comply with the requirements of AB 1346. CARB followed the development of AB 1346 and was aware of the requirements contained therein prior to its passage in the Legislature and signature by the Governor. CARB does not have current plans to initiate additional rulemaking to comply with the requirements of AB 1346.

In response to the question, "1) When will the effective date of the ban be finalized by CARB?": The Proposed Amendments do not prohibit the sale of CARB-certified SORE or require anyone to stop using SORE equipment. The Proposed Amendments will be submitted to the Office of Administrative Law (OAL) by October 2022. Once approval is received from OAL, the Proposed Amendments will be filed with the Secretary of State and could become effective in late 2022 or early 2023. New emission standards will be implemented starting with MY 2024.

In response to the questions, "2) How long before the effective date will the budgeted funds be available to gardeners?" and, "3) Will the funds be disbursed by the local California Air Boards to gardeners?": The Budget Act of 2021 provided $30 million the FY21-22 California state budget "to create a program, or utilize an existing program, to provide incentives for professional landscaping services in California operated by small businesses or sole proprietors to purchase zero-emission small off-road equipment." CARB will ensure this funding is used to provide incentives to sole proprietors and other small landscaping businesses in California to purchase ZEE, including batteries for the equipment. The funding was included in CORE. The Board voted on this inclusion at their November 2021 hearing. Details of how the SORE funding will be distributed will be determined through a public process.

## A.4. Agreement with other commenters

Comment: STIHL has signed on to the comments filed by OPEI, and respectfully submits the following supplemental comments to CARB's proposed regulatory language published on October 12th, 2021 (the "Proposed Amendment"). (509-Docket)

Comment: This comment only provides the somewhat narrow perspective of the equipment end event rental industry within California. There are obviously other industries affected by the proposed SORE regulations, particularly the manufacturers of SORE equipment. The Outdoor Power Equipment Institute (OPEI) is submitting comments on this proposal. ARA wishes to associate itself with OPEI comments on the timing of implementation dates. (513-Docket)

Comment: Briggs & Stratton, the leading American small engine manufacturer, submits these comments to the recently announced changes to CARB's proposed amendments to the Small Off-Road Engine ("SORE") Regulations Transition to Zero Emissions. Briggs & Stratton is a member of the Outdoor Power Equipment Institute ("OPEI") and the Engine Manufacturers Association ("EMA") and supports the EMA Proposal submitted to CARB on November 29, 2021. Given the impracticability of the SORE Transition to Zero Emissions proposed amendments on the SORE manufacturing industry and commercial applications of SORE equipment, Briggs & Stratton is submitting these brief comments to highlight some of the proposed amendments' more problematic aspects. (528-Docket)

Comment: In addition to our proposal, NALP has also been working closely with the Outdoor Power Equipment Institute (OPEI) and the Far West Equipment Dealers Association (FWEDA). NALP has experience and expertise using SORE while OPEI and FWEDA has much more experience and expertise with manufacturing the equipment and going through the certification process with CARB. Because of this, NALP apologizes if some of the jargon used in this section is inexact but NALP would also like to publicly endorse proposals coming from OPEI and FWEDA that also delays implementation timelines and would ease the transition on professional users of SORE (533-Docket) (542-Docket)

Comment: In summary, our position is not one of opposing a move to zero emissions in California. However, the time frame of 2024 creates unrealistic timelines for manufacturers and commercial small businesses to convert to products that meet zero emissions. We support the EMA proposal, which provides for significant emission reductions to meet SIP goals. (3003-Oral Testimony)

**Agency Response:**

These comments made by separate commenters agreeing with each other's comments are included for completeness, but we did not attempt to ascertain which specific points the commenters were agreeing with. CARB made no changes based on the comments. The specific substantive elements by the original commenters are addressed by other Agency Responses in this document.

## A.5. Air Index label

Comment: CARB should delete the proposed requirement that manufacturers include an Air Index Label on products, since CARB has not conducted the hearing required under the current regulations to demonstrate that the labeling is an effective means of communicating information to consumers. (521-Docket)

**Agency Response:**

This comment recommends the removal of current regulatory text that was not subject to the scope of the Proposed Amendments described in the October 2021 45-Day Notice. The rulemaking scope defined by the October 2021 45-Day Notice does not include making changes to § 2404(l)(4). Therefore, CARB made no changes based on this comment.

## A.6. Batteries

### *A.6.1. Charging infrastructure*

Comment: Here are some concerns listed:

Among the problems of using battery powered commercial landscape equipment, there are:

-issues related to charging many batteries such as fire hazards to a facility

-limits of electrical circuits in a facility

-limits of power availability to a facility that would be charging at least 1,000 batteries for 50 landscape crews in 1 day (assuming mowers, blowers, etc would all be using batteries, 20 5ah batteries per crew which is a bare minimum, not mowing much grass)

-limits of personnel to work overnight to rotate batteries

-limits of "peak hours" where electricity is rationed exactly when landscapers would need to charge many batteries in the evening (102-Docket)

Comment: Most companies and individuals will not have the financial resources to prepare or set up their shop to support enough charging stations. I believe that state and local officials should immerse themselves with small to medium sized companies so they know exactly what challenges we will face and how they can help. Give us to 2028 to be inline with the phaseout of gas generators. (491-Docket)

Comment: Charging issues in the field and in the workshop (533-Docket)

Comment: Although it is in all of our interests to do our part to replace the use of gas fueled landscape power equipment the timeline proposed to accomplish this is unrealistic for many reasons as follows:

* We would need to install expensive charging equipment in our landscape yards.

* All locations on our commercial accounts would need charging stations

* The electric power equipment currently is not up to speed compared to our current equipment

* The cost to replace our existing equipment within the proposed timeline would cost our company ten of thousands of dollars. We need more time (554-Docket)

Comment: Businesses that use SORE also use other commercial equipment and vehicles regulated by CARB's onerous mandates (LSI, fleets, ACT, etc.) with estimated upfront costs for other equipment, batteries and charging infrastructure exceeding the purchase and operating costs to replace gas-powered equipment within its limited life cycle. Additionally, charging infrastructure is largely substandard. Business will be required to install various input voltages to manage different types of equipment charging, yet another increase in the cost of doing business, in addition to accommodating existing gas-powered equipment needs. (2001-Docket)

Comment: Two other things. Charging infrastructure is limited. There isn't enough battery power -- or electricity in many buildings and homes to charge all this battery every night. And actually many of the small manu -- small landscape companies don't have access to electricity every night. The power supply from PG&E grid 21 may be on short supply from the high demand. (3048-Oral Testimony)

Comment: Battery powered technology is also not appropriate for all applications and users. Many rural areas lack the infrastructure needed to charge, transport safely and recycle battery powered equipment - and this infrastructure will not exist at the scale necessary to meet the state's accelerated timelines. And, battery powered equipment is simply not a viable option for many critical services, like fuel mitigation, firefighting, emergency services, infrastructure/utilities maintenance, tree care and cleaning services that depend on small engine powered equipment to keep our citizens and infrastructure safe. (Form Letter A-Email)

Comment: Battery powered technology is also not appropriate for all applications and all users. Many rural areas lack the infrastructure needed to charge, transport safely and recycle battery powered equipment – and this infrastructure will not exist at the scale necessary to meet the state's accelerated timelines. And, battery powered equipment is simply not a viable option for many critical services, like fuel mitigation, infrastructure/utilities maintenance and tree care and clearing services that depend on small engine-powered equipment to keep our citizens and infrastructure safe. (Form Letter G-Email)

**Agency Response:**

These comments discuss the commenters' considerations regarding battery charging and electrical service; they do not request a change to the proposed amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments. The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's

assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[38]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. The Proposed Amendments do not require anyone to upgrade their electrical service. Some commenters state that they may upgrade their electrical service to facilitate battery charging. Smart charging switches are another option that can allow for the charging of many batteries on just one electrical circuit without exceeding the current rating of the circuit. One such smart charging switch retails for $1,595 and can handle up to 8 chargers [Towa Industries, 2022[39]]. Landscapers and other users may choose to use higher-capacity batteries, which could reduce the number of chargers and batteries that an organization would need. CARB did not assume landscapers would need to or be able to charge batteries during a work day. The economic analysis assumed users would purchase enough batteries to complete a day of work, as described on page 39 of the SRIA. Please refer to the Agency Response in section IV.A.6.4 for discussion of California's electrical infrastructure and statewide electricity demand for ZEE. Please refer to the Agency Response in section IV.A.33.1 for discussion of comments regarding fuel mitigation, infrastructure/utilities maintenance and tree care. Please refer to the Agency Response in section IV.A.2.4.2 for discussion of comments that request a delay in compliance dates for SORE equipment used by landscapers and other professionals.

Upfront costs that businesses experience due to other regulations are beyond the scope of this rulemaking.

### *A.6.2. Battery production and afterlife*

Comment: As a Southern California authorized dealer for outdoor power equipment over the last forty - one (41) years, our industry has experienced many changes operating in the State. (8-Docket)

Issue One Disposal of Hazardous Waste (Used Batteries)
In response to the recent passing of AB1346 and the "one size fits all" approach to creating this legislation and now how to implement it, concerns should center on the disposal of used batteries. It is well documented that our State has a serious problem with the concept of recycling. Fewer recycling centers are available and like cardboard, it is an industry with growing pains. Essentially, there is way too much by product to recycle or upcycle and much of it is going into landfills. Additionally, the general public is either unwilling or not prepared to address the issue of personal convenience over ecological impact. So, now with AB1346 and the introduction of equipment powered by batteries, what is the plan to responsibly dispose of used batteries which is hazardous waste. As a generator of used gas (cradle to grave manifests), used oil (consolidated manifests) and byproduct from an aqueous parts washer (consolidated manifests) it is necessary to pose the question, what is the industry standard to dispose of used batteries. (8-Docket)

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[38] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[39] Towa Industries. 2022. TOWA PDM 20-8 SmartCharger. Available at: www.towatools.com/towa-pdm-smart-charger/. Last accessed: February 10, 2022.

Comment: And what is a responsible tracking method for knowing where each and every battery associated with a piece of equipment is disposed of in its' afterlife. (8-Docket)

Comment: It is ironic for the State to adopt an "out of sight, out of mind" mentality based on what AB1346 is defined to offset but instead creates on ecological wasteland in the making with hazardous waste from used batteries. (8-Docket)

Comment: The battery industry creates its' own set of hazardous issues that can' t be conveniently ignored because it is popular or a quick fix. (8-Docket)

Comment: Summary. Thank you for the opportunity to express our concerns and bring to your attention what must be incorporated into AB1346 to effectively contribute but not burden the State of California with yet add another layer of waste in our landfills and unrealistic expectations. The legislation as presented will put individuals in harmsway due to not understanding the expressed needs of endusers and recognizing the limitations of batteryoperated equipment as well as the hazardous waste associated with them. (8-Docket)

Comment: Second: Disposing of batteries has become a challenge to our business and homeowners alike. I have currently been waiting a month (and still not been cleared) to be allowed by our local Transfer Station to have an appointment to dispose of lithium batteries. (12-Docket)

Comment: I am also very concerned where all of these batteries are ultimately landing. They are not recyclable. Are they being stacked on vacant land in Nevada with all of the worn out electric vehicles? (12-Docket)

Comment: I also know the state is not prepared to handle the disposal of spent batteries in a proper manner at this time as well. (70-Docket)

Comment: One concern is the manufacturing and disposal of the batteries. Please do not pass this law!!!!! (79-Docket)

Comment: What about overall battery life? Not long I suspect with all that heavy use, in extreme conditions, a few months to a year? So now you are talking about millions upon millions of dead batteries annually, that have to be replaced frequently at large cost ... and that are potentially toxic in and of themselves. Maybe half get properly recycled ... but the other half are going to end up in the landfills. What's the cost, both financial and environmental, to that? (97-Docket)

Comment: Does CARB have a recycling program for lithium batteries in place or in process to support the anticipated battery population growth? (104-Docket)

Comment: lastly, where does lithium mining and the disposal of batteries do to the environment. it sounds great to go battery but it is still a long way off before it is available in all products and not a biohazard for disposal. (110-Docket)

Comment: Battery powered equipment needs lithium and a lot of other natural resources and energy to build them. These batteries can't be recycled. (127-Docket)

Comment: I am against the banning of small off road engines. I have been a California Licensed Landscape Contractor for 40+ years. Here are my objections; 1. The thousands of small gardeners & tree trimmers will eventually have thousands and thousands of battery equipment. All Lithium

charged. And when those pieces of equipment go bad where do you think those defunct Lithium batteries will go?? Answer straight into our landfills. That is a disaster!!! (428-Docket)

Comment: Of course, we share your concern for protecting our environment. We all desire to care for the earth and work hard to build a sustainable future. In fact, MTA has even created an entirely new staff position for developing green energy. However, this legislation will not achieve the intended outcome of reducing ecological damage. In fact, the net effect of this dramatic legislation is actually worse for our environment. Any deeper look into the realities of increasing battery adoption will reveal that the energy equivalent of 100 barrels of oil is used to make a battery that can store the equivalent of one barrel of oil (M. Mills), meaning a move away from combustion engines could cause a 100-fold increase in energy consumption. Furthermore, it is demonstrated that "green" equipment requires ten times more material than fossil-fuel equivalents, and 500,000 pounds of ore must be mined in order to produce 1 battery for an electric car (M. Mills). Please do not attempt a future and putative gain in human welfare at the expense of an immediate and certain loss of it. We feel strongly that a more thoughtful and more measured approaches to alternative energy will better serve both humanity and our precious environment. (463-Docket)

Comment: The disposal of batteries is not resolved ether. No on the ban for batterie powered equipment! (472-Docket)

Comment: Also, the lithium batteries that would be required due to this bill would present an enormous expense to all of the industries currently using pressure washers and steam cleaners, and could present an additional problem for the environment. Disposing of these batteries could prove to be a bigger problem for the environment than our equipment does. (474-Docket)

Comment: Electric batteries are detrimental to the environment, e.g., they leave toxic elements in landfills, the strip mining involved in procuring the materials for the batteries decimates the land, they catch fires that can't be extinguished. (489-Docket)

Comment: No wonder more and more people are leaving CA every day with ill conceived Bill's such as this. I live in rural California and use a gas powered chainsaw, gas powered line trimmer, gas powered lawn mower, gas powered ATVs, gas powered generators. They are not going to save the planet by banning the sale of gas powered small engines. This is simply a "feel good" bill to appease the far left environmentalist Wackos. Lithium for batteries is mined using child slave labor. It takes fossil fuel to charge the batteries. If the batteries aren't recycled they will end up in landfills. What's next? Banning the import of gas powered small engines from out of state. Get a life and stop interfering with ours. (511-Docket)

Comment: An environment impact for battery powered equipment has not been published. A published report documenting the environmental impact and cost of Lithium battery production from cradle to grave. How much non-renewable fossil fuel is required for the production, recycle and disposal of the Zero-Emission battery? (514-Docket)

Comment: A fully detailed environmental impact for battery powered equipment has not been published to my awareness. A published report documenting the environmental impact and cost of Lithium battery production from cradle to grave would make sense if we are to fully mandate their employment. How much non-renewable fossil fuel is required for the production, recycle and disposal of the Zero-Emission battery? (514-Docket)

Comment: And, of course, there are disposal costs associated with the spent batteries that are not accounted for in CARB's TCO assessment. (521-Docket)

Comment: Recycling Challenges
As more industries continue to shift into battery powered technologies, the need to properly care for these batteries at the end-of-life grows as well. Getting certain "high energy" lithium-ion batteries (i.e., batteries rated at greater than 300 W-h per battery), such as those batteries needed to power many professional SORE equivalent ZEE products, to the last step in a circular economy comes with various technical and economic challenges. As battery sizes and formats continue to evolve, it will be increasingly difficult for recycling vendors to create universal solutions, especially as there are increasing demands for raw material supplies and rare earth metals. Today's regulations limit an end user's ability to easily transport these batteries back to manufacturers or potential recycling partners unless there are proper drop-off locations with certified vendors. Title 49 C.F.R. Section 173.185 outlines the legal requirements for transportation of lithium-ion cells and batteries to, from and within the U.S. Currently regulations provide significant exemptions for transportation of small lithium-ion cells and batteries (i.e., batteries rated at less than 300 W-h per battery), however no such reverse-logistic or recycling exemptions exist for lithium-ion batteries exceeding 300 W-h. These batteries require fully regulated hazardous material shipping provisions. Through industry outreach OPEI is learning of new developments that may fill these transportation gaps in the future. However, this will take time and may require special packaging that would include additional costs and could still be restricted by watt-hour ceiling limitations. (524-Docket)

Comment: Individual states and the federal government are taking actionable steps forward to address the ongoing recycling initiatives for lithium rechargeable batteries. The EPA is developing a National Recycling Strategy with a roadmap that includes tangible goals that will incorporate EPR programs. However, current market solutions still require significant resources that may not be sustainable over time. There are many other areas, beyond transportation, that are still being reviewed and developed around lithium-ion batteries including: Storage, Packaging, Air Transport, UN Classification Scheme, Marking and Labeling requirements and much more. Implications from these areas will have immediate impacts from economics to impacts on the environment. As battery chemistries continue to advance and battery adoption grows then the market will need to approach long-term solutions with involvement from producers, regulators, and consumers to address the growing safety concerns. (524-Docket)

Comment: U.S. Department of Transportation Regulations
U.S. Department of Transportation (DOT) regulations currently prohibit commercial users from transporting an adequate supply of batteries needed to power day-long usage of ZEE equipment. Until DOT requirements are updated to meet the reality of professional battery powered equipment usage, professional landscapers and other users will be forced to choose between violating DOT requirements, and/or carrying sufficient batteries to fulfill their clients' needs, and/or using portable generators to recharge batteries in the field. According to the performance requirements of SORE2021, the average landscaper would require 37 to 48 batteries for a day worth of work. These batteries will need to be secured on landscapers' trucks, and, as a commercial user, will be subject to DOT requirements. DOT limits commercial users to 66 pounds "per container" for commercial usage and outlines handling requirements not considered by the Proposed Rule.[38] [Footnote 38: Title 49 C.F.R. Section 173.6] As batteries and ZEE products must be stored and contained securely in trucks for safety purposes, such transport could run afoul of DOT regulations. Additional costs will be needed to comply with these regulations. The Proposed Rule does not consider such costs. Until a market-wide solution for mobile charging is readily available at a cost- effective price, until

high-energy battery recycling is addressed, and until DOT regulations are revised, the implementation of the Proposed Rule should be delayed. (524-Docket)

Comment: Although I am a Landscape Architect, I work closely with the green industry leaders, licensed landscape contractors who install and/or maintain residential, commercial and municipal properties. The amendment proposes banning gas-powered engines of 25HP or less and replacing them with very expensive batteries that are not capable of lasting throughout a work day, demanding multiple batteries for any private or public landscape maintenance company. These batteries are not recyclable needing assistance from the coal industry and will ultimately end up in landfills polluting our soils and contaminating our ground water. It is environmentally unethical and costly, specifically to be put in place by 2024. (529-Docket)

Comment: Additionally, there are safety issues concerning lithium-ion battery fires that should be considered.[19] [Footnote 19: U.S. Department of Labor Occupational Safety and Health Administration "Preventing Fire and/or Explosion Injury from Small and Wearable Lithium Battery Powered Devices" https://www.osha.gov/sites/default/files/publications/shib011819.pdf] (533-Docket)

Comment: **Subject: AB1346**
As found in the "public hearing" notice, I'm reaching out to you regarding any environmental considerations as it relates to the after-life of batteries associated with battery operated equipment. Namely, I understand that the State is pursuing battery operated equipment to off-set air pollution concerns but what if any concerns have been identified pertaining to the after-life of used batteries. As a generator of used gas, used oil and an aqueous parts washer with the gas on a cradle-grave manifest, I have questions regarding the sincerity of protecting the air but not the land. So, my primary question is what if any is the tracking system in place to follow the life of a battery (should have a serial number) to insure that while air pollution is being addressed one is trading or compromising the land with batteries. I strongly believe that this issue that probably hasn't been questioned let alone thought of must be a component of this 2024 requirement. One without the other is very short-sided and lacks integrity in the eyes of a true environmentalist. (567-Email)

Comment: CARB estimates there are 29.3 million pieces of lawn/garden and other outdoor power equipment across the state with 12.8 million of these using gasoline as their power source. It is estimated there are 55,000 landscape businesses in the state. Given that a single landscaper could require a minimum of 35 batteries per day to do their job, the estimated minimum number of batteries landscapers would use daily is nearly 2 million. Once the transition to ZEE is complete, it would total upwards of 12 million batteries (single use) at a minimum for each piece of equipment. The reality is significantly more. The volume of batteries a dealer would need to keep in inventory poses significant and unrealistic logistical, safety and environmental concerns. These demands would be compounded for dealers who offer rental or loaner equipment. The shop infrastructure cost for dealers and outdoor power equipment users associated with additional battery charging and safety is also considerable. There are also performance considerations for batteries in the summer months when heat degrades the charge. (2001-Docket)

The maintenance, storage and disposal of batteries is a significant concern. The handling and disposal of batteries becomes a dealer liability and expense. The staff report acknowledges that compliance includes increased demand for lithium batteries and disposal of batteries would be subject to compliance with existing laws and regulations governing solid waste, such as California's Universal Waste Rule 88 (Cal. Code Regs., tit. 22, Chapter 23). "That is, disposal of used batteries into landfills is prohibited; however, they could be refurbished or re-used. To meet an increased demand of refurbishing or reusing batteries, new facilities, or modifications to existing facilities, are anticipated

to accommodate battery recycling activities. Equipment replacement may result in recycling or selling old equipment." FWEDA is unaware of any assessment or formal plan that would accommodate this volume and turnover of batteries, gas-powered equipment retired from use, and ZEE's shorter life cycle, and found no provisions for how the dramatic increase in equipment and battery disposal would be sustained starting in 2024 when the proposed rules would take effect. Dealers will also assume liability and repercussions for illegal consumer disposal of dead batteries. (2001-Docket)

Lithium prices soar as demand increases: https://www.mining.com/lithium-prices-continue-to- soar-up-88-in-2021/ driving up the cost of transitioning to ZEE. While the Biden administration acknowledges it intentionally drove up gas prices across the nation to justify promoting an escalated transition to "zero-emissions" and its "climate change" goals, the reality is that small and medium businesses that FWEDA dealers serve cannot sustain these increased costs at this pace. Hundreds of California business owners and others affected by these regulations are among the 700 comments submitted for CARB's Dec. 9, 2021, hearing, pleading with CARB and state officials not to put them out of business or drive up their cost of doing business, which is exactly what these regulations will do. (2001-Docket)

Comment: The handling, maintenance, storage, and disposal of batteries becomes a dealer liability and expense. Dealers will also assume liability and repercussions for illegal consumer disposal of dead batteries. (3045-Oral Testimony)

Comment: And the last thing is, what is the plan for battery recycling, because that needs to be addressed in addition. (3048-Oral Testimony)

**Agency Response:**

These comments include expressions of concern regarding the production and disposal of batteries for ZEE. Commenters also include introductory remarks that describe the commenters' organizations and operations. Commenters mention manufacturing of batteries, tracking of batteries, the location where batteries ultimately go after disposal, the prices of lithium and gasoline, battery life, and speculate on the State's ability to handle the disposal of spent batteries and potential environmental damage as a result of improper battery disposal. Such statements are beyond the scope of this rulemaking to address in a regulatory manner under APA. Thus, CARB did not make any changes in response to these comments.

As described on pages 87-88 of the ISOR, increased demand for lithium batteries as a result of the Proposed Amendments could increase production, along with associated increases in lithium mining and exports from source countries or other states. Disposal of any portion of equipment, including batteries, would be subject to, and be in compliance with existing laws and regulations governing solid waste, such as California's Universal Waste Rule (Cal. Code Regs., tit. 22, Chapter 23). That is, disposal of used batteries into landfills is prohibited; however, they could be refurbished or re-used. To meet an increased demand of refurbishing or reusing batteries, new facilities, or modifications to existing facilities, are anticipated to accommodate battery recycling activities. While California's Universal Waste Rule is a California law, its provisions are beyond the scope of this rulemaking.

Commenters also mention AB 1346 and seem to imply a belief that they are commenting on AB 1346 rather than the Proposed Amendments. CARB did not make any decision to approve or disapprove AB 1346. The California Legislature voted to approve AB 1346, and the Governor signed it. The Proposed Amendments comply with the requirements of AB 1346.

In response to statements regarding the number of batteries that might be needed for certain users or all ZEE in California: The commenter's claims of number of batteries needed do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the number of batteries that would be needed for ZEE operators due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[40]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. Commenters offer no evidence that ZEE would use single use, i.e., nonrechargeable batteries.

In response to the statement, "Disposing of batteries has become a challenge to our business and homeowners alike. I have currently been waiting a month (and still not been cleared) to be allowed by our local Transfer Station to have an appointment to dispose of lithium batteries": The commenter does not specify, with evidence, whether the batteries are used for ZEE or some other purpose. Other options may be available to dispose of the batteries mentioned in the comment. Appointments at local transfer stations and other locations where batteries can be recycled or otherwise disposed of are beyond the scope of this rulemaking.

In response to the statement, "Electric batteries are detrimental to the environment, e.g., they leave toxic elements in landfills, the strip mining involved in procuring the materials for the batteries decimates the land, they catch fires that can't be extinguished": The commenter does not provide evidence for these claims.

Regarding the concern about batteries and toxic elements in landfills: California no longer allows batteries to be disposed of in the trash because they contain toxic metals such as mercury, lead, cadmium, and nickel [DTSC, 2007[41] and 2021[42]]. In 2005, to help promote proper disposal of rechargeable batteries by the public, the Governor signed the California Rechargeable Battery Recycling Act, which requires retailers to have a mechanism to accept all rechargeable batteries from consumers for recycling. To track how effective this program is, the law requires the California Department of Toxic Substances Control (DTSC) to survey battery handling and/or recycling facilities and post on its web site, by July 1 of each year, the estimated amount, by weight, of each type of rechargeable battery returned for recycling in California during the previous calendar year. The Proposed Amendments do not conflict with or amend regulations that implement the California Rechargeable Battery Recycling Act.

Regarding the concern about strip mining: The Final EA for the 2016 State SIP Strategy and the addendum to the Final EA (provided in ISOR Appendix H and ISOR Chapter V, respectively) recognize that implementing measures to reduce SORE emissions could result in an increase in demand for lithium ion batteries, which could require an increase in manufacturing facilities and associated increases in lithium mining in the United States (e.g., a mining operation currently exists in Nevada) and exports from countries with raw mineral supplies (e.g., Peru, South Africa, and China). The Final EA identifies mitigation measures that

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[40] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[41] Department of Toxic Substance Control (DTSC). 2007. DTSC AB 1125: Rechargeable Battery Recycling Act Fact Sheet. April 2007.

[42] DTSC. 2021. How is California Doing with Recycling Rechargeable Batteries? October 5, 2021.

the local land-use permitting agencies can require be implemented to reduce to less than significant levels many of the potential adverse environmental impacts from mining activities and other activities related to implementing emission reduction measures for SORE. However, CARB lacks legal authority to impose the mitigation measures associated with development activities because it has no land-use permitting authority. Nonetheless, the Proposed Amendments do not affect the authority of land-use permitting agencies. Further, the Final EA concluded that the potential adverse environmental impacts are outweighed by the substantial air quality benefits that will result from adoption and implementation of SORE emission reduction measures.

In response to the statement, "A fully detailed environmental impact for battery powered equipment has not been published to my awareness. A published report documenting the environmental impact and cost of Lithium battery production from cradle to grave would make sense if we are to fully mandate their employment,": CARB disagrees with the commenter's assertion. The Final EA for the 2016 State SIP Strategy and the addendum to the Final EA are described in Chapter V of the ISOR. The addendum meets the applicable requirements for a substitute environmental document under CARB's certified regulatory program.

Regarding comments about the expense of batteries, the economic analysis acknowledges the increased upfront cost to purchase ZEE, including the cost of batteries. Section C of the SRIA (e.g., pages 39-41 and 48-58) discuss battery costs. Even with the additional upfront costs for batteries, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. As described on pages 41-42 of the SRIA, historically, lithium-ion battery prices have decreased over time, and this trend is expected to continue into the future. Additional discussion of battery costs is provided in the Agency Responses in section IV.A.35.

In response to the statement, "there are disposal costs associated with the spent batteries that are not accounted for in CARB's TCO assessment" and similar statements: The commenters do not specify what costs they believe users will incur for battery disposal. The commenters do not provide evidence that users will incur costs for battery disposal, and CARB does not have evidence to suggest users will incur costs for battery disposal. Under the California Rechargeable Battery Recycling Act, lithium ion batteries cannot be disposed of in a landfill. The act stipulates that some retailers must have a mechanism by which purchasers of these batteries can return them to be recycled free of charge [DTSC, 2007[43] and 2021[44]]. For many retailers, this mechanism is accepting spent batteries at their retail locations. CARB notes that these recycling locations are plentiful, and 15 such locations exist within 10 miles of the CalEPA Headquarters in Sacramento [Call2Recycle, 2022[45]]. CARB made no changes based on these comments.

In response to comments regarding the transportation of batteries and related topics: The commenters discuss transportation of batteries and various related topics, implying ongoing

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[43] Department of Toxic Substance Control (DTSC). 2007. DTSC AB 1125: Rechargeable Battery Recycling Act Fact Sheet. April 2007.

[44] DTSC. 2021. How is California Doing with Recycling Rechargeable Batteries? October 5, 2021.

[45] Call2Recycle. 2022. Battery & Cellphone Dropoff Locations. Available at: https://www.call2recycle.org/locator/?l=95814. Last accessed: February 10, 2022.

work to solve various issues and potential future developments for other considerations related to batteries. Statements regarding storage, packaging, air transport, UV classification scheme, marking, and labeling are beyond the scope of the Proposed Amendments. The commenters do not provide evidence that batteries for ZEE cannot be transported as needed for retail distribution, use by equipment owners, and recycling at the end of the batteries' life. CARB made no changes based on these comments.

In response to the statement, "U.S. Department of Transportation (DOT) regulations currently prohibit commercial users from transporting an adequate supply of batteries needed to power day-long usage of ZEE equipment," and similar statements: CARB disagrees with the commenter's claims and conclusions. The commenter's claims appear to be based in part on the commenter's assumptions regarding the number of batteries needed for a day of work, which are discussed in the Agency Responses in section IV.A.35 of this FSOR. The commenter discusses U.S. DOT regulations and speculates on the implications for landscapers, but does not provide evidence that landscapers could not carry enough batteries to complete their work. In fact, the cited federal regulations relate to the shipment of lithium ion batteries, not the transport by the end users of those batteries.

In response to the statement, "Additionally, there are safety issues concerning lithium-ion battery fires that should be considered": This comment is beyond the scope of the Proposed Amendments. The commenter provides a link to a document published by the U.S. Occupational Safety and Health Administration, titled, "Preventing Fire and/or Explosion Injury from Small and Wearable Lithium Battery Powered Devices," which suggests the safety issues the commenter raises have been considered.

In response to the statement, "The handling, maintenance, storage, and disposal of batteries becomes a dealer liability and expense. Dealers will also assume liability and repercussions for illegal consumer disposal of dead batteries," and similar statements: The commenters do not provide evidence to support their claims. Dealers currently sell ZEE and batteries for ZEE. CARB does not have information to suggest that the Proposed Amendments would impose new costs or liabilities on dealers related to the handling, maintenance, storage, or disposal of batteries beyond those already imposed by the California Rechargeable Battery Recycling Act.

In response to the statement, "the net effect of this dramatic legislation is actually worse for our environment," and similar statements: Commenters do not provide evidence to support these statements. CARB does not have evidence to support the commenters' statements or conclusions.

The comment regarding the source of electricity to charge ZEE batteries is discussed in the Agency Response in section IV.A.6.3.

Please refer to the Agency Responses in sections IV.A.12 and IV.A.35.1 for discussion of battery costs and charge longevity.

Please refer to sections II.A.1.e and II.A.2.d and the Agency Response in section IV.A.2.4.1 for additional discussion of comments about pressure washers and about 15-day modifications to the Proposed Amendments in response to such comments.

Some comments include general expressions of opposition to this rulemaking. Please refer to the Agency Responses in section IV.A.2.2 of this FSOR for discussion of similar comments.

Please refer to the Agency Response in section IV.A.13.1.1 for additional discussion of comments related to potential loss of businesses or jobs.

### *A.6.3. California electricity sources and associated emissions*

Comment: How will the power used to generate the electricity to charge the battery originate? Hydropower, geothermal, wind and solar won't be enough. Please pardon if I've misinterpreted some of the proposed regulations. Information is spotty and contradictory at this stage of the game. (6-Docket)

Comment: A ban on small gas powered motors is unnecessary and ineffective. A complete reliance on electric power has consequences too. It is not a thoroughly clean source of energy and most importantly our existing infrastructure cannot support it. New regulations on circuit breakers are causing modern & up to date coffee makers and microwaves to trip breakers. There is already much strain between restricted home warming fires and space heaters tripping breakers. Stop cutting us off on both ends. (36-Docket)

Comment: Third is why doesn't our government think these things through? How much of the electricity that is used in these "electric machines" are using electricity made with fossil fueled powered electric plants. Is this all smoke and mirrors to make it look good to the public but not really making changes at all? You are still using fossil fuels to make the electricity. (81-Docket)

Comment: The cleaner the better...BUT, the sources of "alternate power" need be non-destructive as possible as well. (384-Docket)

Comment: Currently the source of electricity for California is dependent on 60% non-renewable energy. Logically, an increase in electrical demand would need to be derived from non-renewable energy such as coal and LPG. Hence, the employment of battery powered equipment will place greater demand on the fragile electrical grid which in turn will require a greater amount of non-renewable resources to generate the electricity. This is NOT creating a state of having Zero Emissions. (514-Docket)

Comment: Currently the source of electricity for California is dependent on 60% non-renewable energy. Logically, any increase in electrical demand from battery powered equipment would mostly be derived from non-renewable energy sources such as coal and LPG. Clearly, the employment of battery powered equipment is NOT creating a state of having Zero Emissions. (514-Docket)

Comment: From my perspective, California should not be banning gas powered outdoor equipment 1) until it has demonstrated the ability to provide reliable and affordable derived from Zero-Emission renewable energy; 2) until a fully documented environmental impact report documents the employment of batteries for powered equipment, from cradle to grave, will ultimately consume less non-renewable CO2 emitting energy; 3) without compliance with 1 & 2, at most the ban should apply to residential use only. (514-Docket)

Comment: From my perspective, California should not be banning gas powered outdoor equipment 1) until it has demonstrated the ability to provide reliable and affordable electricity derived from Zero-Emission renewable energy; 2) until a fully documented environmental impact report documents the employment of batteries for powered equipment, from cradle to grave, will ultimately consume less non-renewable CO2 emitting energy; 3) at most, without demonstrated compliance with 1 & 2, the current ban should only apply to the residential consumer. (514-Docket)

Comment: Recently I've been looking into electric vehicles and there seems to be a misconception that they are “clean or green”. Electricity is not a source of green energy. In fact it's not an energy

source at all, only a way to move energy. How clean an electric vehicle/device is depends on where the electricity was generated. If California has a plan to build more Nuclear power plants then electric powered stuff will be green, but otherwise not so much. (592-Email)

There's a related problem that may have been overlooked. The electrical grid is now sized for the current load. If all the gasoline in the US were replaced by electricity then the size of the electrical grid would need to be more than doubled. If, in addition, natural gas is replaced by electricity, like cities "decarbonizing (San Jose) then the size of the electrical grid will need to be more than tripped. Note the electrical grid is not just the transmission and distribution lines, but also includes generating plants and all the ancillary functions. Each DC charging station for cars draws more power than a number of houses, so the peak load on the electrical grid will be higher than the estimates above, maybe requiring a 4X grid expansion. This also means more variability in the total load on the grid making it less stable. (592-Email)

In the US PV solar accounts for a little more than 2% of the load and wind a little more than 8%. Currently these numbers are so small that they do not replace any conventional power plants. But when we get to a point where they might, that plant will NOT shut down because when, not if, the solar power stops because of darkness, clouds or clam the conventional power plant need to be "hot" so that it can take up the slack. The only way PV and/or wind solar can become a major source of energy is when there's a workable grid scale way to store energy. No such system exists today that is feasible to use. (592-Email)

PS I'm a retired engineer and if you want references or calculations about the above just ask. Also see more detail at: https://prc68.com/I/Learning.shtml#Electric_Cars (592-Email)

**Agency Response:**

These comments include questions and expressions of opinions regarding emissions from electrical power generation. Emissions from electrical power generation and the commenters' questions are beyond the scope of this rulemaking. Therefore, CARB made no changes based on these comments.

In response to the comment, "A ban on small gas powered motors is unnecessary and ineffective … There is already much strain between restricted home warming fires and space heaters tripping breakers,": The Proposed Amendments do not require anyone to stop using SORE equipment. Please refer to the Agency Response in section IV.A.2.2.6 for additional discussion of emissions from electrical power generation. Comments regarding regulations on circuit breakers and their effects on coffee makers and microwaves are beyond the scope of this rulemaking.

Please refer to the Agency Response in section IV.A.15 for discussion of the Environmental Analysis for the Proposed Amendments.

Please refer to the Agency Response in section IV.A.2.4.2 for discussion of comments suggesting a delay in implementation of emission standards of zero for equipment used by professionals.

Please refer to the Agency Response in section IV.A.6.4 for discussion of California's electrical infrastructure and statewide electricity demand for ZEE.

### *A.6.4. Statewide electricity demand for ZEE*

Comment: I am a general manager for a landscaping company, and to think chances of this happening in just two years makes me quite nervous. My comment will be considering the power outages we already experience today plus adding what can consequently come from this could be a headache to many of us in this industry. (103-Docket)

Comment: not to mention that the power grid in California has been challenged already. (110-Docket)

Comment: I don't think our electrical infrastructure can handle the increased demand. (113-Docket)

Comment: This state doesn't even have enough electricity for our present needs, electricity uses a lot of natural gas, oil and coal. It is more efficient to just use gas. (127-Docket)

Comment: We already experience rolling blackouts from a lack of clean electrical power. Banning gas power will further impact the states power grid. Politian's need to stop the stupidity now. (293-Docket)

Comment: Changing from gas motors to electric motors is great. one thing I notice the state is not opening new renewable energy plants like the ones using wood biomass to generate electricity. more electric cars more electric equipment great. power outages and power roll outs on neighborhoods who is going to be without electricity. Is the state of California ready to step up and open new electric plants or we have to rely on solar panels. Even Tesla can make panels fast enough to keep up with the energy demand. (382-Docket)

Comment: Secondly the infrastructure will not be able to handle the additional load in electric usage, as it can not be handled at this time. In Southern California during the summer months we experience numerous BROWN OUTS. How do you expect us to be able to work using only electrical when there is not even enough power to sustain regular needs for homeowners. (427-Docket)

Comment: To further speak on electrical california as a state is already maxing out our power grid.. this is the reason for pg&e planed power shut offs.. if all landscapers are charging our equipment that will put even more strain on our grid, what happens if we have a power shut off and can't charge our equipment?? (431-Docket)

Comment: Where is the power to come from to charge all these batteries? Our grid is already overwhelmed at peak hours. This legislation is premature and completely irresponsible. (476-Docket)

Comment: In addition, the elimination of multiple non-electric motors will cause further stress on an already overburdened California electric grid. With all the new electric cars in place, demand can't keep pace already. (485-Docket)

Comment: I am greatly concerned the State of California has taken measures for attaining Zero Emissions by the elimination of Small Off-Road Engines will likely have a negligible effect in the quality of air and at a great expense and detriment of California residents and businesses. California HAS NOT demonstrated its ability to provide reliable electrical power. Currently blackouts and brownouts are a common occurrence throughout the state. (514-Docket)

Comment: I am greatly concerned the State of California has taken measures for attaining Zero Emissions by the elimination of Small Off-Road Engines will likely have a negligible effect in the quality of air and at a great expense and detriment to California business and public entities. California HAS NOT demonstrated its ability to provide reliable electrical power. Currently blackouts and brownouts are a common occurrence throughout the state. (514-Docket)

Comment: On the macro level the landscape industry continues to have concerns that infrastructure issues in the state of California could cripple their ability to operate. California has ranked #1 in the United States for power outages recently.[10] [Footnote 10: Generac "Top 5 U.S. States for Power Outages" https://www.generac.com/be-prepared/power-outages/top-5-states-where-power-outage-occur] (533-Docket)

Comment: Even worse, power outages are on the rise in California. There were 25,281 blackout events in 2019, a 23% increase from 20,598 in 2018. The number of utility customers affected jumped to 28.4 million in 2019, up 50% from 19 million in 2018.[11] [Footnote 11: Bloomenergy "California Power Outage Map" https://www.bloomenergy.com/bloom-energy-outage-map/] It's difficult for the landscape industry to embrace being forced to use inferior equipment with continued concerns on how to ensure the equipment can be operated and charged all-day and every day. (533-Docket)

Comment: And based on previous summers in California, you are now going to load up the infrastructure and in spite of rolling blackouts, now everybody's going to be charging their batteries on every single item mentioned above and that's not going to affect or increase the use of electricity? Which we already do not have enough of? (543-Docket)

Comment: Back to PG&E. It's ironic that the same people pushing PG&E to become more green, gloss over the fact that an aging electric transmission infrastructure[3] without support for vegetation management and ongoing maintenance, has to be relied on more and more with the proposed "all-electric" housing proposals. It was this same infrastructure that sparked thousands of wildfires across our state and ignited the North Bay during the past decade. [Footnote 3: Why would our leaders want us to put all of our eggs into an electric basket that is failing? As reported in December 2019, "If electric-wire replacement continues at the rate currently proposed by the utility, PG&E customers should expect a doubling of sustained power outages in 15 years and a fourfold increase in 30 years, according to the analysis by the National Electric Testing, Research and Applications Center at Georgia Tech, which did the analysis for PG&E last year ... To prevent this outcome, the utility would need to replace at least 1,200 miles of its oldest distribution lines each year. At that pace, the utility's distribution system would be completely refreshed every 67 years, the study found." It seems that we should keep natural gas as the better alternative power source, for at least seven more decades.] (573-Email)

Comment: It's also ironic that forcing a capacity increase in electrical demand (which the potential for millions of new "all-electric" homes will create) would lead to rolling blackouts and scheduled brownouts during the hot summer and fall months. This situation forced out Governor Gray Davis in a recall in favor of Arnold Schwarzenegger a decade ago. The Governator upped the electric generating capacity back then, something the environmentalists did not like. (573-Email)

Comment: Currently, there is no comprehensive strategy to add SORE, large-spark ignition (LSI), large off-road equipment, personal combustion-engine vehicles and gas-powered fleets to California's power grid in the next 2-3 years as CARB endeavors to do. Given the findings of California power outages last year (http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme- Heat-Wave.pdf) acknowledging the lack and absence of power generation,

infrastructure and storage to sustain what is already in use, it's inconceivable 1) to add millions more units to the power grid, and 2) to have no formal plan to do it. The report illustrates the push for all electric is infeasible without sufficient energy resources into the grids that will sustain any meaningful support of the expected demand. And while CARB and the state may argue there will be incentives like the FARMER program, funding for these incentives is chronically uncertain due to politics. (2001-Docket)

Comment: One other issue is the technology is not yet there for battery life and that's super important. Another issue that will affect us down here in Southern California is our infrastructure is not ready in the Los Angeles area. We consistently have brownouts during the summertime, and that is not going to help us out at all. (3035-Oral Testimony)

**Agency Response:**

The commenters make general statements about power outages due to high electricity demand that occurred periodically in California in the past. None of the commenters presented evidence, however, that these outages affected the ability of owners of zero-emission small off-road equipment to charge their equipment when needed; CARB, likewise, has no such evidence. Historically, power outages have typically occurred during peak demand of electricity, which tends to be during the daytime when high temperatures and building cooling are at their peak. As noted in the ISOR, on page 17, CARB's technological feasibility determination assumed that ZEE users will recharge batteries overnight when electricity demand is in its off-peak period, which has corresponded to the time when outages are least likely to occur. As a result, CARB does not expect the charging of ZEE batteries to have an appreciable effect or influence on power outages due to high electricity demand. CARB made no changes in response to these comments.

As provided in the rulemaking record, in the November 12, 2021 Notice of Public Availability of Documents and Information, the Proposed Amendments would not significantly increase electricity demand. CARB estimated that electricity demand would increase by only a fraction of a percent. This finding is based on CARB's economic and energy demand analyses [CARB, 2021[46]]. CARB estimated that implementation of the Proposed Amendments could increase annual electricity demand statewide by 365 GWh on average between 2024 and 2043, which is only 0.13% of total California electricity consumption in 2019. The annual electricity demand increases under the Proposed Amendments could range from 21.1 GWh in 2024 to 581 GWh in 2043. These forecast increases are only 0.008% to 0.21% of total California electricity consumption in 2019.

The Final Environmental Analysis for the 2016 State SIP Strategy (Final EA, provided in ISOR Appendix H) concluded that implementation of the 2016 State SIP Strategy measures, including measures to reduce SORE emissions and increase use of ZEE, "would effectively shift the use of petroleum-based fuels (i.e., gasoline and CARB diesel) to battery-electric, hydrogen and natural gas." The electrical grid and hydrogen supply supporting these electric vehicles would need to represent 50 percent renewable energy generation by 2030, as required by the

[46] CARB. 2021. Technical Support Document: Potential Increase in Electricity Demand from Added Charging Requirements for Zero-Emission Small Off-Road Equipment under Proposed Amendments to the Small Off-Road Engine Regulations. Prepared by staff of the Monitoring and Laboratory Division, California Air Resources Board. November 12, 2021.

Clean Energy and Pollution Reduction Act of 2015. According to Appendix F of the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15000 et seq.), the wise and efficient use of energy includes:

1. Decreasing overall per capita energy consumption;

2. Decreasing reliance on fossil fuel such as coal, natural gas, and oil; and

3. Increasing reliance on renewable energy sources.

The Final EA concluded that "Implementation of the State SIP Strategy would increase the amount of renewable energy supplies because vehicular fuels would increase the use of electricity (50 percent of which would be renewable by 2030), and decrease the use of petroleum through increased use of PHEVs, ZEVs, and Low-Emission Diesel fuels." Thus, the State SIP Strategy measures, including measures to reduce SORE emissions and increase use of ZEE, "would support wise and efficient uses of energy, and would result in a beneficial long-term operational impact on energy demand."

Please refer to the Agency Responses in section IV.A.35 for discussion of comments related to technological feasibility and cost-effectiveness, including ZEE performance and battery life.

## A.7. Clarification of existing provisions

Comment: **Subject: Is ARB's Approval or the EPA's Needed**
This question comes from the marked up version of section 1065 Subpart J that is on ARB's website. With respected to the highlighted statement below from section 1065.901 (b) Laboratory testing. From Subpart J…….. is ARB's prior approval needed, or the EPA's? You may also use PEMS for any testing in a laboratory or similar environment if we approve it in advance, subject to the following provisions: (596-Email)

**Agency Response:**

The comment does not directly address the Proposed Amendments, as no amendments are proposed to §1065.901(b). CARB made no change in response to this comment. The following response provides clarification and context for several points within the above comments. Per §1065.1001 of the amended Part 1065 "We (us, our) means the Executive Officer of the California Air Resources Board or a designee of the Executive Officer." As such, as with other provisions in Part 1065, CARB's prior approval would be required to use data collected from PEMS testing for California certification or other purposes under the SORE exhaust regulations.

## A.8. Compliance Testing

Comment: CARB testing performed on MY2020 and MY2021 certified evaporative components shows all tested components to be in be compliance. Thus, CARB's extrapolation rationale is not a reasonable methodology given the significant differences between the SORE models tested previously in connection with the revisions to the evaporative standards in 2016, and the current SORE models that are certified to current standards. Nor does it recognize that the cited emission "failures" are almost wholly attributable to shed-tested portable generators manufactured by non-US entities. And, as previously discussed, the failure to properly QA/QC the CSUF survey data makes those data unreliable. CARB's assertions based on those data are simply not reasonable. (521-Docket)

Comment: Also, Ms. Ostad noted the 50 percent compliance with the evap standards. This is not base on -- this is based on units tested, not volume and is misleading. Handheld products make up approximately half of the SORE fleet and demonstrated a hundred percent compliance with equivalent diurnal standards in the recent E10 validation study. (3039-Oral Testimony)

**Agency Response:**

These comments describe conclusions the commenter has made regarding CARB's evaporative compliance testing and the CSUF survey and do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

In response to the comment referencing compliance testing performed on MY 2020 and MY 2021 certified evaporative components: CARB has performed compliance testing on MY 2015-2019 engines as described in ISOR section II.A.1, but has not performed compliance testing on MY 2020 or MY 2021 certified evaporative components. In response to the statement, "CARB's extrapolation rationale is not a reasonable methodology given the significant differences between the SORE models tested previously in connection with the revisions to the evaporative standards in 2016, and the current SORE models that are certified to current standards,": The commenter does not describe what extrapolation rationale they believe is not a reasonable methodology. To the extent that this comment may refer to the use of emission test data, including compliance test data, to estimate emissions of SORE in California, it is true that manufacturers' certification test data and CARB's compliance test data were used in development of emission factors for SORE2020 [CARB, 2020[47]]. Those test data represent SORE in California. The commenter does not describe what differences they believe exist between engines tested before amendments to the evaporative emission regulations were adopted in 2016 [CARB, 2016[48]] and engines produced after those amendments were adopted. The 2016 amendments did not change the emission standards except to include fuel line permeation emission standards for engines with displacement less than or equal to 80 cc. Although the certification test fuel for MY 2020 and later engines is different from the certification test fuel used for MY 2019 and earlier engines, many MY 2020 and later engines are substantially similar in design to MY 2019 and earlier engines, as indicated by some manufacturers' continued reliance for MY 2020 and later engines on running loss emission control approvals first obtained for MY 2019 or earlier engines.

In response to the statement, "the cited emission "failures" are almost wholly attributable to shed-tested portable generators manufactured by non-US entities,": Manufacturers choose equipment units to make available to CARB for compliance testing in response to orders from the Executive Officer to make units available. Engines from many evaporative families are used in more than one type of equipment, and generators are often among the equipment types in which engines from a given evaporative family are used. A unit that CARB tests for compliance testing represents all engines in its evaporative family by definition, since an evaporative family includes models in the same engine class that are grouped together based on similar

[47] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[48] CARB. 2016. Technical Support Document: Small Off-Road Engine Validation Study and E10 Test Results. September 27, 2016.

fuel system characteristics as they relate to evaporative emissions. For that reason, the equipment type chosen should not affect the test results, and different results would not be expected for a different equipment type within the same evaporative family. One criterion CARB uses to choose evaporative families for compliance testing is high production volume because these evaporative families, if they fail compliance testing, will result in significant excess emissions.

In response to the statement, "Also, Ms. Ostad noted the 50 percent compliance with the evap standards. This is not base on -- this is based on units tested, not volume and is misleading. Handheld products make up approximately half of the SORE fleet and demonstrated a hundred percent compliance with equivalent diurnal standards in the recent E10 validation study,": The staff presentation during the December 9, 2021, public hearing included the statement, "Most recently, the Board adopted amendments to the evaporative emission regulations in 2016. At the time, testing suggested less than 50 percent compliance with the existing emission standards, so the amendments included measures to increase accountability for manufacturers and better ensure CARB could enforce the emission standards." CARB disagrees that CARB staff's statement is misleading. CARB staff's statement regarding what the test data suggest was based on the available data. Since not every engine is or can be tested for evaporative emissions, manufacturers and CARB rely on representative data. Handheld engines were not subject to the diurnal emission standards, so they could neither comply with nor be out of compliance with the diurnal emission standards. Some handheld engines (with displacement less than or equal to 80 cc) tested by CARB have had emissions below the diurnal emission standards applicable to engines with displacement greater than 80 cc, and others have had emissions greater than the diurnal emission standards applicable to engines with displacement greater than 80 cc. No changes were made to the Proposed Amendments in response to these comments.

Please refer to the Agency Response in section IV.A.14.5 for discussion of the comment regarding the CSUF survey.

## A.9. Component Certification

Comment: I'm an Engineer with Forney Industries in Fort Collins, Colorado. My company works with numerous partner manufacturers around the globe to develop new welding and other light industrial equipment for the North American market. We are looking at designing and hopefully launching a line of gasoline powered electric generators for jobsite and recreational use. We will absolutely pursue CARB testing and certification for the engine and all other evaporative emission components. I am writing today because one of our partners has expressed a few concerns and we would like to clear these up. The engine in our new generator design has already passed CARB certification, but we would also like to design our own fuel tank for branding purposes. Is CARB currently accepting new fuel tank designs for testing and certification? What about other fuel system related components that would need to meet evaporation emission standards? We don't want to put in the effort to design our new tank if we can't CARB certified at this time. If CARB is not currently evaluating new equipment design, do you know when testing and certification will resume? (2015-Email)

**Agency Response:**

The comment's requests are beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comment. The rulemaking described in the October 2021 45-Day Notice does not affect certification before the rulemaking is finalized.

The comment requests feedback on questions about CARB's certification process and is not relevant to the Proposed Amendments. Commenters can reach out to CARB staff for questions about certification outside of the rulemaking process.

## A.10. Consistency with federal Clean Air Act

Comment: Seventh, the Proposed Amendments do not meet the Environmental Protection Agency's criteria for a waiver from the Clean Air Act. (515-Docket)

Comment: The Proposed Amendments Do Not Meet EPA Requirements For a Clean Air Act Waiver Section 209(e)(2) of the federal Clean Air Act preempts states from adopting and enforcing standards and other requirements relating to the control of emissions from non-road engines, including generators. That said, the same section requires the EPA Administrator, after notice and opportunity for public hearing, to authorize California to adopt and enforce standards and other requirements relating to the control of emissions from such engines if California determines that California standards will be, in the aggregate, at least as protective of public health and welfare as applicable Federal standards. (515-Docket)

But EPA shall not grant such authorization if it finds that (1) the determination of California's protectiveness determination (i.e., that California standards will be, in the aggregate, as protective of public health and welfare as applicable federal standards) is arbitrary and capricious; (2) California does not need such California standards to meet compelling and extraordinary conditions; or (3) California standards and accompanying enforcement procedures conflict with Section 209 of the Clean Air Act, including whether the standards are technologically feasible. (515-Docket)

CARB cannot enforce the Proposed Amendments until the EPA has authorized California to do so. The Proposed Amendments are not within the scope of the EPA's previously granted authorization. As described throughout this letter, the standards are not technologically feasible. Adopting the Proposed Amendments as currently drafted risks regulatory uncertainty while California consumers and SORE manufacturers await EPA's decision on whether the Proposed Amendments are consistent with Section 209 of the Clean Air Act. (515-Docket)

Comment: The Proposed SORE Amendments are cost-prohibitive, as demonstrated through independent expert analyses prepared by NERA and Trinity. Cost- prohibitive rulemakings are invalid under California law and cannot qualify for a federal preemption waiver under the federal CAA. (521-Docket)

Comment: CARB also has ignored the lead time provisions of the federal Clean Air Act ("CAA"), including through a mandated transition to zero-emissions equipment ("ZEE") that would take effect with less than two full model years of lead time, and without regard to the timeframe required to fulfill the applicable federal preemption waiver requirements. That clear violation of the CAA renders the Proposed Amendments ineligible for a federal preemption-waiver, and therefore invalid and unenforceable. (521-Docket)

Comment: In that regard, and contrary to one of CARB's core assertions, the SORE market is not well prepared for full across-the-board electrification, as CARB states (without basis) in its Initial Statement of Reasons ("ISOR"). (See Staff Report p. ES-5 and SRIA, p.19.) The same holds true even if CARB staff narrow their claim of market-readiness to the residential and commercial lawn and garden market segments. (SRIA p. 10.) (521-Docket)

Comment: The Proposed SORE Amendments are invalid and unlawful, not only because they violate the requirements for adopting valid administrative regulations (including under the California Administrative Procedures Act), but also because they directly violate the controlling "lead time" provisions of the federal Clean Air Act ("CAA"). CAA Section 209(e) (42 U.S.C. §7543(e)) mandates that new standards relating to the control of emissions cannot take effect unless the regulations afford adequate lead time to permit development of the technology necessary to meet the requirements, giving appropriate consideration to the cost of compliance within that adequate timeframe. CARB needs to demonstrate its compliance with CAA Section 209(e) in order to obtain a waiver of federal preemption under CAA section 209(b). (See 42 U.S.C. § 7543(b)(1)(c).) Since the Proposed SORE Amendments will provide less than the minimum two years of lead time for all of the 2024 MY requirements, CARB's Amendments are violative of the controlling provisions of the CAA, are disqualified from receiving a waiver of federal preemption, and, as a result, are unlawful. (521-Docket)

Comment: CARB is providing insufficient lead time for the Proposed SORE Amendments, which is manifestly unreasonable, and which will disqualify CARB from obtaining a federal CAA preemption waiver for the Proposed Amendments. To put the current Proposed Amendments in perspective, the most recent exhaust emission standards were implemented between MY 2000 and 2008; the evaporative emission standards were implemented between MY 2006 and 2013. Yet in this rulemaking, CARB is proposing to allow only one full year of lead time. (Tellingly, with respect to the evaporative emission regulations that CARB amended in 2016, CARB still has not even applied for, let alone obtained, an EPA waiver for those amendments, despite enforcing them beginning in MY2020.) (521-Docket)

Comment: CARB's Cost Assessment, Standardized Regulatory Impact Analysis, and Environmental Analyses are unreasonable and insufficient, and cannot meet CARB's administrative rulemaking requirements, including under the California Administrative Procedures Act, the California Government Code, and the California Environmental Quality Act, since those Analyses, among other defects, fail to evaluate a full range of regulatory alternatives. (521-Docket)

Comment: Legal Issues Impacting the Validity of the Proposed SORE Amendments
There are a number of fundamental legal issues that CARB will have to address and cure before finalizing the Proposed SORE Amendments. Otherwise, those amendments will not be eligible for a waiver of federal preemption or will be invalid on other grounds. The multiple legal issues impacting the validity of the Proposed Amendments are detailed below. (521-Docket)

Comment: CARB must receive a preemption waiver from EPA before attempting to enforce the Proposed SORE Amendments
Section (209)(e)(1) of the Clean Air Act (CAA) provides in relevant part that "no State shall attempt to enforce any standard relating to the control of emissions" from new nonroad engines, unless the EPA Administrator authorizes a waiver of federal preemption. See 42 U.S.C.§7543(e)(1) and (e)(2). From this, it is clear under federal law that while CARB can initiate and complete a rulemaking for the Proposed SORE Amendments, CARB will be precluded from implementing and enforcing those Amendments – including any of the ZEE requirements – until after an affirmative waiver determination is published in the Federal Register, which itself must come after the required notice and comment process regarding CARB's application to EPA for a preemption waiver and a related authorization. (See 40 CFR §1074.101.) CARB needs to make that clear in the rulemaking record, and in any Board Resolution relating to this matter. (521-Docket)

Comment: In the past, CARB has attempted to skirt the mandates of federal preemption by enforcing CARB's nonroad emission standards – including the most recently revised evaporative standards for SORE that CARB adopted in 2016 – prior to receiving a preemption waiver and authorization. That is unlawful and could subject CARB to a mandatory injunction. CARB's practice of honoring federal preemption in the breach cannot continue, and certainly not in connection with this very significant rulemaking. The scope and effect of express federal preemption, and any potential limited waivers thereof, are actual constraints imposed by controlling federal law, not mere suggestions that CARB can choose to ignore at its discretion. EPA has been crystal clear on this point:

EPA does not believe that section 209(e) may be interpreted to permit California to enforce any nonroad regulations before receiving authorization. Were California to enforce its regulations before it receives authorization, it would defeat the protection section 209(e) was established to provide—that California's nonroad program only go forward if EPA authorizes it in accordance with the provisions of that section. Thus, EPA believes that while California may adopt nonroad regulations before receiving EPA authorization, its adoption must be conditioned upon EPA's authorizing those regulations under 209(e). In short, California may adopt, but not enforce, nonroad standards prior to EPA authorization. (59 FR 36969, 36982, July 20, 1994.) (521-Docket)

Comment: Consequently, in any final rulemaking documents, CARB must be explicit that it cannot and will not attempt to enforce any of the Proposed SORE Amendments until after EPA has published in the Federal Register a notice of decision waiving preemption as it otherwise would apply to the Proposed SORE Amendments. (521-Docket)

Comment: b. CARB has failed to provide the required leadtime for the Proposed SORE Amendments As noted, CARB must obtain a waiver of preemption and receive authorization from EPA before attempting to enforce the nonroad engine standards at issue. (See 42 U.S.C. §7543(e).) As a prerequisite to obtaining any such waiver, CARB must show that: (i) the proposed California nonroad standards are at least as protective of the public health as any corollary EPA standards; (ii) the proposed nonroad standards are needed to meet compelling and extraordinary air quality issues in California; and (iii) of most relevance here, the proposed standards and accompanying enforcement procedures are "consistent with this section [CAA section 209]." See 42 U.S.C. §7543(e)(2)(A). EPA has confirmed that the phrase "consistent with this section" includes "all of CAA section 209" (and includes an additional incorporation by reference of section 202), and that a preemption waiver will not be issued "if there is inadequate leadtime." (See 59 FR 36969, 36983, July 20, 1994; 40 CFR §1074.105.) (521-Docket)

One of the relevant provisions of section 209(e) in this instance is section 209(e)(B)(ii). That section of the CAA specifies that otherwise preempted nonroad regulations cannot be authorized and enforced unless California "adopted such standards *at least 2 years* before commencement of the period for which the standards take effect." 42 U.S.C. §7543(e)(2)(B)(ii). (Emphasis added.) That provision, in essence, establishes a *minimum* lead time period – the period between the adoption of a CARB nonroad engine regulation at its enforcement – *of at least two (2) full model years.* (521-Docket)

CARB has failed to provide the requisite, reasonable minimum 2-year leadtime period for the Proposed SORE Amendments. To the contrary, CARB is providing for only one (1) full year of lead time. That is unreasonable and unlawful, and will preclude CARB from receiving a preemption waiver for the Proposed SORE Amendments. (521-Docket)

The SORE rulemaking at issue will be heard by the Board initially on December 9, 2021. That hearing likely will be followed by one or more 15-day change notices and comment periods. In addition,

CARB staff will need to draft a comprehensive Final Statement of Reasons and other final rulemaking documents before ultimately sending the complete rulemaking file to the Office of Administrative Law (OAL) for its review and approval. Following OAL approval, the SORE regulations would then be transmitted to the California Secretary of State for publication in the California Code of Regulations. Only at that point would the SORE Amendments actually be "final." (521-Docket)

The main point from the foregoing is that the pending rulemaking to adopt the Proposed SORE Amendments will not be final until sometime well into 2022. As CARB is proposing to implement the zero-emission standards for all SORE, except generators, starting in model year 2024, CARB is only providing one full year of lead time for the proposed SORE zero-emission standards (including evaporative emissions). That is contrary to the clear dictates of CAA section 209(e)(2), and so is unlawful. Consequently, CARB will need to revise the Proposed SORE Amendments so that they take effect no earlier than the 2025 model year. (521-Docket)

Comment: That unreasonable (and unlawful) lead time is simply and utterly infeasible. (521-Docket)

Comment: Just as significant, and as already explained, CARB cannot demonstrate that manufacturers will have sufficient lead time to incorporate into their product development and manufacturing plans the changes required to meet the wide-ranging MY2024 ZEE mandates or the MY2024 through MY2027 standards for portable generators. Indeed, by the time the Proposed Amendments will become final in 2022, after OAL approval, manufacturers will have only one (1) full year of lead time to try to meet the MY2024 requirements. That amount of lead time is clearly inadequate, and, as noted, is directly contrary to the controlling provisions of the federal Clean Air Act, which will preclude a preemption waiver for the Proposed Amendments, and which will render the 2024 MY standards and requirements invalid and unenforceable as a matter of law. (521-Docket)

Comment: Moreover, the Proposed Rule continues to fall significantly short in demonstrating that the rule is needed to meet compelling and extraordinary conditions in California, is at its very foundation arbitrary and capricious, and inconsistent with Section 209 of the Clean Air Act by not allowing sufficient lead time to permit the development of the necessary technology or consideration of the cost of compliance. In light of these serious deficiencies, the Proposed Rule once finalized will be prohibited by the Clean Air Act. (524-Docket)

Comment: Without accurate data and modeling, there is no factual evidence the sector contributes to compelling and extraordinary conditions, or that the resulting benefits are achievable, and the Proposed Rule is arbitrary and capricious. As a result, the Proposed Rule fails to meet California administrative regulatory requirements and is prohibited by the Clean Air Act. (524-Docket)

Comment: Section 209 of the federal Clean Air Act (CAA) preempts states and political subdivisions thereof from adopting specific emission standards for mobile sources. In recognition of California's unique air-quality challenges, Congress provided a specific waiver from preemption for California. However, to obtain the waiver needed in order for California to enforce standards and other requirements relating to the control of emissions from SORE, California must satisfy the following conditions.[1] [Footnote 1: Clean Air Act Section 209(e)(2)(A); 24 U.S.C. Section 7543(e)(2)(A).]
(i) The requirements must not be arbitrary and capricious,
(ii) The standards are needed to meet compelling and extraordinary conditions, or
(iii) The standards and accompanying enforcement procedures are consistent with section 209 of the CCA.
The Proposed Rule fails to meet *any of these* conditions. (524-Docket)

Comment: Given this lack of evidence and support, the Proposed Rule is arbitrary and capricious, fails to meet California administrative regulatory requirements, and is prohibited by the Clean Air Act. (524-Docket)

Comment: Comment 2 – The Proposed Rule appears to present certification, testing and enforcement requirements that are different than EPA small spark-ignited engine requirements. These requirements must not diverge for California to obtain a valid EPA waiver of preemption under the Clean Air Act. Importantly, California's accompanying enforcement procedures appear to be inconsistent with section 202(a), one of the key requirements to obtain a waiver under Clean Air Act section 209. (524-Docket)

Comment: In its 1994 Preemption of State Regulation for Nonroad Engine and Vehicle Standards final rule, EPA determined that it must determine nonroad authorization requests under the same consistency criteria that it reviews motor vehicle requests. With this determination, the rule states that the Administrator shall not grant a California motor vehicle waiver under section 209(b)(1)(C) if she finds that California standards and accompanying enforcement procedures are not consistent with section 202(a) of the Act. EPA interpreted this criterion in previous motor vehicle waiver decisions to say that California's accompanying enforcement procedures would be inconsistent with section 202(a) if the federal and California test procedures were inconsistent. That is, manufacturers would be unable to meet both the state and federal test requirements with one test vehicle or engine.[3] [Footnote 3: 40 CFR Part 85, FR Vol. 59, No. 138, pg 36983] (524-Docket)

Comment: EPA's 1994 final rule is clear, federal and California test procedures must be consistent for certification vehicles and engines. The Proposed Rule presents new challenging requirements that are inconsistent with EPA procedures. As a result, manufacturers would be unable to meet both the state and federal test requirements with one test vehicle or engine which a key requirement to obtain a waiver of federal preemption under section 2019 of the Clean Air Act. (524-Docket)

Comment: Inconsistent with the SIP and needs to meet federal air quality standards, there is no evidence to support the conclusion that the Proposed Rule reductions are needed to address compelling and extraordinary conditions, rendering the rule arbitrary and capricious and without basis. As a result, the Proposed Rule fails to meet California administrative regulatory requirements and is prohibited by the Clean Air Act. (524-Docket)

Comment: As a result, the Proposed Rule is not consistent with California administrative regulatory requirements and is prohibited by the Clean Air Act. (524-Docket)

Comment: As the above data demonstrates, the assumptions suggested in the Proposed Rule and that serve as the basis for SORE2020 that ZEE penetration will not continue unless forced by rulemaking, are not based on current trends and must be reexamined to accurately reflect the current and future SORE emission contributions and determine the additional emission reductions needed to meet SIP goals, as well as related benefits. Without considering the actual market trends, the Proposed Rule is arbitrary and capricious and lacks a reasonable or rational basis. (524-Docket)

Comment: Footnote 13: OPEI met with CARB staff on January 8, 2019 to discuss the CARB OFFROAD2007 model – 18 months before SORE2020 was published. At the closing of the meeting Dr. Michael Benjamin (Chief, Air Quality Planning and Science Division) noted (paraphrasing) "if I can offer advice to your members, it would be to look at the (Innovative Clean Transit regulation)". This rule phases-in a requirement that public transportation bus purchases must be 100% ZEE by 2029. Similarly, on August 17, 2019 OPEI met with Dr. Sam Pournazeri (Chief, Mobile Source Analysis

Branch) virtually to discuss questions about modeling and market statistics previously provided to CARB for model development purposes. While discussing the need and use for OPEI zero-emissions market statistics data, Dr. Pournazeri noted (paraphrasing) "the data will be used to give industry credit for ZEE penetration", but that "it's not a matter of if, but when" regarding CARB rules to force transition of SORE to ZEE. From these statements, it is clear that CARB was already developing strategies to force the transition to ZEE long before the SORE2020 model was finalized and sector emissions were appropriately analyzed and considered. (524-Docket)

Comment: Additionally, changing the number of engines tested to one is a significant deviation and inconsistent with EPA's procedure. Manufacturers may not be able to meet both the state and federal test requirements for one family, which would be inconsistent with Section 202(a) of the Clean Air Act. (524-Docket)

Comment: Briggs & Stratton shares CARB's goal of reducing emissions from SORE sources and supports electrification of SORE-operated applications, but CARB's proposed amendments to be considered at the December 9, 2021, public hearing are untenable and would be catastrophic to the myriad individuals and industries that use SORE-operated products. (528-Docket)

Comment: The amendments arbitrarily and capriciously dictate a moratorium on technology that provides crucial support to countless facets of American industry and life by dictating what types of technology Briggs & Stratton and other industry participants must use in order to sell products in California. (528-Docket)

Comment: The Clean Air Act (CAA) is the federal statute that outlines the statutory and regulatory paradigm that emissions are regulated in the United States. Under the CAA, Congress delegated to California the exclusive authority to also regulate emissions but only after being granted a waiver that must be approved by the U.S. Environmental Protection Agency (EPA). The other 49 states are federally preempted to act in this manner until California has been granted this waiver. In order to obtain this waiver, the California standard being approved by EPA must:
1. California's standards are at least as protective as federal standards, and that the state's determination of that fact was not arbitrary and capricious;
2. California's standards are needed to meet compelling and extraordinary conditions.
3. California's standards are not inconsistent with certain Clean Air Act provisions related to technical feasibility and lead time to manufacturers.[2] [Footnote 2: California Air Resources Board (CA.gov) "California and the Waiver: The Facts" https://ww2.arb.ca.gov/resources/fact-sheets/california-waiver-facts] (533-Docket)

Comment: When considering the technical feasibility EPA will look at both technology performance and cost.[3] [Footnote 3: 3 U.S. Environmental Protection Agency " Setting Emissions Standards Based on Technology Performance" https://www.epa.gov/clean-air-act-overview/setting-emissions-standards-based-technology-performance] The problem with the CARB proposal is that CARB failed to adequately assess the technical feasibility with compelling quantitative and qualitative data and a lack of engagement address the differences between commercial and residential equipment and the heightened requirements and impacts on commercial businesses that rely on this equipment to provide for their income. (533-Docket)

Comment: For the reasons stated herein, NALP supports a responsible transition to ZEE SORE. Unfortunately, we believe the ISOR as presented is deeply flawed but can be amended to address these flaws. NALP also believes that based on the technical feasibility prong of the Clean Air Act section 209 waiver process that the Environmental Protection Agency will not grant CARB a waiver

and therefore the 2024 date will need to be adjusted. NALP believes we can make this adjustment now, gain industry support, push for more financials support from the California Legislature and chart a path forward on this transition with complete buy-in from all interested stakeholders. (533-Docket)

**Agency Response:**

These comments include expressions of the commenters' opinions regarding the adequacy of CARB's analyses to meet various requirements of California laws and CARB's compliance with Clean Air Act (CAA) requirements for the adoption of the Proposed Amendments. Commenters provide their assessments of potential timelines for finalizing the Proposed Amendments, consistency of the Proposed Amendments with the 2016 State SIP Strategy, and the impacts the Proposed Amendments might have on users. The commenters claim CARB has not met applicable requirements in CAA necessary for U.S. EPA to grant CARB a waiver for the Proposed Amendments or authorization to continue to rely on the existing waiver for the SORE regulations. Commenters make claims that the Proposed Amendments are arbitrary and capricious, that the Proposed Amendments are not technologically feasible or are otherwise invalid, that the Proposed Amendments are not needed to meet compelling and extraordinary conditions, and that the Proposed Amendments are not consistent with various CAA requirements. The commenters do not provide evidence that CARB has not complied with CAA or APA requirements in its adoption of the Proposed Amendments, nor do they provide evidence for their other claims. Comments regarding the 2016 amendments to the SORE regulations are beyond the scope of this rulemaking. CARB made no change based on these comments.

**Section 209(e)(2)(A) of the Clean Air Act does not impose a two-year lead time requirement on California's adoption of emission standards and other emission-related requirements for new off-road engines.**

CARB disagrees with the commenters' assertions that the lead time provided by the Proposed Amendments violates the Federal Clean Air Act and makes no changes in response to the comments related to this issue. That assertion is based upon an interpretation of the Federal Clean Air Act (CAA) that is expressly contradicted by the terms of section 209(e)(2)(A), which authorizes California to adopt and to enforce emission standards and other emission-related requirements for new off-road engines that are not expressly preempted by section 209(e)(1).

When the United States Congress enacted the 1990 Amendments to the Federal Clean Air Act, it generally preempted states and their political subdivisions from adopting or enforcing emission standards or other emission-related requirements for nonroad engines or equipment.[49] However, Congress authorized only California to adopt and enforce emission standards and other emission-related requirements for new and in-use nonroad engines that are not expressly preempted by section 209(e)(1)(A).[50] Section 209(e)(2)(A) sets forth the applicable authorization criteria, and expressly provides that the Administrator of EPA "*shall, after notice and opportunity for public hearing, authorize California to adopt and enforce standards and other requirements relating to the control of emissions from such vehicles and engines ….*" The statutory text does not specify that California cannot enforce authorized

[49] Section 209(e)(1)

[50] Section 209(e)(1)(A) expressly preempts new engines less than 175 hp used in farm and construction equipment and vehicles, and new engines used in new locomotives and locomotive engines.

emission standards and other requirements earlier than two years after the issuance of an authorization.

Commenters improperly rely upon CAA § 209(e)(2)(B) to support their arguments. As explained above, CAA § 209(e)(2)(A) establishes the protocol and criteria for the EPA Administrator to grant California an authorization to enforce emission standards and other requirements relating to controlling emissions from new and in-use nonroad engines that are not conclusively preempted by section 209(e)(1)(A). CAA § 209(e)(2)(B) comprises *a related, but distinct provision* that only applies to "States other than California", and allows qualifying states to adopt and enforce California nonroad emission standards that have been granted an authorization, provided (i) the other state's emission standards and implementation and enforcement are identical to the authorized California emission standards, and (ii) California and the other states adopt the subject emission standards at least 2 years before commencement of the period for which the emission standards take effect. Commenters interpret "the period for which the emission standards take effect" to apply to California emission standards, but that interpretation is directly contradicted by the statutory text of §209(e)(2)(B) and by EPA regulations interpreting §209(e), which state that the provisions of §209(e)(2)(B) only apply to states other than California.[51]

Moreover, CARB notes that EPA stated, in response to comments that section 209(e)(2)(B) imposes a two-year lead time requirement on California's nonroad emission standards and other emission-related requirements, that it does not interpret that section as independently requiring California nonroad emission standards to provide at least two years of lead time, because California is already required to provide adequate lead time for its emission standards under section 209(e)(2)(A).[52]

Commenters' position also relies on an interpretation that the criterion of §209(e)(2)(A)(iii) pertaining to adequate lead time, which requires EPA to evaluate technical feasibility of the Proposed Amendments, commences from the date EPA grants California the authorization. That interpretation is precluded by the express terms of §209(e)(2)(A), §202(a), and EPA's regulations implementing § 209(e).

CAA § 209(e)(2)(A) directs the Administrator of EPA to grant California an authorization for off-road engine emission standards and requirements if California determines that its state's emission standards will be, in the aggregate, at least as protective of public health and welfare as applicable federal emission standards, unless the Administrator finds that: (1) California's protectiveness finding is arbitrary and capricious; (2) California does not need separate state emission standards to meet compelling and extraordinary conditions; or (3) California's emission standards and accompanying enforcement procedures are not consistent with CAA section 209.

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[51] *See* 40 CFR §85.1606. 40 CFR §85.1606(e) clarifies that the two year time period specified in §209(e)(2)(B)(ii) only pertains to the time period "for which the standards take effect *in the state that is adopting under section 209(e)(2)(B)*". *Emphasis supplied.*

[52] 59 Fed. Reg. 36969, 36983 (July 20, 1994).

In its regulation implementing CAA § 209(e), EPA interpreted "not consistent with section 209" to mean that the opponents of a California authorization request must show that the State's emission standards and accompanying enforcement provisions are not consistent with sections 209(a), 209(b)(1)(C) – that is, that the emission standards are not consistent with CAA section 202(a), and 209(e)(1).[53]

EPA determines whether California emission standards are consistent with CAA § 202(a) by considering whether the California regulation or amendments thereto provide sufficient lead time to permit the development of technology needed to meet the emission standards and other requirements, giving appropriate consideration to the cost of compliance in the timeframe provided, and if the California and federal test procedures are sufficiently compatible to permit manufacturers to meet both the state and federal test requirements with one test vehicle or engine.[54] With regards to the sufficient lead time criterion, § 202(a) does not specify that lead time commences from a specific point in time; however, in the context of evaluating California waiver and authorization requests, EPA interprets lead time to commence from the time CARB adopts a regulation.[55]

"EPA measures lead time for its regulations from the time of promulgation, which is analogous to California's adoption of its regulations. EPA review of CARB waiver requests causes no more uncertainty than judicial review of EPA regulations. In addition, California and regulated parties do not know when EPA will make a final decision on a request for waiver of preemption, so California would have little ability to evaluate lead time at the time it adopts its emission standards if lead time were based on a future action by another entity the timing of which is uncertain."[56]

As demonstrated in other responses to comments and throughout this rulemaking record, no issue of lead time arises from the Proposed Amendments because the technology needed to comply with the Proposed Amendments already exists or can be developed within the time provided for compliance. As described in ISOR section I.E, the level of performance, number of brands, and number of equipment options among ZEE for both residential and professional use have increased greatly and continue to do so today. Battery and electric motor technology has advanced rapidly in recent years, while costs have declined. For the most common types of SORE equipment, there are ZEE equivalents available in the market with similar or better performance characteristics and lifetime. As explained in ISOR sections I.E and II.A and in sections II.A.1.e and II.A.2.d of this FSOR, the Proposed Amendments include a longer compliance timeframe for SORE equipment that do not yet have cost-effective equivalents—higher-power pressure washers typically used by professionals and portable generators—to comply with emission standards of zero. A delayed phase-in for generator engines and pressure washer engines with displacement 225 cc or larger allows time for the zero-emission generator and pressure washer markets to further develop. Please refer to the ISOR section I.E. and Agency Responses in sections IV.A.35 for additional discussion of the current

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[53] 59 Fed. Reg. 36969, 36983 (July 20, 1994).

[54] *See* 61 Fed. Reg. 53371, 53372 (October 11, 1996); Decision Document at p.2 (*OBD II Waiver Decision*).

[55] 74 Fed. Reg. 32744, 32777, fn. 209 (July 8, 2009); 59 Fed. Reg. 48625 (Sept. 22, 1994), Decision Document at 39–41); 46 Fed. Reg. 26371, 26373 (May 12, 1981).

[56] 74 Fed. Reg. 32744, 32777, fn. 209 (July 8, 2009).

technological feasibility of ZEE for other equipment types and why more time is not needed for them to comply with emission standards of zero.

Moreover, commenters' position is inconsistent with Congress' intent in enacting section 209(e)(2)(A), which authorizes California to adopt and enforce its own emission standards and other emission related requirements regulations for non-preempted new and in-use nonroad engines. That authority is similar to the authority that Congress previously granted California in section 209(b) to adopt and enforce separate and distinct emission standards for new motor vehicles. Congress had an opportunity to restrict section 209(b) when it enacted the 1977 amendments to the CAA, but instead elected to expand California's ability to adopt a complete program of motor vehicle emissions control. Congress expressed in the House Committee report for the 1977 CAA Amendments[57] that "[t]he Committee amendment is intended to ratify and strengthen the California waiver provision and to affirm the underlying intent of that provision, i.e., to afford California the broadest possible discretion in selecting the best means to protect the health of its citizens and the public welfare." Commenters' argument that Congress expressly restricted California from enforcing newly authorized requirements for two years is clearly inconsistent with Congress' expressed intent to provide California the "broadest possible discretion in selecting the best means to protect the health of its citizens and the public welfare."

In response to the statement, "Additionally, changing the number of engines tested to one is a significant deviation and inconsistent with EPA's procedure. Manufacturers may not be able to meet both the state and federal test requirements for one family, which would be inconsistent with Section 202(a) of the Clean Air Act," and similar statements: Commenters state their opinions and speculate on the ability of manufacturers to meet both California and federal requirements with one test engine but do not provide evidence to support their claims. CARB's requirements are more stringent than federal requirements but do not preclude the use of one test engine to meet both California and federal requirements.

In response to the statement, "From these statements, it is clear that CARB was already developing strategies to force the transition to ZEE long before the SORE2020 model was finalized and sector emissions were appropriately analyzed and considered" and similar statements: The commenter relates its recollection of discussions it had with CARB staff. CARB disagrees with the commenter's statements. The Proposed Amendments do not force consumers to transition to ZEE. The Proposed Amendments do not require anyone to stop using SORE equipment, nor do they prohibit the sale of CARB-certified SORE. The Proposed Amendments are inherently technology neutral because they specify emission standards of zero and do not specify a particular energy source or technology.

Please refer to the Agency Responses in sections IV.A.14, IV.A.15 and IV.A.35 for discussion of comments related to emissions inventory modeling, including small off-road equipment market trends, environmental analysis and technological feasibility and cost-effectiveness for the Proposed Amendments.

In response to the statement, "NALP believes we can make this adjustment now, gain industry support, push for more financials support from the California Legislature and chart a path forward on this transition with complete buy-in from all interested stakeholders" and similar statements: For additional explanation of the necessity for the current rulemaking, its benefits

[57] H.R. Rep. No. 294, 95th Cong., 1st Sess. 301-302 (1977), U.S. Code Cong. & Admin. News 1977, p. 1380

for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV.

## A.11. Consistency with federal provisions

Comment: The Proposed SORE Amendments purport to harmonize with the corollary federal regulations (SRIA p. 9), but in many cases the amendments actually diverge from those federal regulations in unjustified ways. And, as additional evidence of the lack of due diligence that CARB has brought to this rulemaking, the Proposed Amendments are not even based on the most current version of EPA regulations (Parts 1054 and 1065) despite their stated desire to harmonize the CARB regulations with EPA. Nor has CARB addressed issues in which the proposed amendments to the CARB regulations will actually conflict with the EPA regulations. For example, EPA Part 1060 does not allow the use of CA LEV III fuel; however, the proposed amendments to TP 901 and 902 require the use of CA LEV III fuel. In that particular case, therefore, "the divergence is such that the amended regulations will not qualify for a federal preemption waiver under the federal CAA, since the enforcement procedures are inconsistent between the CARB and EPA regulations, such that manufacturers would be unable to meet both state and federal test requirements with one test vehicle [equipment in this case] or engine." (See Federal Register Vol. 59 No. 138, July 20, 1994.) (521-Docket)

Comment: Other Elements of the Proposed Amendments are Unreasonable and Inconsistent with EPA's Regulations
Despite CARB's stated intent in the ISOR that the Proposed Amendments will harmonize the California regulations with the corollary federal regulations, there are numerous instances in which the Proposed Amendments diverge from the current applicable federal regulations. Those key differences are detailed in Exhibit "F." Some of the differences are due to CARB staff simply not using the current federal regulations as the "starting point" of the Proposed Amendments. Some are due to CARB staff simply failing to be thorough in the review of the applicable federal regulations, or omitting references to relevant federal regulations contained in 40 CFR Parts 1054, 1065 and 1068. Indeed, CARB staff have completely overlooked and omitted any of the necessary references to Part 1068. All of this will create fundamental inconsistencies between the Proposed Amendments and the controlling federal regulations, including as to what constitutes a prohibited act. (521-Docket)

In that regard, it appears that CARB staff have not fully incorporated all of the recent "Technical Amendments" that EPA finalized on June 29, 2021. (See 86 FR 34308-34590, June 29, 2021.) More specifically, there are numerous proposed regulatory changes that CARB delineates in Appendices A-G to the ISOR for this rulemaking that need to be revised in order to make those proposed changes consistent with the controlling federal regulations. Those required changes are detailed in the Exhibit "F," which is a compendium of EMA's detailed review of, comments on, and recommended revisions to the proposed regulatory language contained in the multiple Appendices (A-G) to CARB's ISOR. (521-Docket)

Comment: CARB's proposed modification to the required emission labels elevates form over substance. It will require manufacturers to have two separate labels, one for EPA and one for CARB, with no justification for that added burden. (521-Docket)

CARB's proposed modification to the current warranty statement would prohibit manufacturers from declining warranty coverage where an owner has failed to perform the maintenance specified in the Operator's Manual. That warranty disqualifier and disclaimer is currently incorporated into the

certification of SORE products. Eliminating that well-established and long- accepted disclaimer, in effect, constitutes an increase in the stringency of the standards and is inconsistent with EPA's regulations. (521-Docket)

Comment: As noted above, CARB's proposed revisions to ISOR Appendices F and G are not based on EPA's most recent updates to 40 CFR Parts 1054, 1065 and 1068, including the recent Technical Amendments. The divergence is so extreme that in some instances it will be impossible for manufacturers to use a single engine or piece of equipment to demonstrate compliance, which amounts to a violation of section 209 of the Clean Air Act. For example, the DF procedure (section 1054.245) proposed by CARB would create an inconsistency such that a manufacturer may be compliant under one regulation but not the other. And again, CARB is proposing changes to the labeling provisions, which elevate form over substance, resulting in the need for the dual labeling of product. (521-Docket)

Comment: As noted above, and in addition to the foregoing issues, Exhibit "F" to these comments contains EMA's detailed recommendations for how the regulatory text set forth in ISOR Appendices A-F needs to be revised to comport with Parts 1054, 1065 and 1068 of EPA's regulations. The additional revisions that will need to be made to incorporate EPA's recent changes to Part 1064 are detailed in EPA's Technical Amendments. (See 86 FR 34308-34590.) (521-Docket)

Comment: OPEI is concerned the Proposed Rule includes several changes that would result in inconsistent procedures between CARB and EPA, and that the same test would not be allowed for both EPA and CARB certification and compliance. (524-Docket)

Comment: First, the Proposed Rule would establish California requirements for evaporative SHED testing for many products. An OPEI member recently reported that they discussed this Proposed Rule requirement with EPA. The member reported that EPA advised they would not accept SHED test results for handheld applications because 40 C.F.R. Part 1060 requires that fuel lines and tanks be tested and certified to the component-based standards. As a result, separate tests would need to be conducted for EPA and CARB certification and compliance. (524-Docket)

Comment: These examples are not exhaustive. Stakeholders will need additional time to understand the differences and impact of the Proposed Rule versus EPA certification and compliance programs. (524-Docket)

Comment: Comment 19-4: Labeling and Warranty Statement Formatting
OPEI is concerned formatting changes to the labeling and warranty statement requirements will result in unique requirements for EPA and CARB, which will require duplicative labels and warranty statements (one for CARB and one for EPA) with no value. The cost of these additional requirements were not considered in the Proposed Rule. OPEI recommends the proposed formatting changes are withdrawn until CARB, EPA and Industry can harmonize requirements. (524-Docket)

**Agency Response:**

These comments present several related criticisms of the proposed regulatory text, on the basis that it is not fully harmonized with similar federal provisions. The comments also state a concern regarding potential differences between testing requirements under California and federal procedures, with differences in evaporative certification procedures cited as an example. The comments include expressions of the commenters' opinions and conclusions the commenters have made about the Proposed Amendments. These comments assert that the

proposed revisions to Title 13, California Code of Regulations, sections 2400-2409 and 2750-2774, and/or the associated test procedures, particularly California parts 1054 and 1065, as published with the ISOR, differ in several respects from the analogous federal regulations and have not fully incorporated recent amendments to those federal provisions. CARB made changes based on some of the issues raised in these comments.

These commenters are correct that there are differences between the Proposed Amendments and the analogous federal regulations. As described on page ES-4 of the ISOR:

"Most of the Proposed Amendments to the exhaust emission test procedures are intended to align them with updates to the federal test procedures that have been adopted since CARB adopted its test procedures. The Proposed Amendments also include California-specific changes necessary to maintain the stringency of California emission standards, provide consistency with other California SORE regulations, prevent redundant effort and confusion for testers, or provide additional flexibility."

Based in part on the issues raised in these comments, CARB undertook additional review of Appendices F and G of the ISOR and identified additional textual changes needed to harmonize with changes made to Title 40, Code of Federal Regulations, Parts 1054 and 1065, where no California-specific changes are necessary. In most cases, as detailed in the March 2022 15-Day Notice, these changes represent the correction of typographical errors or harmonization with minor changes to the wording of the analogous federal provisions.

CARB disagrees that the other differences between CARB's proposed regulatory text and analogous federal procedures represent a failure to harmonize with federal procedures according to CARB's stated intentions with this rulemaking. As noted above, CARB's stated purposes in proposing this rulemaking include harmonizing certain test procedures – not the entirety of California's SORE regulations – with similar federal provisions, except where California-specific changes were needed, not unconditionally. Many California-specific changes made when California parts 1054 and 1065 were adopted by CARB in 2012 have been retained in the proposed text, and additional California specific changes are proposed in this rulemaking. CARB's general reasons for adopting regulations different from those contained in the Code of Federal Regulations are described on pages 143-147 of the ISOR, and the rationale for each new California-specific change in the proposed regulation and test procedures is presented in Chapter XI, pages 153-409, of the ISOR. CARB disagrees with one commenter's assertion that these differences are in violation of section 209 of the Clean Air Act. As described on pages 5 and 143 of the ISOR, California is permitted under the Clean Air Act to set its own emission standards, including test procedures and testing requirements, to address California's unique air quality challenges and because of California's historical leadership in air pollution control. Please refer to the Agency Response in section IV.A.10 for discussion of comments related to CAA requirements.

In response to the statement, "The Proposed SORE Amendments purport to harmonize with the corollary federal regulations…": The comment indicates vaguely that there are differences between some of California's regulations, under the Proposed Amendments, and corresponding federal regulations, and states the commenter's opinion that those are "unjustified." CARB disagrees with the commenter's assertion that the Proposed Amendments are in conflict with CARB's stated intention of harmonizing certain test procedures with corresponding federal regulations except where changes are needed for consistency with other California regulations or to address California's unique air quality challenges. CARB disagrees that these differences are unjustified. CARB's justification for adopting regulations

different from federal regulations is described in general terms on pages 143-147 of the ISOR and in the Purpose and Rationale statements for each provision adopted or modified by the Proposed Amendments on pages 153-409 of the ISOR.

As noted by two of the commenters, the proposed revised text of California parts 1054 and 1065 uses the existing text of California parts 1054 and 1065, rather than the most recent revised text of Title 40, Code of Federal Regulations, Parts 1054 and 1065, as the base text, with insertions shown in underline and deletions in strikeout. This is necessary to satisfy the requirements of California's Administrative Procedures Act, which requires changes to existing regulation to be published in this way.

CARB disagrees that compliance with the California Administrative Procedures Act represents or suggests a lack of due diligence. The comments imply an opinion that "due diligence" might involve adopting new procedures based on federal Part 1054 and Part 1065 rather than updating California Part 1054 and Part 1065. CARB disagrees that adopting new procedures based on federal Part 1054 and Part 1065 is necessary or would be more appropriate than the Proposed Amendments to Part 1054 and Part 1065.

In response to the statement, "Nor has CARB addressed issues in which the proposed amendments to the CARB regulations will actually conflict with the EPA regulations. For example, EPA Part 1060 does not allow the use of CA LEV III fuel; however, the proposed amendments to TP 901 and 902 require the use of CA LEV III fuel,": This statement misrepresents the requirements of TP-901 and TP-902. Section 6 of TP-901 states, in part, "Testing according to this procedure shall be conducted using 1) LEV III Certification Gasoline...or 2) the gasoline defined in 40 CFR Part 1060.520(e)." Section 6 of TP-902 states, in part, "Testing according to this procedure shall be conducted using 1) LEV III Certification Gasoline...or 2) the fuel defined in 40 CFR Part 1065.710(b) for general testing." These provisions give manufacturers flexibility in choosing certification test fuels. The commenter's statement is false, and CARB disagrees with the commenter's conclusion.

In response to the statement, "CARB staff have completely overlooked and omitted any of the necessary references to Part 1068,": CARB disagrees with this interpretation. As described on pages 321, 325, 328, 329, 331, 385, 405, 406, and 407 of the ISOR, references to Title 40, Code of Federal Regulations, Part 1068 in the present text of California parts 1054 and 1065 have in most cases been intentionally replaced with references to analogous provisions in California regulation, to maintain consistency with existing California regulations.

CARB disagrees with one commenter's assertion that elements of the Proposed Amendments are unreasonable, per the purpose and rationale statements for each proposed element in Chapter XI of the ISOR and the analysis outlined on pages ES-1 to ES-11 of the ISOR.

In response to the statement, "These examples are not exhaustive. Stakeholders will need additional time to understand the differences and impact of the Proposed Rule versus EPA certification and compliance programs": This comment, in context, accompanies a list of the commenter's assessed differences between the Proposed Amendments and current federal regulations. The comment implies that other differences are known to exist or may be discovered, and implicitly requests a delayed implementation alternative. CARB made no changes based on this comment.

The commenter appears to request a delayed implementation alternative, but without requesting a specific implementation timeframe. As described in sections II.A.1.e and II.A.2.d of this FSOR, in response to other stakeholder comments about technological feasibility

specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers used by professional cleaning services to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for pressure washers using engines with displacement 225 cc or larger that are the same as those proposed for generators and setting emission standards of zero for MY 2028 and later for these pressure washers. Please refer to section II.A.1, section II.A.2 and the Agency Response in section IV.A.2.4.1 for additional discussion about these modifications. As explained in ISOR sections I.E and II.A, the regulatory amendments already include a longer timeframe for portable generators to comply with emission standards of zero. Please refer to the Agency Responses in section IV.A.35 for additional discussion of the current technological feasibility of ZEE for other equipment types and why more time is not needed for them to comply with emission standards of zero.

However, CARB's conclusion is that a more general implementation delay is not appropriate. CARB analyzed a "more gradual implementation" alternative on pages 125-135 of the ISOR, and found that delaying implementation of the emission standards described in the Proposed Amendments, with an intermediate step of lower, but nonzero, emission standards in 2024, is less cost-effective than the Proposed Amendments, fails to maximize health benefits as required by California Health and Safety Code section 43000, subsection (b), and would make it more difficult for CARB to achieve its air quality goals both under EO N-79-20 and the 2016 State SIP Strategy. Delaying implementation of the Proposed Amendments without an intermediate step of more stringent emission standards would amount to an intermediate step of a "no action" alternative, entirely eliminating the expected health benefits for one or more years. It would also make it more difficult for California to meet its SIP commitments, since as described in detail in the ISOR (sections II.A.1 and III.A.3), current SORE regulations will not achieve emission reductions expected under the 2016 State SIP Strategy.

One commenter refers to "exhibit" documents containing additional detailed comments regarding specific elements of the proposed regulation. Please refer to the Agency Responses in Attachments A and B of this FSOR for further discussion of these comments and similar comments.

In response to comments regarding labeling and warranty statements: CARB disagrees with the commenters' assertions that the Proposed Amendments elevate form over substance or require duplicative labels and warranty statements for U.S. EPA and for CARB. The Proposed Amendments change the regulations' formatting of text in all capital letters to mixed case to aid in making regulation documents accessible to everyone, including people with visual impairments and assistive technology users, as described on page 154 of the ISOR. The Proposed Amendments do not prohibit the use of all capital letters to label an engine, nor do they require any specific letter case to be printed on labels. Therefore, manufacturers can continue to satisfy federal and California labelling requirements with a single emission control label. The concerns raised in these comments are similar to those addressed in Agency Response 6(b) in Attachment A to this FSOR.

In response to the statement, "CARB's proposed modification to the current warranty statement would prohibit manufacturers from declining warranty coverage where an owner has failed to perform the maintenance specified in the Operator's Manual": This comment is similar to other comments submitted by OPEI and EMA and implies that manufacturers may be denying claims without determining that a failure to ensure the performance of all scheduled maintenance is the cause of a failure of a warrantable part. CARB disagrees that

failure to ensure the performance of all scheduled maintenance would necessarily cause an engine to fail. For example, a leaking fuel tank may not be attributable to a user's failure to clean an air filter. As described on pages 248-249 of the ISOR, the change to section 2764 in the Proposed Amendments is necessary to prevent excess emissions resulting from improperly denied warranty claims. This comment further suggests the necessity of the change by implying that manufacturers may be denying claims without determining that a failure to ensure the performance of all scheduled maintenance is the cause of a failure of a warrantable part. Similarly, it would be improper for a manufacturer to determine a lack of receipts constitutes failure to ensure the performance of all scheduled maintenance and deny a warranty claim for an engine whose owner had ensured the performance of all scheduled maintenance but who had not retained the receipts or other records of maintenance. The concerns raised in this comment are similar to those addressed in Agency Responses 14 and 53 in Attachment A to this FSOR.

## A.12. Costs for landscapers

Comment: In examining the cost, the first thing to consider is the actual equipment. For example, commercial-grade handheld electronic leaf blowers have significant cost concerns for the landscape industry. One popular manufacturer's electric leaf blower retails for approximately $350 - $400, similar to the same manufacturer's gas-powered unit. However, to use this electric leaf blower for an entire workday requires the purchase of extra batteries and chargers thus, driving the up-front cost to exceed $3,000. More alarming is when you look at larger equipment. Popular commercial gas-powered riding mowers range from $8,000-$11,000 while the few commercial riding ZEE mowers available with 4-5hr run time range from $16,000 to 21,000+. These are significant up-front investments for landscapers, the majority of whom are sole-proprietor (single employee) businesses, with no guarantee they will recover the difference based on energy costs and maintenance. (533-Docket)

Comment: All of this considered together (equipment cost, battery cost, increased labor) represents significant cost impediments to make a complete transition. (533-Docket)

Comment: From a cost perspective a complete transition is a significant impediment for the landscape industry, specifically to undertake in only two years. For example, commercial-grade handheld electronic leaf blowers have significant cost concerns for the landscape industry. One popular manufacturer's electric leaf blower retails for approximately $350 - $400, similar to the same manufacturer's gas-powered unit. However, to use this electric leaf blower for an entire workday requires the purchase of extra batteries and chargers thus, driving the up-front cost to exceed $2,000. (533-Docket)

Comment: From a cost perspective, a complete transition is a significant impediment for the landscape industry, specifically to undertake such in only two years. Data from manufacturers shows that commercial ZEE can have an upfront cost of as much as 2 to 4 times that of their gas-powered counterparts. Some examples:

1. One popular manufacturer's commercial-grade electric leaf blower retails for approximately $350 - $400, similar to the same manufacturer's gas-powered unit. However, to use this electric leaf blower for an entire workday requires the purchase of extra batteries and chargers thus, driving the up-front cost to exceed $2,000. (542-Docket)

2. One of the most popular commercial gas-powered riding mowers cost ranges from approximately $10,000 to $11,000 while its ZEE counterpart cost starts at approximately $21,000 (all prices MSRP). (542-Docket)
3. A commercial grade gas-powered string trimmer from a leading manufacturer starts at $329 but a commercial grade battery-powered unit from the same manufacturer (including the extra batteries and chargers needed to complete a day's work) exceeds $1,000. (542-Docket)

Comment: As you can clearly see, the initial costs to transition to commercial grade landscape ZEE represent real and significant up-front investments for landscape professionals. There is no guarantee that landscape professionals will recover the cost difference particularly when you realize the above cited costs do not include the daily cost of electricity to charge the batteries (542-Docket)

**Agency Response:**

These comments discuss commenters' assessments of costs of equipment for landscapers and do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

CARB's economic analysis acknowledges the higher upfront costs associated with professional-grade zero-emission leaf blowers and other ZEE used by landscapers as compared to SORE equipment. The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[58]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. However, the commenters correctly note that the cost of enough batteries for a work day for a professional-grade ZEE leaf blower can make up a majority of the price. The professional-grade ZEE leaf blower used in the economic analysis for this rulemaking is the Stihl BGA 100, with a price of $369.95. The price of the battery required to power this blower for a full work day, the Stihl AR 3000, was $1099.99 [Stihl, 2020[59]]. As discussed on pages 104-106 of the ISOR, a landscaper could save money within four years of purchasing a ZEE leaf blower.

In response to the statement, "More alarming is when you look at larger equipment. Popular commercial gas-powered riding mowers range from $8,000-$11,000 while the few commercial riding ZEE mowers available with 4-5hr run time range from $16,000 to 21,000+" and similar statements: These comments note the commenters' assessments of purchase cost of ZEE riding mowers as compared to SORE-powered riding mowers. The comments claim that commercial SORE-powered riding mowers cost approximately $8,000 to $11,000 while a comparable ZEE riding mower costs approximately $21,000. It is true that the upfront cost of

[58] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[59] Stihl. 2020. Stihl AR 3000 Backpack Battery. Available at: https://www.stihlusa.com/products/batteries-andaccessories/batteries/ar3000/. Last accessed November 3, 2020.

ZEE riding mowers is typically higher than the upfront cost of SORE riding mowers. However, as described in Table VII-4 in the ISOR, ongoing costs for ZEE riding mowers are lower than ongoing costs for SORE riding mowers.

In response to the comment, "A commercial grade gas-powered string trimmer from a leading manufacturer starts at $329 but a commercial grade battery-powered unit from the same manufacturer (including the extra batteries and chargers needed to complete a day's work) exceeds $1,000,": In the SRIA, CARB uses two trimmers from Husqvarna for the SORE and ZEE professional equipment examples. The prices including tax are $365.85 and $867.83 for SORE and ZEE, respectively. The ZEE unit included in the economic analysis includes two batteries and a charger. CARB acknowledges the incremental upfront costs associated with the Proposed Amendments.

In response to the comments about the significance of the upfront investments under the Proposed Amendments: Landscapers are expected to bear ten percent of the total upfront costs associated with the transition to ZEE. However, a landscaping business would not need to purchase a full suite of ZEE at once, thereby avoiding a significant one-time cost to transition to ZEE. Rather, landscaping businesses can continue to use their CARB-certified SORE equipment and gradually purchase ZEE to replace SORE equipment as it breaks or for other business reasons, such as upgrading equipment. In addition, as described on page 67 of Appendix I to the ISOR (SRIA), a sole-proprietor landscaper could see net cost-savings between two and three years after purchasing ZEE. Similarly, a landscaping business with a 10-person crew could save money overall between 4 and 5 years after purchasing ZEE. Savings come from reduced preventative maintenance and fuel costs. CARB's economic analysis acknowledges that not every professional user will reach net cost-savings with ZEE.

The cost of electricity to charge batteries for ZEE was included in the economic analysis, as described in section C.1.d of the SRIA. Please refer to the Agency Responses in section IV.A.35 for discussion of comments related to the ability to complete work in a similar amount of time with ZEE. For a discussion of incentives available to landscapers, please refer to the Agency Response in section IV.A.1.2.

## A.13. Economics

### *A.13.1. Business Hardship*

#### A.13.1.1. Potential loss of businesses or jobs

Comment: I am writing to you today as a concerned constituent in opposition to AB 1346 and CARB's proposed rule to ban small engine powered equipment in California by 2024. These proposals, if enacted, would result in significant hardships for my small business, and thousands of independent landscapers/gardeners be put out of business. (9-Docket)

Comment: Firstly, as a California resident, I do appreciate your efforts to minimize climate changing emissions. As a mother of 3 young children living in Southern California, I care deeply about the air quality and believe we should take actions sooner than later, but with a plan to support those who will be immediately affected by the change in place. At work I serve many customers who are very hard working small business owners whose livelihood depends on professional and commercial equipment listed as SORE. I am afraid prematurely moving forward with banning small engine powered equipment in 2024 without having alternative technology at a comparable price range and

performance will not have the support from small business stakeholders. As it stands, it would have numerous negative impacts on landscapers, mobile washers, commercial contractors, outdoor power equipment dealers, and other businesses throughout the state of California, as well as their employees, and the various commercial and residential customers they service. (21-Docket)

Comment: We provide homes with multiple services with the use of gasoline hand held blowers and hard scape pressure washing tools. It's effective and efficient for business, and allows us to provide many homeowners and renters a great way to keep their home and neighborhoods clean. Removing (not making them for future persons/businesses) these efficient tools that will in all likelihood under-improve our state's smog emissions will very likely hurt small and medium businesses instead. (22-Docket)

Comment: I am writing to you today as a concerned constituent in opposition to AB 1346 and CARB's proposed rule to ban small engine powered equipment in California by 2024. These proposals, if enacted, would result in significant hardships for my small business, and my customers, many of whom are minorities and your constituents. (34-Docket)

Comment: Moving forward with banning small engine powered equipment in 2024 would have numerous negative impacts on landscapers, outdoor power equipment dealers, and other businesses throughout the state of California, as well as their employees, and the various commercial and residential customers they service. These proposals would drastically limit equipment choice for professional landscape contractors and outdoor power equipment dealers across California. We are small businesses who rely on small engine powered equipment every day as cost-efficient and high-performing solutions to install and maintain living landscapes and green spaces in communities throughout the state. (34-Docket)

Comment: If this bill is not removed it is going to put a lot of small business out of business. Not to mention more business will leave the state cause unemployment to go up. People will go out of state and purchase these items anyway. Plus the publics electric bill's will increase. I can not see how this is going to effect any good change in air quality anyway because most small off-road engines do not emit very much emissions. Why put people out of work or force businesses to leave the state when the economy is so bad. I have looked at a lot of the studies and for the most part they do not take into consideration the large rural counties and how this is going to effect those economies. (35-Docket)

Comment: Another plan to kill small business in the USA. Reject this "law" before it's too late. (42-Docket)

Comment: I run a small commercial landscape business If I have to change for gasoline-powered equipment to electric this will put a huge burden on over head cost as well as efficiency of using electric power equipment, (49-Docket)

Comment: Not to mention the thousands of jobs that would be lost as work is eliminated. Not a well thought out move. (61-Docket)

Comment: This is going to make our customers consider moving to another states where they can still continue with their work. If our customers start doing this I will have to let go of my employees and will have to close down my business after 20 years, please consider all these concerns from my customers and from my employees. Thank you. (93-Docket)

Comment: There are also thousands of workers that depend on small engine equipment to make a living and yes beautify California some would suffer huge financial losses if this ban goes into affect on 2024. (102-Docket)

Comment: This is nuts. Has anyone thought of the far reaching effects this will cause. How many more jobs need to be lost? We need common sense to come back to California!! We all vote and this will drive all of us to the polls to get rid of any politician that supports this. (109-Docket)

Comment: This law will put hundreds if not thousands out of business. From repair shops to lawn maintenance personnel, all will suffer. (112-Docket)

Comment: Landscapers are already barely making ends meet. its a tough competitive market and this proposed amendment to the small off-road engine regulations would put many out of business. California's electrical infrastructure cannot handle all the additional load of batteries charging every afternoon. Besides the cost of converting equipment inventory to battery powered, the cost of upkeep and maintenance would drive overhead up. Help keep small business alive. (284-Docket)

Comment: Also we need to analyze our costs and efficiencies with this equipment and make sure we are charging our customers accordingly otherwise we risk going out of business and putting more people out of work. All this items take a lot of time to analyze, organize, spend, and assemble to be able to continue to same level of service to our customers. In closing a 2 year deadline to make all the above happen is simply not possible. It does not make business sense nor industry sense to make that change that fast. Our vendors would not even be able to fulfill orders. Also with this fast deadline this will push companies to simply buy their products out of state, thus decreasing commerce and the economy within CA and putting an undue burden on the vendors out of state and that in turn will put a burden on the purchasers in those states. That in turn won't fix your problem. (395-Docket)

Comment: Dear Sirs; this is the worst idea ever. For any small business owners it will put us all out of business. We in the Landscape business servicing large residential properties will not have the ability as it will be cost prohibitive for us to remain in business. (427-Docket)

Comment: To further speak on electrical california as a state is already maxing out our power grid.. this is the reason for pg&e planed power shut offs.. if all landscapers are charging our equipment that will put even more strain on our grid, what happens if we have a power shut off and can't charge our equipment?? The employees don't work or get paid?? The business can't charge the clients?? Sounds like a detriment to the economy. (431-Docket)

Comment: MTA Distributors, LLC is a distributor of small lawn & garden equipment. The company serves a network of both manufacturers of small equipment and small retail businesses in California, such as hardware and lawn and garden stores. We supply these small businesses with Honda engines and dozens of different pieces of equipment powered by internal combustion engines. While the proposed mandate of no internal combustion engines would negatively impact the lives of our 60 employees, we do not make this appeal primarily on our own company's behalf. Instead, we make it on behalf of the thousands of employees of our customers' businesses that we serve. Many of these Californians would be instantly unemployed by this legislature. Last year, we served 631 businesses in California, each employing anywhere from 2 to 40 people. At a conservative estimate, this would represent 2,500 Californians that we currently serve who would be unemployed by this policy. This is not even to consider the many employees served by our competitors. Moreover, this legislation will create new financial burdens for all Californian homeowners, and it would be most painful for the lower income households. A battery powered zero-turn mower costs 33% more than its gas-powered

equivalent. This extra cost will be passed down from the landscaping companies that service low-income apartments straight through to the tenants. (463-Docket)

Comment: Further, landscaping companies, many of which qualify as small businesses, would suffer as ZEEs cost significantly more and require substantial investment in additional batteries to allow crews to use the equipment all day long. According to the National Association of Landscape Professionals, there are 604,163 landscaping service businesses in the United States,[3] and 51 percent of landscaping businesses had revenue of less than $500,000 in 2019.[4] [Footnote 3: See https://www.landscapeprofessionals.org/LP/About/Industry-Statistics/LP/Media/landscape-industry- statistics.aspx (accessed November 22, 2021)] [Footnote 4: See http://giecdn.blob.core.windows.net/fileuploads/document/2020/03/02/landscaper%20census march.pdf (accessed November 22, 2021)] (475-Docket)

Comment: I am writing to you today as a concerned constituent in opposition to CARB's proposed rule to ban small engine powered equipment in California by 2024. These proposals, if enacted, would result in significant hardships for my small business, and my customers. (482-Docket)

Comment: Other off road engine regulations proposed will force many small gardening services out of business due to the high cost of purchasing new electric equipment and multiple power packs. Costs for these services will increase. Many organizations, farmers, and ranchers use off road gasoline vehicles routinely, this regulation will eliminate that valuable use forcing massive repurchasing and economic harm. (485-Docket)

Comment: Without stating every single challenge the ban would impose on our business, I can truthfully say it will create a drastic negative impact to our business. I plead to those in power to genuinely consider the strain this will impose on businesses like ours that utilize such pieces of equipment. And to please wait until the technology has advanced to the point where the battery powered option is really viable. (495-Docket)

Comment: This is the most asinine piece of legislation yet drafted by the fascists running the CA state legislature. This will negatively impact millions of consumers and hundreds if not thousands of businesses. What are these people thinking. That's the problem, they don't think. They just vote with their emotions on the climate change hoax and "green new deal." We need to clean house and replace every last one of these ccx worthless Democrat legislators that voted for this bill. (504-Docket)

Comment: Just as significant, the Proposed Amendments could force SORE manufacturers to exit the California market. While CARB staff may not be concerned with prematurely driving SORE engine and equipment manufacturers out of the California market, those who need this equipment to perform work or earn a living in the State surely will take note. CARB staff estimate that 88,000 California residents are employed in the landscaping business. Ninety-nine percent of the 8,600 businesses and 51,000 sole proprietorships are small businesses (mostly minority-owned) that will bear the brunt of the Proposed Amendments. (SRIA pp. 67 – 68.) The SRIA concedes that the landscaping sector of the economy also will experience a decrease in employment and personal income that may not recover during the anticipated span of the amended regulations. (SRIA pp. 82, 88 and 89.) In addition, the Proposed Amendments will result in a significant slow-down in California's progress to reach NAAQS attainment, which will lead to still more corollary adverse impacts to the California economy. (521-Docket)

Comment: CARB staff also have failed to acknowledge the markedly increased costs that the impacted small businesses will face if compelled to purchase ZEE starting in 2024. As noted in the Staff Report (p. 97) the vast majority of licensed landscapers are small businesses and, of those, the majority are sole proprietorships with an average annual revenue of $32,000. CARB staff recognize the overall substantial upfront costs of the proposed ZEE transition (SRIA p. 48). During the first 4 years of ZEE ownership, landscapers would bear the majority of the higher upfront costs under the Proposed Amendments despite owning less than 10% of the total population of SORE equipment. And many of the businesses that will be most impacted by the increased costs at issue are owned by people of color. (521-Docket)

Comment: Ninety-nine percent (99%) of landscapers are small business. They primarily use lawn and garden chainsaws, lawn mowers, leaf blowers, string trimmers and hedge trimmers. (SRIA, p. 67.) Significantly, the average income for these small landscaping businesses is $32,000, below the poverty level for a family of four. Thus, the significant cost impacts of the Proposed Amendments are real and will be imposed on real businesses – most of which are minority-owned -- that are simply unable to absorb the resultant costs. The SRIA also posits that some professional users who purchase certain types of ZEE equipment instead of SSI-powered SORE could experience costs- savings within a product lifetime equivalent to the median equipment age in the CSUF Survey at 2023 prices. However, for most other equipment types, all of which is powered by non-handheld engines, cost savings could only occur if the equipment is kept longer than its useful life. Examples of these other equipment types include professional corded power washers and ZEE riding mowers. (SRIA p. 66.) (521-Docket)

Comment: The acknowledgement by CARB that the costs is significant but a failure to provide some additional timeline delays for commercial uses or incentives to ease the transition is tremendously disappointing. NALP asserts that pursuant to the Clean Air Act that the failure by CARB to make accommodations to account for the economic impacts associated with the cost on the industry that relies on this equipment will result in EPA rejecting California's waiver. (533-Docket)

Comment: We share Governor Newsom and other California policymakers' intent to reduce carbon emissions from gas-powered landscape equipment as quickly as possible. Still, we must do so in a responsible manner that mitigates the negative financial impact on the landscape industry. The landscape industry in California is a $9 billion industry annually with more than 55,000 companies employing over 133,000 employees; 99% of these businesses are considered small businesses and a vital industry for entrepreneurs throughout the state of California, many of which are Latino, or minority owned. (533-Docket) (533-AppA-Docket) (542-Docket)

Comment: "Sole-proprietorships and other small business landscapers may be significantly affected by the direct economic impacts of the Proposed Amendments. Small business landscapers make up more than 99 percent of landscaping businesses in California. The higher upfront costs of ZEE and the batteries needed to power ZEE for a full work day may be a significant expense for many landscaping businesses."[7] [Footnote 7: California Air Resources Board "Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions" Staff Report: Initial Statement of Reasons (p. 96) October 12, 2021] (533-Docket)

Comment: This CARB regulation will destroy 10's of thousands of businesses jobs in California. I am totally against this regulation. No wonder everybody is leaving California. (535-Docket)

Comment: As you can clearly see, the initial costs to transition to commercial grade landscape ZEE represent real and significant up-front investments for landscape professionals. There is no guarantee

that landscape professionals will recover the cost difference particularly when you realize the above cited costs do not include the daily cost of electricity to charge the batteries. For the landscape industry, this is highly concerning because the majority of landscape maintenance professionals who are sole-proprietor (single employee) businesses have an average revenue of just $32,000 per year.[8] [Footnote 8: Small Off-Road Engines: Transition to Zero Emissions. CARB Staff Report: Initial Statement of Reasons, page 97. October 12, 2021.] (542-Docket)

Comment: **Subject: carb regulations affecting my lively hood and life's plans**
I own a small engine (yard equipment) sales and service business in the small town of Gridley Ca. From my understanding it is because of regulations by CARB, and testing expense, that I am loosing a huge portion of my sales from here on out. I have worked for 39 years building my business and getting it paid for, and have just reached the point of being able to save some money for retirement which is only a couple of years away. Now with these regulations and the expense of getting equipment tested to get into Ca., we are loosing sales. Not only are we loosing the equipment to sell, but we are loosing the commercial grade, higher priced, more profitable equipment, which will hurt us tremendously! I have just recently sold out of almost all of the equipment that will no longer be coming to Ca. The reason for this email is to inform you that I have already noticed the financial impact that this is having on my business and I want you to know that you are affecting people's lives by your decisions. Just in the last few months, we've missed out on several sales which amount to a few thousand dollars in profit. I just got off of the phone with a customer (this is not the first time) who may be going out of state to pick up a piece of equipment that he cannot get here. This seems very unfair, and unfair to work all these years to have my hopes and plans taken away from me. Most people put money away for retirement. I've invested my money in my business thinking all these years that I would be able to sell it and retire. Now with the loss of product, sales, and not being as profitable, the worth of my business is also drastically affected, another loss! Just noticed that this email is the help line. I don't think that there's anything you can do to help, but I just wanted to get this off of my chest. (569-Email)

Comment: Contrary to CARB's representations that these rules would have no impact on business competition, California has seen a similar dynamic illustrated by CARB's 2021 Agricultural Emissions Inventory report showing the agricultural sector lost 22,000 small/medium farms over 10 years through 2017. Larger growing operations are justified for grant funding and better equipped to afford Tier 3 and above agricultural equipment, which represents a significant increase in pricing. CARB cheers the loss of these small and medium businesses as a victory for emissions reductions. Outdoor power equipment businesses will face a similar fate that pushes consolidation if CARB's proposal is implemented. (2001-Docket)

Comment: I'm Shari Rodriguez, one of the 600 plus outdoor power equipment dealers. My concerns are not only will this bill impact our unit sales with engines under 45 cc's, or 25 horsepower, which is all mower, weed eaters, hedge trimmers, pull saws, and 50 percent of the blowers and chainsaws we currently sell at our store, but it will affect all the parts and accessory sales for each product, which subsidizes the lower unit profit margin. I anticipated having to cut or close the service department to our business. The service for battery units is not the same as gas engines and are often not affordable to repair. In our previous experience with smaller, handheld cordless drills, for example, they were not profitable to repair, thus it become a throw-away tool to this society. (3012-Oral Testimony)

Comment: I also would hate to see California, our dealers, lose the sales of emergency services purchases to outside California. And something else to be analyzed is the storage compliant cost of disposing the dead batteries. And just keep in mind that there's a lot of blue collar workers and their families depend on the landscape industry for their income. The large commercial companies using

the battery-powered units will collect the subsidies being offered and the smaller two- to three-man companies, which is a valued customer base, will be left struggling. The OPE dealers have to be profitable to survive and to continue to generate sales tax and payroll tax for the state. (3012-Oral Testimony)

Comment: A 2024 ban for commercial grade landscape equipment will certainly adversely impact landscape businesses and their employees. There are approximately 55,000 landscape companies in California, 99 percent of which are small businesses. (3034-Oral Testimony)

Comment: Elizabeth Burns Zone 24 Landscaping, female owned and operated landscape contractor in Southern California. We appreciate the financial incentives. And the cost to transition is -- would be significant and probably kill my small business. (3035-Oral Testimony)

Comment: I refer Board members to the extensive comment letters from the Outdoor Power Equipment Institute and those of the Truck and Engine Manufacturers Association for granular specific details. For the 99 percent of landscapers who are sole proprietor businesses, usually Latino, earning less than $40,000 a year, the impact of these staff proposed changes are simply enormous. (3037-Oral Testimony)

Comment: My name is Gabe Foo. I'm from a business called Gardenland Power Equipment. We're an independent outdoor power equipment dealer located in Silicon Valley. We also happen to be the largest retailer in the United States selling battery-powered equipment and have actually been working through the transition from gas to ZEE equipment for the past nine years. There's a couple things that I'd like to comment on regarding the transition timeline, just to give some feedback on the reality of this transition. In addition -- the first thing is the retailers that are 600 plus retailers like us in California, we will be forced by -- be being forced to sell battery-powered equipment, it's going to reduce our profitability from both the profit margin selling ZEE equipment and the elimination of the service revenue that a lot of the dealers make today. (3048-Oral Testimony)

Comment: And basically, we're concerned that the regulation and the time frame of what you're proposing has a very, very strong possibility of dealing the death blow to our company and all other power equipment retailers in the state. (3052-Oral Testimony)

Comment: I am writing to you today as a concerned constituent in opposition to AB 1346 and CARB's proposed rule to ban small engine powered equipment in California by 2024. These proposals, if enacted, would result in significant hardships for my small business and my customers, many of whom are minorities and your constituents. Moving forward with banning small engine powered equipment in 2024 would have numerous negative impacts on landscapers, outdoor power equipment dealers, and other businesses throughout the state of California, as well as their employees, and the various commercial, government, and residential customers they service, at a time when local businesses are already reeling from the catastrophic effects of a global pandemic. (Form Letter A-Email)

Comment: I am writing to you today as a concerned constituent in opposition to AB 1346 and CARB's proposed rule to ban small engine powered equipment in California by 2024. These proposals, if enacted, would result in significant hardships for my small business, and my customers, many of whom are minorities and your constituents. Moving forward with banning small engine powered equipment in 2024 would have numerous negative impacts on landscapers, outdoor power equipment dealers, and other businesses throughout the state of California, as well as their employees, and the various commercial and residential customers they service. (Form Letter B-Email)

Comment: I am writing to you today as a concerned constituent in opposition to CARB's proposed rule to ban small engine powered equipment ("SORE") in California by 2024. These proposals, if enacted, would result in significant hardships for my small business, and my customers. Please submit these comments to the docket for the CARB SORE2021 rulemaking. Moving forward with banning small engine powered equipment in 2024 would have numerous negative impacts on emergency responders, landscapers, outdoor power equipment dealers, and other businesses throughout the state of California, as well as their employees, and the various commercial and residential customers they service. (Form Letter F-Email) (Form Letter H-Email)

Comment: I am writing to you today as a concerned constituent in opposition to CARB's proposed rule to ban small engine powered equipment in California by 2024. These proposals, if enacted, would result in significant hardships for my small business, and my customers. Please submit these comments to the docket for the CARB SORE2021 rulemaking. Moving forward with banning small engine powered equipment in 2024 would have numerous negative impacts on emergency responders, landscapers, outdoor power equipment dealers, and other businesses throughout the state of California, as well as their employees, and the various commercial, government and residential customers they service, at a time when local businesses are already reeling from the catastrophic effects of a global pandemic. (Form Letter G-Email)

Comment: These proposals would drastically limit equipment choices for professional landscape contractors and outdoor power equipment dealers across California. We are small businesses who rely on small engine powered equipment every day as cost-efficient and high-performing solutions to install and maintain living landscapes and green spaces in communities throughout the state, and maintain our state's critical infrastructure. Equipment choices and supply are already limited due to worldwide supply chain disruptions caused by COVID-19, and we do not yet see any indications of recovery and return to normal supply and demand. (Form Letter G-Email)

Comment: I am writing to you today as a concerned constituent in opposition to CARB's proposed rule to ban small engine powered equipment ("SORE") in California by 2024. These proposals, if enacted, would result in significant hardships for my small business, and my customers. Please submit these comments to the docket for the CARB SORE2021 rulemaking. Moving forward with banning small engine powered equipment in 2024 would have numerous negative impacts on emergency responders, landscapers, outdoor power equipment dealers, and other businesses throughout the state of California, as well as their employees, and the various commercial and residential customers they service. (Form Letter F-Email) (Form Letter H-Email)

**Agency Response:**

These comments include expressions of opposition to AB 1346 and this rulemaking and expressions of concern regarding a transition to ZEE. The comments do not request specific changes to the Proposed Amendments. Expressions of opposition to this rulemaking imply a suggestion to not move forward with this rulemaking. CARB made no changes based on these comments. Several commenters make statements about the potential for the loss of businesses, income, or jobs. The following response provides clarification and context for several points within the above comments.

Comments that recommend CARB not move forward with this rulemaking are discussed in the Agency Response in section IV.A.2.2.1. In response to comments that discuss potential prohibitions on the use of SORE equipment: The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in

California, or introduced, delivered or imported into California for introduction into commerce. The Proposed Amendments do not prohibit anyone from using SORE equipment. Manufacturers may use emission reduction credits as needed to continue to manufacture SORE for sale in California after MY 2023, and dealers and other retailers may sell CARB-certified SORE as long as they are available.

Comments related to the California Legislature, commenters' opinions about common sense, and voting are beyond the scope of this rulemaking. Commenters did not provide any supporting evidence for their claims about loss of businesses and jobs. Section E of Appendix I to the ISOR discusses macroeconomic impacts of the Proposed Amendments. The modelling results cannot directly estimate the creation or elimination of businesses. Therefore, changes in jobs and output for the California economy described in Section E of Appendix I to the ISOR can be used to understand some potential impacts. The results of the assessment of impacts due to the Proposed Amendments show a decrease in output of $772 million in 2027 and a decrease of $369 million in 2043, representing a change that does not exceed 0.01 percent of baseline output. The Proposed Amendments are estimated to result in an initial decrease in employment growth that is less than 0.03 percent of baseline employment that diminishes towards the end of the regulatory horizon. In total numbers it is estimated that in 2027 the decrease in employment growth would be 4,908 jobs. The decrease falls to 453 by 2043. CARB has no evidence to suggest landscapers and other professional users of small off-road equipment or equipment retailers will close their businesses or leave the state entirely due to the Proposed Amendments.

In response to the statement, "While CARB staff may not be concerned with prematurely driving SORE engine and equipment manufacturers out of the California market, those who need this equipment to perform work or earn a living in the State surely will take note. The SRIA concedes that the landscaping sector of the economy also will experience a decrease in employment and personal income that may not recover during the anticipated span of the amended regulations,": CARB disagrees with the commenter's interpretation of macroeconomic impacts of the Proposed Amendments. As described on pages 81-84 of the SRIA, initially there will be a decrease in job growth in the Services to Businesses and Dwellings industry, which includes landscapers. However, by the end of the regulatory horizon (2043), there is actually an increase in job growth over the Baseline Scenario in this industry as cost-savings from ZEE are realized. As described on page 88 of the SRIA, modeled changes in personal income growth are not specific to landscapers. Changes in personal income growth are a result of increased costs and cost-savings for all individuals in California. The decrease in personal income growth due to the Proposed Amendments never exceeds 0.02 percent and approaches zero by the end of the regulatory horizon. The change in personal income growth per capita is positive starting in 2031.

In response to the statement, "the Proposed Amendments will result in a significant slow-down in California's progress to reach NAAQS attainment, which will lead to still more corollary adverse impacts to the California economy" and similar statements: The commenters do not provide evidence to support their claims that the Proposed Amendments will slow down progress toward attainment of NAAQS. As described in ISOR chapters III and IV, the Proposed Amendments are designed to maximize emission reductions and associated health benefits that could be achieved. Please see the Agency Responses in sections IV.A.2.6.2 and IV.A.14 for additional discussion of similar comments. The commenters do not provide evidence for their claims that adverse impacts to the California economy will occur as a result of any slow-down in progress toward attainment of NAAQS.

CARB's economic analysis recognizes the upfront cost for landscapers and other SORE equipment users due to the Proposed Amendments. A landscaping business would not need to purchase a full suite of ZEE at once, thereby avoiding a significant one-time cost to transition to ZEE. Rather, landscaping businesses can gradually purchase ZEE to replace SORE equipment as it breaks or for other business reasons, such as upgrading equipment. As described on page 67 of Appendix I to the ISOR (SRIA), a sole-proprietor landscaper could see net cost-savings between two and three years after purchasing ZEE. Not every professional user will reach net cost-savings with ZEE. Similarly, a landscaping business with a 10 person crew could yield net cost-savings between 4 and 5 years after purchasing ZEE. Savings come from reduced preventative maintenance and fuel costs.

As described on pages 69-70 of the SRIA, CARB expects that dealers of SORE and small-engine repair shops will be indirectly impacted by the Proposed Amendments. ZEE do not have the same maintenance requirements that SORE equipment do, so statewide reductions in engine repair costs are expected. As an increasing number of professional and residential users experience cost-savings from avoided SORE maintenance, dealers and small-engine repair shops could experience a decrease in revenue.

CARB does not expect a substantial impact on revenue from equipment sales, as the total number of equipment pieces sold is assumed to remain the same under the Proposed Amendments. Dealers and small-engine repair shops have many overlapping lines of business, with many dealers also performing repairs and repair shops also selling equipment.

There is expected to be some additional loss of revenue from repair of SORE that was not accounted for in this analysis, including major repairs when engines break, but this cannot be quantified. The remaining revenue for these businesses likely comes from sales of new equipment (including preempt equipment), repair of equipment other than SORE, such as saws and hand tools, repair that would be conducted on both ZEE and SORE, including blade sharpening, and repair of preempt equipment.

In response to the comment about an Agricultural Emissions Inventory report: This comment is beyond the scope of the Proposed Amendments.

In response to comments that discuss the availability of suitable equipment choices: As discussed in section I.E of the ISOR, ZEE have been available for many equipment types for decades. The level of performance, number of brands, and number of equipment options have increased greatly and continue to do so today. There are at least 12 brands of zero-emission lawn and garden equipment designed for professional users available currently for sale.

Regarding the comment, "Our vendors would not even be able to fulfill orders": The commenter does not provide evidence for its claim, and CARB has no evidence that manufacturers and vendors will not be able to fulfill orders.

In response to comments about equity and disproportionate impacts on minorities, please see the Agency Response in section IV.A.13.3. CARB disagrees with comments that suggest CARB did not take into consideration impacts on rural communities; please see the Agency Response in section IV.A.2.5.3 for discussion of comments related to the needs of rural communities. Chapter VI of the ISOR discusses environmental justice. All communities, including disadvantaged low-income communities and communities of color, would benefit from the Proposed Amendments. CARB expects emission benefits will be greatest in areas with the highest emissions, which are likely to include disadvantaged communities where equipment users may have the oldest and highest-emitting equipment.

In response to comments about infrastructure and costs for charging equipment and the ability to charge equipment: The cost of electricity to charge batteries for ZEE was included in the economic analysis, as described in section C.1.d of the SRIA. CARB concluded in "Technical Support Document: Potential Increase in Electricity Demand from Added Charging Requirements for Zero-Emission Small Off-Road Equipment under Proposed Amendments to the Small Off-Road Engine Regulations" [CARB, 2021[60]] that it is technologically feasible that the increase in electricity demand due to the Proposed Amendments can be met by the current electricity infrastructure. The reliability of the California energy grid and the potential scenario in landscapers cannot charge batteries for their equipment due to a power shutoff are beyond the scope of this rulemaking. Please refer to the Agency Responses in sections IV.A.6.1 and IV.A.6.4 for additional discussion of charging infrastructure and California's energy grid.

In response to comments regarding the magnitude of emissions from SORE, please refer to the Agency Response in IV.A.2.2.2.

Some comments request to delay implementation due to supply chain issues because of the COVID-19 pandemic. ISOR section VII.B.1 explains that the economic modeling was adjusted to reflect the impacts of COVID-19. Please refer to the Agency Response in section IV.A.28.2 for additional discussion of supply chain concerns.

In response to comments about current loss of business: These comments are beyond the scope of the Proposed Amendments. The comments imply manufacturers may have stopped distributing equipment to California or may have stopped certifying their engines with CARB. Such business decisions on the part of manufacturers are beyond the scope of the Proposed Amendments.

In response to the statement, "I also would hate to see California, our dealers, lose the sales of emergency services purchases to outside California": Section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available. For purposes of this section, a request to purchase emergency equipment powered by a non-California certified engine must be submitted for approval to the Executive Officer." The regulations do not require entities to travel to another state to purchase emergency equipment powered by a non-California certified engine.

In response to the comment, "The OPE dealers have to be profitable to survive and to continue to generate sales tax and payroll tax for the state,": As described in section II.D and Attachment D (Tables D-8 and D-9) of this FSOR and sections D.1 and D.2 of ISOR Appendix I, both state and local governments will see a net decrease in revenue due to the Proposed Amendments. This comes from decreases in gasoline excise tax and local sales taxes on gasoline. The Proposed Amendments will cause the State and local governments to earn more sales tax from small off-road equipment sales than in the Baseline Scenario, as the upfront cost of ZEE is often higher than the upfront cost of SORE equipment. CARB estimates fiscal

[60] CARB. 2021. Technical Support Document: Potential Increase in Electricity Demand from Added Charging Requirements for Zero-Emission Small Off-Road Equipment under Proposed Amendments to the Small Off-Road Engine Regulations. Prepared by staff of the Monitoring and Laboratory Division, California Air Resources Board. November 2021.

impacts based on the direct cost and cost-savings to affected entities. Indirect impacts, such as those from payroll taxes, are implicitly considered in the Macroeconomic Impact Analysis model (REMI). Because the decrease in output of the California economy due to the Proposed Amendments is relatively small (not exceeding 0.01 percent in any given year), any indirect impact on payroll taxes is expected to be minimal.

CARB disagrees with the comment, "The large commercial companies using the battery-powered units will collect the subsidies being offered and the smaller two- to three-man companies, which is a valued customer base, will be left struggling." The Budget Act of 2021 provided $30 million in the FY21-22 California state budget "to create a program, or utilize an existing program, to provide incentives for professional landscaping services in California operated by small businesses or sole proprietors to purchase zero-emission small off-road equipment." CARB will ensure this funding is used to provide incentives to sole proprietors and other small landscaping businesses in California to purchase ZEE, including batteries for the equipment. The funding was included in CORE. The Board voted on this inclusion at their November 2021 hearing. Details of how the SORE funding will be distributed will be determined through a public process. Please refer to the Agency Responses in sections IV.A.1.2 and IV.A.2.4.2 for discussion of incentives for landscapers to purchase ZEE.

Please refer to the Agency Response in section IV.A.13.1.2 for discussion of comments regarding the potential for businesses to absorb increased costs or charge their customers higher fees.

Please refer to the Agency Response in section IV.A.6.2 for discussion of comments regarding the disposal of batteries.

Please refer to the Agency Responses in sections IV.A.14.1 and IV.A.15 for discussion of out-of-state sales of SORE equipment ("leakage").

Comments related to compliance of the Proposed Amendments with the Clean Air Act are discussed in the Agency Response in section IV.A.10.

### A.13.1.2. Absorbing higher costs

Comment: Also in the past the cost of such is absorbent and we are unable to pass all those costs along to our customers. If government wants to pass such a Law then the equipment must have multiple manufacturing options and to ensure replacements and repair shops are available. Financial aid needs to be given to us to avoid closing business. (40-Docket)

Comment: No we should not do away with gas powered equipment. We have enough trouble getting paid a price that we should be getting for work that we do. With battery equipment we will need to change more money for are work and we are not being paid enough for the work we do now. (44-Docket)

Comment: How will this rapid forced change affect the one person commercial operation? The small operation with a couple of crews? The larger operations with fleets? How will the many significant costs, and these are not incremental costs, get passed on to the consumers? So, while the goal of reducing emissions is worthwhile it does not appear that this has been thought out, researched or studied. And it needs to be studied in the field, over time/several years in different seasons and weather conditions and on the scale needed. Please do so before implementing any mandates. (97-Docket)

Comment: As a family-owned business with less than 8 employees, we already face a plethora of hurdles struggling to stay afloat, especially in the midst of a pandemic. Prices of materials and supplies are surging while our ability to pass costs along to customers is diminishing; projects bid on are no longer profitable just weeks later. Unlicensed individuals and large landscape companies are at an unfair advantage of reducing or absorbing costs when bidding projects. The daily operations are becoming too expensive to maintain when all we are trying to do is keep our business open with integrity and hard work as the back bone of our operations. All we strive for is to contribute to our community and make a living for our family and employees we view as family. Some days, it feels like one more hardship may just be the final straw that puts us under. (99-Docket)

Comment: if landscape companies are not allowed to use gas powered equipment, we would have to raise our rates. if gas powered equipment becomes illegal in the state of California, the only way this can make sense is to fine homeowners who contract with contractors who use gas powered equipment. If pollution is the issue, then we need to look beyond landscape equipment and look at the vehicles we use, particularly diesel powered trucks that haul and deliver goods. (106-Docket)

Comment: If the ban takes effect, all of our customers would see higher costs. (127-Docket)

Comment: Please also keep in mind that if Landscapers would need to do clean up by using rakes instead of blowers, they would need to possibly double there staffing to get the job done in the same amount of time. This would increase the cost of the contractors operating expense's. Not just in employee slaveries but in Workers Compensation Insurance, additional vehicles and fuel cost. (424-Docket)

Comment: There will be an unburdened expense to contractors who will be passed to the taxpayers. (477-Docket)

Comment: Another factor is increased labor due to more limited portability. If a job takes slightly longer due to battery run time concerns or we have to be swapping batteries this increases labor. Labor is another extreme challenge we face. There are no prospects of labor becoming more available or less expensive. (481-Docket)

Comment: I would like to share my sincere concerns towards the proposed gas small engines ban. We are a commercial landscape business that has been in operations since 2006 and currently employs over 100 full time employees. Having personally been in the landscape industry since 1998 I feel that I have gained the experience necessary to provide real insight on this matter. We have had a few small municipalities in our service area implement a gas powered small engines ban over the years. Fortunately those clients were not large properties, therefore there was not a lot of area to maintain. In an effort to continue to service those clients we invested in a small number of battery operated pieces of equipment, blowers and hedge trimmers. Unfortunately not all of our clients were willing to accept a surcharge for the necessary acquisition of new equipment. Therefore we had no choice but to absorb the cost. (495-Docket)

Comment: Prior to acquiring the equipment we were informed by the distributors/suppliers that there was nothing available on the market at the time that would be efficient enough to use on a competitive level when compared to the gas powered equipment. The amount of batteries required to operate the equipment for the hours which we require would make the initial investment alone more than 2.5x that of the gas powered equipment. The ROI in gas savings was well over 2 yrs. Another big hurdle for us has been the ability to charge the batteries while on a job in a reasonable amount of time along with short battery life. There will also inevitably be locations were charging the

batteries onsite will not even be an option. If there is a state wide ban, we will most certainly find ourselves in a position in which we will not be able to provide our larger clients the same level of service in the same duration of time. This will force us to renegotiate our service contracts at a higher rate to account for the necessary added service time. There is no guarantee that our clients will be willing to increase our fees, and in most cases will seek out less expensive alternatives. In essence creating a situation for cheaper competitors to take business away, that otherwise would not have existed. (495-Docket)

**Agency Response:**

Most of these comments do not request specific changes to the Proposed Amendments. CARB made no change based on these comments. The commenters express concerns and ask questions about increased costs to businesses that use small off-road equipment and the potential for a prohibition on the use of SORE equipment. Most are related specifically to landscaping businesses. CARB's economic analysis recognizes the upfront cost for landscapers and other SORE equipment users due to the Proposed Amendments. However, as described on page 67 of Appendix I to the ISOR (SRIA), a sole-proprietor landscaper could see net cost-savings between two and three years after purchasing ZEE. Not every professional user will reach net cost-savings with ZEE. Decisions by landscapers regarding whether to pass on costs to their customers are beyond the scope of the Proposed Amendments. Comments about prices businesses currently charge for their services or business advantages are beyond the scope of this rulemaking. Please refer to the Agency Responses in sections IV.A.2.2.3, IV.A.2 and IV.A.25 for discussion of the comments regarding maintenance, alternatives and incentives, respectively.

In response to comments that discuss potential prohibitions on the use of SORE equipment: The Proposed Amendments would not require the use of rakes and other manual tools instead of small off-road equipment. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. The Proposed Amendments do not prohibit anyone from using SORE equipment. Manufacturers may use emission reduction credits as needed to continue to manufacture SORE for sale in California after MY 2023, and dealers and other retailers may sell CARB-certified SORE as long as they are available.

In response to the statements, “Also in the past the cost of such is absorbent and we are unable to pass all those costs along to our customers. If government wants to pass such a Law then the equipment must have multiple manufacturing options and to ensure replacements and repair shops are available,” and "How will this rapid forced change affect the one person commercial operation? The small operation with a couple of crews? The larger operations with fleets? How will the many significant costs, and these are not incremental costs, get passed on to the consumers? So, while the goal of reducing emissions is worthwhile it does not appear that this has been thought out, researched or studied. And it needs to be studied in the field, over time/several years in different seasons and weather conditions and on the scale needed": Costs to professional users are discussed on pages 104-106 of Appendix I to the ISOR. As described in Chapter I.F and X.E of the ISOR, CARB staff has operated a demonstration project called the ZEE Roadshow since 2018, where several brands of zero-emission lawn and garden equipment designed for professional use are loaned to landscaping crews throughout the state. This provides them with an opportunity to use ZEE without purchasing it. The response has been overwhelmingly positive, with nearly all crews finding at least one ZEE type that they preferred over SORE equipment. Landscaping crews receiving the ZEE Roadshow

have included theme parks, colleges and universities, school districts, and municipal organizations. As discussed in section I.E of the ISOR, ZEE have been available for many equipment types for decades, and the level of performance, number of brands, and number of equipment options have increased greatly. Years of additional research is not necessary before implementing the Proposed Amendments.

In response to the comment, "Another factor is increased labor due to more limited portability. If a job takes slightly longer due to battery run time concerns or we have to be swapping batteries this increases labor," and similar statements: CARB does not have information to suggest that ZEE are less portable than SORE equipment or that swapping batteries takes longer than refilling a fuel tank with gasoline or mixing oil with gasoline and filling a fuel tank with a gasoline/oil mixture. CARB did not assume landscapers would need to or be able to charge batteries during a work day but, rather, that recharging would take place overnight for use during the day. CARB's economic analysis assumed users would purchase enough batteries to complete a day of work with fully charged batteries at the start of the day, as described on page 39 of the SRIA. The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[61]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer.

In response to the comment, "Financial aid needs to be given to us to avoid closing business," several programs provide incentive funding for professional and residential users to purchase ZEE. These programs are an important complement to this rulemaking. While the scope of the rulemaking described in the October 2021 45-Day Notice does not include providing incentive funding, the FY21-22 California state budget included $30 million in incentive funding for the transition to ZEE. The Board approved including this funding in CORE at their November 2021 hearing. Details of how the SORE funding will be distributed will be determined through a public process. Please refer to ISOR section I.F for additional discussion of sources of incentive funding. For discussion of concerns about potential loss of businesses, please refer to the Agency Response in section A.13.1.1.

In response to the comment, "If pollution is the issue, then we need to look beyond landscape equipment and look at the vehicles we use, particularly diesel powered trucks that haul and deliver goods,": Please refer to the Agency Response in section A.14.13 for discussion of comments that assert that SORE are small contributors to air pollution.

### A.13.1.3. Business hardship due to new diesel laws and pandemic

Comment: This ban also follows closely behind the new diesel laws outlawing older diesels weighing over 14 k gvw. We had to get rid of 2 trucks with just over 100k miles on them and replace them with equal vehicles costing 65k each totaling 120k. Soon after the diesel laws changed we have the covid 19 pandemic. We lost some accounts and some have switched to a partial maintenance program

[61] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

reducing our maintenance income. And on top of this we have paid out over 650 hours to pay employees who have either had covid or have been exposed to someone who has. (431-Docket)

**Agency Response:**

The comment does not directly address the Proposed Amendments. CARB made no change based on this comment. The following response provides clarification and context for several points within the above comments.

The commenter describes the cost impacts to the commenter's business of other emission regulations and the COVID-19 pandemic, and appears to be implying that commenter will be impacted economically by the Proposed Amendments. As described in pages 96-106 of the ISOR, CARB acknowledges that the Proposed Amendments will present initial costs to professional users, although many professional users can realize cost savings due to reduced ongoing costs. Furthermore, as discussed on page 108 of the ISOR, the benefits of the Proposed Amendments, described in more detail in pages 61-83 of the ISOR, exceed the costs. As discussed on pages 4-5 of the ISOR, CARB has a mandate to achieve the maximum degree of technologically feasible, cost-effective emission reductions from SORE by the earliest practicable date, in order to meet SIP commitments and address California's unique air quality challenges.

## *A.13.2. Disagreement with CARB conclusions*

### A.13.2.1. Manufacturer Costs

Comment: In addition, new hot soak plus 24-hr diurnal testing for handheld equipment would require additional SHED costs and compliance lead-time that is not addressed in the Proposed Amendments. There will be no opportunity to recover the investments and costs based on the Proposed Amendment. (509-Docket)

Comment: (See Staff Report pp. 19-21.) CARB staff do concede that "there may be a cost to comply" for manufacturers, but then minimize the impacts by concluding that those costs will simply be passed on to consumers (SRIA p. 37) without accounting for any such costs in CARB's modeling of TCO. CARB staff also admit that the assumed on-going cost savings of ZEE vs. gas are dependent upon the relative prices of electricity vs. gasoline, two commodities which have experienced significant price fluctuations in recent years. (SRIA p. 51.) (521-Docket)

Comment: CARB assumes that there are existing ZEE engines and equipment currently on the market in California, and that no significant R&D costs or manufacturing changes will need to be made for the wholesale transition of SORE to ZEE by MY2024. That assumption is simply incorrect, as detailed above, and is wrongly premised on CARB's flawed comparison of existing ZEE product with currently available SSI powered-product and, in the case of portable generators, on the certification data for just two (2) products, one of which is actually a non-representative marine generator. (521-Docket)

Comment: CARB also incorrectly assumes that manufacturers will "spread costs" and not exit the California market by using emission credits to maintain available products until the credit banks are depleted and ZEE are adequately phased-in. (See SRIA pp. 21 and 44.) That aspirational assumption, however, does not account for: (i) the differences in the exhaust and evaporative emission credit banks that are held by each manufacturer in a non-integrated industry; (ii) how – and by which entity – SORE products are actually certified for sale in California; and (iii) the fact that SORE manufacturers

that utilize the component certification process do not generate any evaporative emission credits. Indeed, some EMA members do not have sufficient credits to support any sales of non-ZEE after MY2024. Other members estimate they may be able to continue California sales for just 6 months to one year after MY2024. CARB's proposed changes to add trading to the existing averaging and banking program do not close this gap. (521-Docket)

Comment: EMA supports the comments that the Portable Generator Manufacturers Association (PGMA) previously submitted in response to the CARB Workshops on the SORE Amendments. As noted in those comments, a significant flaw in the SRIA analysis of the portable generator market (SRIA, at pp. 43–44) is the fact that a marine generator is used as a surrogate for a professional grade portable generator. Those are two mechanically different products, designed to different federal standards based on the environments in which they are used (i.e., marine vs. land), and their disparate costs reflect those differences. In addition, the SRIA assumes that credits can be used to maintain currently-priced product for approximately 6% of the generator market from MY2024 to MY2027, thereby spreading out the increased costs. That assumption is simply incorrect given the non-integrated nature of the non-handheld market, and the widespread use of the design certification process under which no evaporative emission credits are generated. The assumption also fails to take into account which manufacturers have credits, the type of credits they have, and how the credits can actually be used by manufacturers and the proposed revisions to the averaging, banking and trading program cannot address the shortfall. (521-Docket)

Comment: The Proposed Rule fails to evaluate the capital and development expenses required to certify zero-emissions engines and equipment and provides no time for industry to recover costs of these investments. (524-Docket)

Comment: Comment 19-5: Exhaust Compliance Testing
Manufacturers demonstrate ongoing compliance with Production Line Testing process, calculated by the Cum-Sum method. This on-going manufacturer compliance testing allows deviation to account production variability. By removing the U-factor CARB may determine new engine compliance based on one engine. This is a significant increase in stringency versus what is permitted with the PLT program. The cost of this additional stringency was not considered in the Proposed Rule. (524-Docket)

Comment: Comment 19-7: Evaporative emissions performance-based (SHED) testing will be required for SORE from 2024, including non-generator and handheld products. The cost and lead-time of this requirement have not been considered in the Proposed Rule, especially for handheld manufacturers who are currently not subject to diurnal performance-based compliance testing. Since the rule sets zero-emissions limits from 2024 for most SORE, the only way to certify most gas-powered products would be by the use of credits. This will result in a very limited number of gas-powered units available for sale in California from 2024, and manufacturers will not be to recoup investment costs for diurnal testing. The Proposed Rule should be updated to reinstate current handheld product evaporative emissions procedures. E10 Validation Study results suggest handheld products are compliant with existing standards. Exhaust credits will ultimately limit sales gas-powered products after 2024. (524-Docket)

Comment: We appreciate CARB's willingness to reconsider the diurnal testing standards on the 15-day changes. But even as presented today by staff, the changes are not enough. Stihl would still need to certify and redesign our products to fulfill the diurnal standards. The proposal to allow to certify to diurnal standards is expensive. It would require SHED testing not currently applied. It would

require cost and lead time with no chance to get return on investment. And with a standard limit of zero, it's impossible to generate any credits. (3038-Oral Testimony)

**Agency Response:**

These comments include expressions of the commenters' opinions and conclusions regarding the economic analysis for this rulemaking and a transition to ZEE. The comments also present criticism of CARB's technical feasibility determination regarding the proposed MY 2024-2027 emission standards for generator engines. The commenters state their opinions that certain cost impacts to engine manufacturers are not accounted for in the economic analysis. CARB disagrees with the commenters' conclusions. CARB made no changes based on these comments.

Commenters claim additional costs associated with compliance with the Proposed Amendments would exist for handheld equipment and are not accounted for in the Proposed Amendments. The commenters do not provide an estimate of any such costs or make any statement regarding whether any such costs would be expected to be passed through to equipment purchasers or would be absorbed by manufacturers. CARB assumed that all available emission reduction credits would be used by manufacturers for generators in MYs 2024 through 2027, as discussed on pages 55-57 of the ISOR. The economic analysis in the ISOR does not assume sales of SORE equipment using engines with displacement less than or equal to 80 cc other than generators would occur after MY 2023. As a result, the analysis does not assume an increase in purchase price for equipment purchasers due to any certification testing of equipment using engines with displacement less than or equal to 80 cc other than generators after MY 2023.

In response to the statement, "CARB staff do concede that "there may be a cost to comply" for manufacturers, but then minimize the impacts by concluding that those costs will simply be passed on to consumers (SRIA p. 37) without accounting for any such costs in CARB's modeling of TCO,": Section C.1.a on page 37 of the SRIA begins, "There may be a cost to SORE and small off-road equipment manufacturers to comply with the Proposed Amendments. Manufacturers would have to produce engines compliant with the MY 2024 emissions limits or use or buy emission credits to satisfy the regulatory requirements. This may require more research and development and changes to their manufacturing processes, which could result in costs." Costs are assumed to be passed on to equipment users. The commenter implies that it disagrees with CARB's approach but does not demonstrate that CARB's approach was insufficient to estimate costs.

In response to the statement, "CARB staff also admit that the assumed on-going cost savings of ZEE vs. gas are dependent upon the relative prices of electricity vs. gasoline, two commodities which have experienced significant price fluctuations in recent years,": The costs for gasoline and electricity used in the economic analysis are described in Section C.1.d. of the SRIA. The commenter states that prices have fluctuated but does not suggest different prices than those cited in the SRIA.

In response to the statement, "CARB assumes that there are existing ZEE engines and equipment currently on the market in California, and that no significant R&D costs or manufacturing changes will need to be made for the wholesale transition of SORE to ZEE by MY2024,": As described in Chapter I.E. of the ISOR, ZEE have been available for many equipment types for decades. The economic analysis described in Chapter VII and Appendix I of the ISOR uses prices of SORE equipment and ZEE in estimating cost impacts. CARB

assumed research and development or manufacturing costs would be reflected in purchase prices of equipment sold in California.

In response to the statement, "That assumption is simply incorrect, as detailed above, and is wrongly premised on CARB's flawed comparison of existing ZEE product with currently available SSI powered-product and, in the case of portable generators, on the certification data for just two (2) products, one of which is actually a non-representative marine generator,": Please refer to the Agency Responses in section IV.A.35 for discussion of comments on the comparison of ZEE and SORE equipment. As described on page 165 of the ISOR, "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[62]] lists ten MY 2020 engine families with HC + $NO_x$ certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-2 of the ISOR. Whether or not manufacturers installed engines from those engine families in MY 2020 generators, they could choose to install them in generators in the future. "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" lists 27 evaporative families with certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR. The price of a SORE marine generator was used in the economic analysis. As described on page 44 of Appendix I of the ISOR, using this generator for pricing was conservative. The commenter does not demonstrate that a SORE marine generator is an inappropriate example of a SORE generator.

In response to comments regarding the use of emission reduction credits: the commenter makes statements about items it believes CARB did not account for and states that it believes trading will not close the gap, but the commenter does not provide additional information regarding what it believes the implications of such inclusion would be. The amounts of banked exhaust and evaporative emission reduction credits at the end of MY 2018 are discussed on pages 55-57 of the ISOR. The Proposed Amendments add flexibility for manufacturers by allowing trading of evaporative emission credits, as described in section II.C of the ISOR. Each manufacturer's decision as to whether or not to certify engines or use credit trading is a decision that is beyond the scope of the Proposed Amendments.

In response to comments regarding the cost to certify ZEE: Certification of ZEE is voluntary. The Proposed Amendments did not add the ZEE credit program in section 2408.1 of the exhaust emission regulations. Manufacturers may already certify ZEE to earn credits under that program with the current regulations. CARB did not assume certification of zero-emission generators would impact the price of zero-emission generators or SORE equipment. The commenter does not suggest certification of zero-emission generators would impact the price of zero-emission generators or SORE equipment.

In response to the statement, "Comment 19-5: Exhaust Compliance Testing, Manufacturers demonstrate ongoing compliance with Production Line Testing process, calculated by the Cum-Sum method. This on-going manufacturer compliance testing allows deviation to account production variability. By removing the U-factor CARB may determine new engine compliance based on one engine. This is a significant increase in stringency versus what is permitted with the PLT program. The cost of this additional stringency was not considered in the Proposed

[62] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

Rule,": This comment recommends retention of the current requirements for compliance testing pursuant to § 2407(a) or alignment with federal requirements for selective enforcement auditing. The comment includes statements about production line testing, which is discussed in §§ 2407(b)-(d) of the regulations, and claims the amendments to § 2407(a) represent an increase in stringency versus the requirements in §§ 2407(b)-(d). The comment states that a manufacturer may be unable to meet both state and federal test requirements for one family and claims that would be inconsistent with § 202(a) of the Clean Air Act.

Amendments to § 2407(a) do not impact production line testing requirements in §§ 2407(b)-(d). New engine compliance testing is initiated by CARB, not manufacturers, and is a distinct process that is not part of the production line testing process. The SORE regulations do not draw a connection between CARB's new engine compliance testing and federal selective enforcement auditing. The commenter does not provide information regarding costs it believes manufacturers might incur based on the commenter's perceived increase in stringency. CARB has no information suggesting the changes to section 2407(a) would impact the price of SORE equipment directly or indirectly.

The purpose and rationale for the changes to § 2407(a) are described on pages 176-182 of the ISOR. The Proposed Amendments to § 2407(a) are necessary to ensure expected emission reductions are achieved. CARB made no changes based on this comment.

### A.13.2.2. Cost Assessment

Comment: **The Proposed Amendments to the SORE Regulations are Cost-Prohibitive**
CARB's Cost Assessment is completely inadequate and is not supported by the relevant technology assessments or data. Consequently, CARB's Cost Assessment is wholly insufficient to support this proposed major rulemaking. (521-Docket)

Comment: Independent experts at NERA and Trinity have conducted a comprehensive cost-benefit study regarding the Proposed SORE Amendments focusing on engines that power non-handheld equipment. (See attached Exhibit "B.") The NERA/Trinity Report is an economic analysis based on two types of economic analyses: one that ignores market-price effects, and one factors-in market-price effects. Market price effects include the impacts of cost, scrappage and leakage, which will increase emissions and off-set expected reductions. The NERA/Trinity Report compares three different widely ranging alternatives. In contrast, CARB's alternative analysis only includes potential alternatives that still mandate a broad-based unrealistic transition to ZEE. (521-Docket)

As explained in Exhibit "B," the Proposed Amendments are cost-prohibitive when compared to the alternatives analyzed by NERA/Trinity, and when compared to the benchmark cost-effectiveness guidelines provided under the Carl Moyer Program, which are $30,000/ton, and $100,000/ton for zero-emission projects. As detailed in the NERA/Trinity Report, and as discussed more fully below, when market-price effects are taken into account, the Proposed Amendments actually have a negative incremental cost-effectiveness when compared against more reasonable regulatory alternatives, and have a specific incremental cost factor that exceeds $304,000/ton. (521-Docket)

**Agency Response:**

These comments do not request changes to the Proposed Amendments. CARB made no changes based on these comments. These comments are from the Truck and Engine

Manufacturers' Association (EMA) and discuss the cost-effectiveness of the Proposed Amendments.

As described in CARB's economic analysis, the metric used to quantify cost-effectiveness of the Proposed Amendments and alternatives was the ratio of total monetized benefits divided by total monetized costs. A comparison of this type is an appropriate cost-effectiveness measure if the harm associated with increased emissions is fully captured in the estimates of monetized health impacts. For the Proposed Amendments, the benefit-cost ratio is 1.26, meaning benefits are greater than costs during the regulatory horizon. Of the alternatives considered by CARB, the Proposed Amendments had the highest benefit-cost ratio while being technologically feasible.

The NERA/Trinity analysis determines cost-effectiveness on the basis of dollars per ton of emissions reduced. Rulemaking is not subject to a cost-effectiveness limit in dollars per ton of emissions reduced. CARB is required to maximize health benefits from reduction of criteria pollutants as required by California Health and Safety Code section 43000, subsection (b) accounting for technological feasibility and cost-effectiveness.

In response to EMA's comment, "The NERA/Trinity Report compares three different widely ranging alternatives. In contrast, CARB's alternative analysis only includes potential alternatives that still mandate a broad-based unrealistic transition to ZEE,": Government Code section 11346.2, subdivision (b)(4) requires CARB to consider and evaluate reasonable alternatives as compared to the selected alternative, the Proposed Amendments, and provide reasons for rejecting those alternatives. The rulemaking must meet the emission reductions expected under the 2016 State SIP Strategy and the goals of California Executive Order N-79-20. In addition, the 2016 State SIP Strategy calls for more stringent emission standards and incentives to accelerate the replacement of SORE equipment with ZEE. As described on page 116 of the ISOR, during the development process of the Proposed Amendments, CARB staff solicited public input regarding alternatives that would achieve the Proposed Amendments' goals. Staff evaluated several alternatives to the proposal, including suggestions from both public and industry stakeholders. No alternative proposal was found to be less burdensome and equally effective in achieving the purposes of the Proposed Amendments in a manner that ensures full compliance with the authorizing law being implemented or made specific by the Proposed Amendments. The alternatives presented by EMA and discussed in the NERA/Trinity Report are discussed in sections IV.A.2.3.5, IV.A.2.4.2 and IV.A.2.6.2.

In response to the statement, "The NERA/Trinity Report is an economic analysis based on two types of economic analyses: one that ignores market-price effects, and one factors-in market-price effects. Market price effects include the impacts of cost, scrappage and leakage, which will increase emissions and off-set expected reductions,": Please refer to the Agency Responses in sections IV.A.2.6.2, IV.A.14.1, and IV.A.15 for discussion on leakage and scrappage effects.

In response to EMA's comment, "The Proposed Amendments to the SORE Regulations are Cost-Prohibitive - CARB's Cost Assessment is completely inadequate and is not supported by the relevant technology assessments or data. Consequently, CARB's Cost Assessment is wholly insufficient to support this proposed major rulemaking,": CARB disagrees with the commenters' conclusions, as discussed in Agency Responses in section IV.A.35. CARB considered costs and cost-savings associated with the Proposed Amendments and alternatives, as discussed in Chapters VII and VIII of the ISOR and the SRIA. CARB considered

the impacts to both residential and professional users along with the indirect impacts of the costs on other industries.

### *A.13.3. Equity*

Comment: This regulation will put a cost on people with not a lot of money that is not fair. How about we do away with congress members not flying in private jets. (27-Docket)

Comment: This law will not only affect our business but our small community which most of our customers are hispanics and their main resource for income is their gardening work. They are concerned about all the money they have to spend in batteries for their equipment since they sometime spend more than an hour with a gas powered blower on a single job and the only powered leaf blower available the battery only lasts 45 min to an hour so they will have to buy like 6-7 batteries which run over $1000 each and they will have to make sure they charge them every night and have to buy a charger for each of them which also run over $150 each. (93-Docket)

Comment: Make the blowers affordable to low income gardners. (230-Docket)

Comment: These regulations will destroy Mexican american families 1000's of jobs lost ..... please don't do this. (396-Docket)

Comment: In addition to the financial implications, the legislation is discriminatory toward minorities (particularly hispanic). A large portion of the landscape and gardening industry is comprised of hispanic owners and workers and it is my position that this new legislation unfairly targets these minorities. (465-Docket)

Comment: The Proposed SORE Amendments will impose enormous costs and burdens on California consumers, local government and small businesses, many of which are owned by persons of color. CARB staff even admit that the Proposed Amendments are not expected to bring down costs. (SRIA p. 11.) Consequently, the Amendments will more likely cause those minority-owned businesses to keep their current gas-powered products longer and defer buying new, low or zero- emission products – a foreseeable market response that will delay the "scrappage" of older SORE. (521-Docket)

Comment: The Proposed Rule will drastically limit equipment choices for professional landscape contractors, outdoor power equipment dealers, and critical infrastructure workers (such as construction workers, utility workers, farmers, and clearing/fuel mitigation workers) throughout California. These small business owners and contractors rely on small engine powered equipment every day as cost-efficient and high- performing solutions. Banning of SORE on this accelerated timeline negatively impacts tens of thousands of small businesses, many of which are small and/or minority owned, at a time when small businesses are already reeling from the catastrophic effects of a global pandemic. Transitioning to a ZEE fleet adds significant cost at a time when small businesses (and all employers) are losing employees and facing significant staffing issues, while unchecked inflation continues to increase the cost of all equipment and services, nationwide. (524-Docket)

Comment: We highlight this fact because our understanding is that the cost increase for using only ZEE is approximately a 30%-40% increase over average industry pricing for the customer. This point is critically important as this proposed rule will further disadvantage small and minority owned businesses, but ALSO those lower income communities they service that deserve properly maintained healthy green spaces at affordable prices. (533-Docket)

Comment: I find this legislation to be racist and insensitive. Most of the Contract Cleaners in this State are from Diverse Backgrounds. If you eliminate there ability to wash by imposing limitations on what equipment they can buy or having no viable alternatives basically kills this industry. (538-Docket)

Comment: This proposed ruling would hurt our staff, to perform essentially duties on the jobsite in a safe and effective manner. This ruling stands to hurt small business owners of color, and employees of color the most as it stands. I know this first hand as a practitioner, and a veteran of the landscape industry for several decades. The additional time would be much needed to allow professionals to further acclimate to an environment better suited and tailored to transition to all electric ZEE. Thank you for your consideration. Feel free to reach out to me anytime for more information. (561-Docket)

Comment: What I'm asking is to -- for you to go into -- you went to University of Fullerton. I ask you to go to an agricultural university and ask some more of the questions that will help a rural area. Disadvantaged residents in the rural areas have a lot more problems than anybody in the city. (3047-Oral Testimony)

Comment: My name is Alex Salazar. I am co-owner of Ground Care Landscape Company and I'm based out of LA California. I've heard certain people speak to this as an equity issue. I agree this is an equity issue, but I disagree in the way that it's presented. I'd like for the Board to play close attention to the amount of commenters on this public hearing. Out of all the public comments or commenters, how many have been from the Latino or Hispanic gardeners who are -- who seem to be the overwhelming users of the SORE equipment, according to your documents. Californians proudly consider themselves to be a diverse and inclusive people. And I don't think that this hearing appropriately reflects that with the amount of participants. I am the first -- I am the first Latino or Hispanic gardener speaking today. (3062-Oral Testimony)

**Agency Response:**

These comments do not request changes to the Proposed Amendments. CARB made no changes based on these comments. These comments describe concerns about the Proposed Amendments as they relate to equity and environmental justice. CARB disagrees with the commenters' assessments of the Proposed Amendments. As described in ISOR chapters III and VI, the Proposed Amendments would reduce statewide SORE emissions of $NO_x$ and ROG by approximately half in 2031, compared to the Baseline Scenario. Reducing $NO_x$ and ROG emissions is an integral part of California reaching its goal of attaining and maintaining national and California ambient air quality standards for ozone, which are protective of the health and welfare of all California residents. Consequently, all communities, including disadvantaged low-income communities and communities of color, would benefit from the Proposed Amendments. As discussed in ISOR chapter VI, CARB expects emission benefits will be greatest in areas with the highest emissions, which are likely to include disadvantaged communities where equipment users may have the oldest and highest-emitting equipment. The Proposed Amendments would help improve the overall health of these communities through fewer instances of premature mortality, fewer hospital and ER visits, and fewer lost days of work. These health benefits would result from reduced tropospheric ozone and PM production as $NO_x$ and ROG emissions decreased.

Users of SORE equipment are exposed to carbon monoxide, particulate matter, toxic air contaminants, and other pollutants when operating equipment [Baldauf et al., 2006, as reviewed in ISOR section IV.E pages 82-83 and section VI pages 95-97]. Frequent users of lawn and garden equipment, particularly landscaping professionals, would be exposed to these air

contaminants less frequently by replacing their SORE equipment with ZEE. Employees of landscaping businesses typically have lower income than an average employee in California. The U.S. Census Bureau estimates the average annual salary for a landscaping business employee in California is $38,318 [U.S. Census Bureau, 2021, as reviewed in ISOR section VI pages 95-97]. This is substantially lower than the median salary of $75,235 per year for the overall California population. Further, 67 percent of landscaping business employees in the CSUF survey were identified as being Hispanic or Latino [CSUF SSRC, 2019, as reviewed in ISOR section VI pages 95-97]. These users are disproportionately exposed to CO, $PM_{2.5}$, and TACs, as noted above. Replacing SORE equipment with ZEE will reduce these exposures and protect the health of users, while offering a potential for cost-savings to businesses. The Proposed Amendments are consistent with CARB's environmental justice policy of reducing exposure to air pollutants and reducing adverse health impacts from TACs in all California communities.

Please refer to the Agency Response in section IV.A.1.2 for discussion of comments regarding incentive funding.

For discussion of concerns regarding professional-grade pressure washers, please refer to the Agency Response in section IV.A.2.4.1.

For discussion of concerns regarding equipment choice and availability of ZEE, please refer to the Agency Response in section IV.A.35.1.

For additional discussion of comments regarding the impacts of the Proposed Amendments on landscapers, please refer to the Agency Responses in sections IV.A.2.4.2 and IV.A.12.

For discussion of comments about decreased scrappage rates, please refer to the Agency Response in section IV.A.35.2.

For discussion of comments about construction equipment or vehicles, farm equipment or vehicles, utility workers, clearing and fuel mitigation, please refer to the Agency Responses in section IV.A.29.

## *A.13.4. Modeling*

### A.13.4.1. General Statement

Comment: CSU-F survey and CARB SORE2020 emission inventory model are the datasets at the core of the Proposed Rule. SORE2020 is used to determine emissions, cost and health benefits described in the Proposed Rule. (524-Docket)

**Agency Response:**

This comment does not request changes to the Proposed Amendments. CARB made no changes based on this comment. This response clarifies the statements made in the comment. The CSUF survey is one of the inputs for the SORE2020 emissions inventory. The SORE population and activity data inputs are based on the results of the CSUF survey. The population data encompass all SORE types, including engines that are used in construction and farm equipment or vehicles under 175 horsepower that fall under section 209, subsection (e)(1)(A) of the Clean Air Act. However, other data inputs contribute to the emissions inventory. CARB used manufacturer certification test data and CARB's test data to develop emission factors for each equipment type included in the emissions inventory. The

emission factors take into account deterioration factors (the rate at which emissions increase as equipment is used over its lifetime).

From the base year population in SORE2020, CARB modeled the statewide small off-road equipment population into future years. Growth is expected in both ZEE and SORE equipment populations. The modeling utilized household growth projections in California along with historical shipment data for gasoline-powered equipment. The small off-road equipment population in the past has tracked well with household growth, so that was used as a proxy going forward.

SORE2020 was indeed used to estimate emissions under the Baseline Scenario and under regulatory scenarios. Emission reductions under a regulatory scenario were used to estimate health benefits, as described in section IV.D of the ISOR. Direct and indirect costs of the Proposed Amendments were estimated using models described in the SRIA. Modeled equipment populations from SORE2020 were one of the inputs to the economic model. Other inputs included equipment prices from retailers, equipment fuel use rates, battery capacities, and projected energy costs from the California Energy Commission. While SORE2020 was used in analyses for the Proposed Amendments, it is not the only data source.

### A.13.4.2. Economics Model

Comment: **Comparative Cost of ZE v ICE Equipment**
Please reveal your model for calculating the difference in cumulative costs of ICE- powered equipment v ZE equipment by posting it in the SORE section of your website. Also note the duration of ownership for which the cumulative costs of ZE are lower than that of ICE SORE. As production and sales of ZEE rise, economies of scale will likely decrease the cost of ZEE while increasing the cost of ICE. Also, battery prices are likely to continue their downward trajectory. (523-Docket)

**Agency Response:**

This comment does not request changes to the Proposed Amendments. CARB made no changes based on this comment. The details of the economic analysis can be found in the ISOR Appendix I SRIA, which is posted to the CARB website. The SRIA explains the methods, inputs, and assumptions built into the economic analysis. The SRIA also includes details of the macroeconomic model used to estimate the indirect effect of the Proposed Amendments.

The commenter makes statements similar to those on pages 11-12, 22, 25-26, 105, and 107 of the ISOR regarding a projected price decrease for batteries and potential decreases in the prices of ZEE. The number of years after which the total cost of ZEE is lower than the total cost of SORE equipment for specific equipment types can be found in SRIA Tables C-23 and C-28.

### A.13.4.3. Social Cost of Carbon

Comment: **Social Cost of Carbon**
There is a wide range of SCC estimates. These are rising each year as the costs of climate change rise. https://www.regulations.gov/comment/OMB-2021-0006-0047 (click Download to view) The Interagency Working Group (IWG) relies upon a model that is incomplete and thus underestimates SCC. Recent peer-reviewed scientific research provides more accurate estimates than the IWG model. See references in the link for links to citations. Discount rates greater than zero do not represent accurate estimates of SCC. To incorporate intergenerational impacts, which IWG indicates are

important, the discount rate should be zero or less. This would provide a more empirically- defensible estimate, which would be well over $100/MT CO2e (in contrast to $51 at a 2.5% discount rate as calculated by IWG). IWG plans to increase its estimate of SCC in January. CARB publications, on any topic, after the release of the new estimate should use the new estimate when computed at a discount rate of zero. (523-Docket)

**Agency Response:**

This comment does not request changes to the Proposed Amendments. CARB made no changes based on the comment. CARB appreciates the citations and suggestions for updating the social cost of carbon estimates presented in the SRIA. The Proposed Amendments do not rely on the social cost of carbon estimates to support the necessity of the rulemaking because the Proposed Amendments propose new criteria air pollutant emission standards, not a $CO_2$ emission standard. Thus, the social cost of carbon valuation of reductions in $CO_2$ emissions does not factor into the cost-effectiveness of the Proposed Amendments even though it does serve as a co-benefit of the rulemaking.

## A.14. Emissions Inventory

### *A.14.1. Alternatives to the SORE2020 Emissions Inventory*

Comment: In addition, CARB's proposed ZEE program is not calibrated for "success." Rather, CARB's Proposed Amendments are far more likely to lead to a significant deceleration in SORE scrappage, along with the accelerated development of a robust used equipment market and increased purchases of new products outside of California for use in the State (what will amount to "leakage" from an emissions inventory perspective), and an absence of CARB-compliant new engines and equipment in California. (521-Docket)

Comment: One of the likely impacts from the cost-prohibitive and infeasible Amendments will be that users will keep their gas-powered SORE products for longer periods of time, thereby reducing scrappage rates. (521-Docket)

Comment: The Proposed SORE Amendments will lead consumers to accelerate the purchase of new SORE powered non-handheld products before MY2024, and to refrain from purchasing new non-handheld products after the 2024 MY (a "pre-buy/no-buy" response). (521-Docket)

Comment: CARB's 2020 SORE Emissions Inventory and Model also do not account for a reduced turnover (or "scrappage") rate, or for the loss of potential emissions reductions (or "leakage") due to increased out-of-state purchases, which will occur due to the increased product costs in California that will result from the Proposed SORE Amendments. Those foreseeable market response are described in the NERA/Trinity "Cost-Effectiveness Report," a copy of which is attached hereto as Exhibit "B," as follows: (521-Docket)

Facing higher equipment prices [due to the SORE regulations], some California consumers will change their behavior, either retaining existing equipment rather than buying new equipment (termed the "scrappage effect" because this behavior reduces scrappage rates for existing equipment), or buying the new equipment in a state without the higher prices (termed the "leakage effect" because emissions "leak out" to uncovered sources rather than being reduced on net). (521-Docket)

Since they are using their equipment longer (and there is therefore less scrappage of old equipment), these emissions from the existing equipment offset emissions reductions that would otherwise arise from new lower emissions standards and reduced levels of equipment sales due to higher prices in California. The leakage effect likewise results from the increases in new equipment prices in California, with some customers substituting a new equipment purchase in California with a purchase outside California (e.g., Nevada). Non-California purchases due to the leakage effect mean there are no emission reductions arising from these purchases despite the more stringent California standards for new equipment. (See Exhibit "B," pp. 10-11.) (521-Docket)

Tellingly, CARB did not take any of those reasonably anticipated market responses into account in assessing the supposed merits of this rulemaking. Accordingly, given the foregoing, it is clear that the non-handheld SORE emissions inventory that CARB has estimated is substantially overstated, and that the projected emissions benefits of the Proposed Amendments are substantially overstated as well and will not be achieved. (521-Docket)

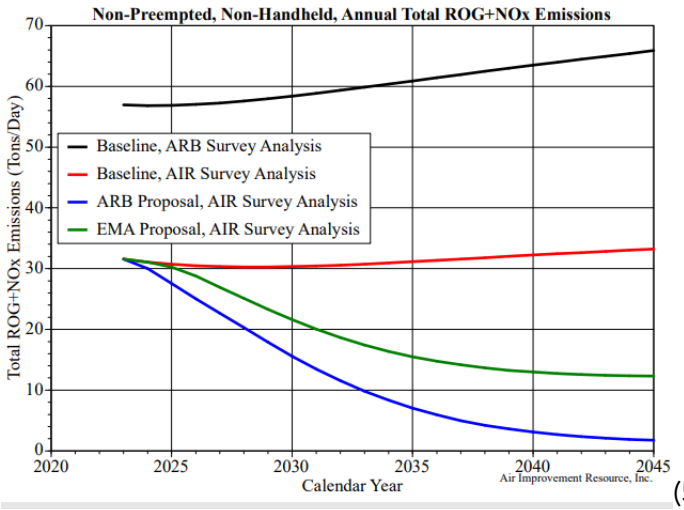
Comment: When reality-based assumptions are used, the Proposed Amendments to the SORE Regulations more likely will have negative emissions-inventory impacts. (See Exhibits "A" and "B.") Those likely negative impacts amount to an additional factor supporting the comparative cost-effectiveness of EMA's alternative proposal, as discussed below. (521-Docket)

Comment: AIR's comparative analysis
AIR used CARB's SORE 2020 model emissions to estimate the benefits of the EMA proposal in comparison with CARB's Proposed SORE Amendments, with some modifications. First, AIR modified CARB's estimated running-loss emissions for generators and diurnal and resting-loss emissions for lawnmowers (and for other equipment types that utilize those estimates of evaporative emissions) to reflect more up-to-date emission factors, since CARB's analysis used non-representative data from a 1995 and a 2022 model engine. Next, AIR used updated annual-use estimates to evaluate both the CARB and EMA proposals. For the EMA proposal, exhaust and evaporative emissions for residential lawnmowers were set to zero starting with model year 2025. Exhaust emissions for all other non-handheld equipment were set to the same emissions estimated by CARB for generators during the 2024-2027 time period. (See Exhibit "A.") (521-Docket)

The ROG + $NO_X$ emission inventories resulting from the EMA proposal in comparison to the CARB proposal are shown in Figure 6 below (reproduced from AIR's Report). This inventory analysis uses the updated AIR annual-use estimates. AIR found that EMA's proposal would reduce ROG + $NO_X$ emissions from non- preempted, non-handheld equipment to about 11 tpd in 2045. (521-Docket)

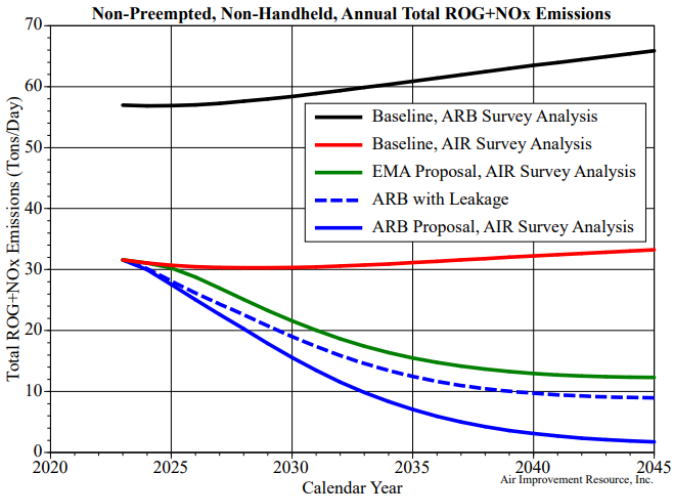
Figure 7 (also reproduced from AIR's Report) shows the comparative emission reductions if reasonably anticipated "leakage" impacts are taken into account. More specifically, Figure 7 factors-in the impact of assuming that 50% of commercial landscapers' new SORE purchases and 10% of residential SORE purchases will be made out-of-state in response to CARB's ZEE mandates for SORE, starting in 2024. Significantly, Figure 7 does not include the impact from slower fleet turnover (reduced "scrappage"), which is another expected outcome from CARB's proposal, and which will further reduce the putative benefits of that proposal. As reflected in Figure 7, EMA's alternative proposal would largely match CARB's proposal with respect to anticipated ROG + $NO_x$ reductions, but would do so at a fraction of the cost and without the large market dislocations and disruptions that CARB's Proposed Amendments will cause. (521-Docket)

**Figure 6**




(521-Docket)

**Figure 7**




(521-Docket)

NERA/Trinity's comparative analysis

The NERA/Trinity comparative analysis included the reasonably anticipated leakage and scrappage impacts that likely would result from the implementation of the Proposed SORE Amendments. (See Exhibit "B.") NERA/Trinity found that the likely emission increases associated with the increased leakage and reduced scrappage rates that would result from the Proposed Amendments would "more than offset the emission reductions expected from the ZEE standards for new equipment resulting in the CARB staff ZEE Proposal achieving fewer emission reductions than would occur if the other [EMA] proposal were adopted instead." (Exhibit 'B," p. ES-1.) The more specific findings from the NERA/Trinity analysis include the following: (521-Docket)

(i) The EMA proposal will achieve a 62% reduction of emissions from the current baseline at an average cost of approximately $7,000 per ton.
(ii) CARB's proposal, if the market impacts of leakage and scrappage are excluded, could achieve an additional 33% more emission reductions than the EMA proposal, but at an incremental cost of $304,100 per additional ton, which is more than 43 times as expensive as the EMA proposal.

(iii) When reasonably anticipated increased leakage and reduced scrappage impacts are included, the EMA proposal would reduce emissions by 60% from the current baseline, while the CARB proposal would only reduce emissions by 49% from the current baseline – a smaller net reduction than EMA's proposal.
(iv) Since CARB's proposal would yield fewer emission reductions than EMA's proposal when reasonably anticipated market impacts are more fully accounted for, CARB's proposal would result in negative incremental cost-effectiveness. (See Exhibit "B," pp. ES-2 through ES-4, ES-6, 16-17, 20-23, and 26.) (521-Docket)

Comment: CARB's ZEE requirement means that many landscapers and other small engine users will purchase equipment outside of California for use in California (i.e., leakage). In addition, the high price of some new electric equipment compared to gasoline will cause fleet turnover rates to slow, reducing the benefit of ARB's proposal. (521-ExhA-Docket)

Comment: 4. ARB's proposed ZEE requirement means that many landscapers and other small engine users will purchase equipment outside of California for use in California (i.e., leakage), or simply continue to repair their existing gas powered equipment to the maximum extent possible, if they cannot find electric equipment that meets their needs or if it cannot be found at a reasonable cost. (521-ExhA-Docket)

Table VII-4 of the ISOR shows upfront and ongoing annual costs for a variety of professional-grade gasoline and electric equipment. ARB estimates the upfront cost of an electric riding mower at close to $21,000, while the gasoline version is about $11,300. For a generator, the ZEE version is $6,800, and the gasoline version is $5,300. Interestingly, a commercial ZEE lawnmower is estimated at just over $1,000, while the gasoline version is over $1,400. Despite CARB's calculated upfront savings of ZEE for a commercial lawnmower, ZEE lawnmower penetration among landscapers is very low leading one to conclude that landscapers do not equate the overall utility of a ZEE lawnmower with that of a gasoline powered unit. (521-ExhA-Docket)

If ARB's proposal takes effect, landscapers and other equipment purchasers who cannot find equipment that meets their needs in California, or cannot find it at a reasonable cost, may travel outside of California to purchase such equipment. We refer to this as "leakage." The impact of leakage on emission inventories was not modeled by CARB in the evaluation of their proposal; CARB assumed all Californians would purchase all needed equipment within the state. Furthermore, CARB assumes that there is no change in equipment turnover rates. (521-ExhA-Docket)

Based on user responses to prior rulemakings, AIR believes that landscapers in particular, and some other heavy users of equipment (residential and business) will have strong incentive to purchase some equipment out-of-state. A factor of 2x difference in the upfront cost of riding mowers (zero turn mowers, or ZTRs) is a strong incentive for that equipment type. (521-ExhA-Docket)

AIR evaluated the impacts of 50% leakage for landscapers, and 10% leakage for residential and business uses for the ARB proposal. Under this scenario, equipment purchased in other states would meet ARB "baseline" emissions instead of the emission rates of their proposal. This modeling, comparing the leakage scenario to the ARB proposal is shown in the next section. (521-ExhA-Docket)

Comment: The SORE2020 model was used to estimate the benefits of the EMA proposal in comparison with the ARB proposal, with some modifications. First, running loss emissions for generators and diurnal and resting loss emissions for lawnmowers (and for other equipment that utilizes evaporative emissions from these two equipment types) were modified for the ARB proposal

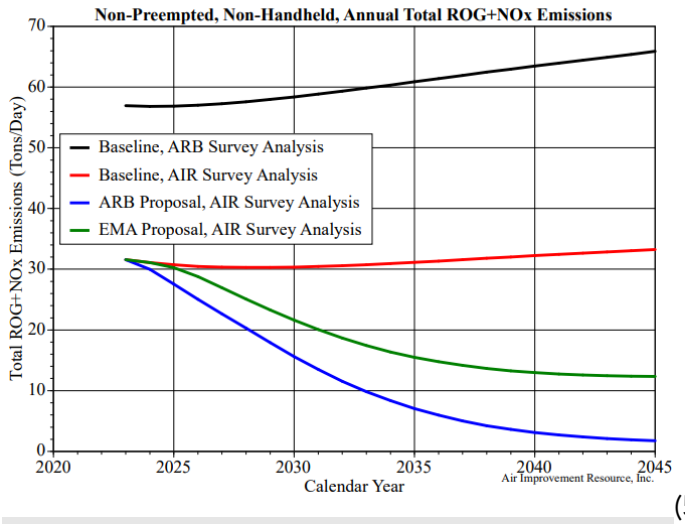
as indicated in Section 2. Next, the AIR annual use estimates were inputted for both the ARB and EMA proposals. (521-ExhA-Docket)

For the EMA Tier IV proposal, exhaust and evaporative emissions for lawnmowers were set to zero starting with model year 2025. Exhaust emissions for all other non- handheld equipment (including fixed mount generators) were set to the same emissions estimated by CARB for generators for 2024-2027. Evaporative emissions for non-lawnmowers were unmodified, except for the modifications discussed in Section 2. (521-ExhA-Docket)

The ROG+$NO_X$ emission inventories of the EMA proposal in comparison to the ARB proposal are shown in Figure 8. This analysis uses the AIR annual use estimates discussed in Section 2. The EMA Tier IV proposal reduces ROG+$NO_X$ emissions from non- preempted, non-handheld equipment to approximately 11 tpd in 2045. (521-ExhA-Docket)

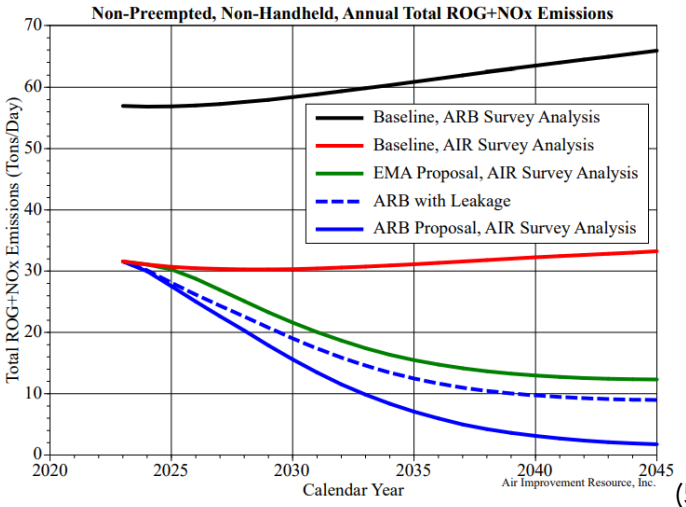
Figure 9 shows the impact of 50% landscape leakage and 10% residential/business leakage on the benefits of the ARB proposal. Purchases of equipment outside the state by landscaper, residential, and business users have a significant impact on the benefits of ARB's proposal. In addition, while not specifically modeled, slower fleet turnover would also significantly reduce the benefits of the ARB proposal. (521-ExhA-Docket)

Figure 8




(521-ExhA-Docket)

Figure 9




(521-ExhA-Docket)

Comment: The analysis does not take into account equipment leakage (purchases of equipment out of state) and slower fleet turnover due to higher prices (521-ExhA-Docket)

Comment: CARB still has ample time to develop a data-supported and reasonable regulatory reduction strategy to achieve California's model year 2031 SORE State Implementation Plan goals without banning SORE. However, the first necessary step is to obtain stakeholder agreement on a representative SORE sector emissions inventory which serves as the basis for modeling reasonable, data-driven, fact-based, technologically feasible and cost-effective strategies that achieve the SIP SORE goals. Despite significant industry-led outreach, CARB's SORE2020 emissions inventory model ("SORE2020") largely ignores industry concerns and as a result fails to reasonably represent SORE sector emissions or the current ZEE trends which suggest continued growth and adoption of ZEE technologies in applications and uses where the technology currently permits. Until these issues are addressed, this Proposed Rule, is arbitrary and capricious without a reasonable or rational basis and fails to meet California's own administrative regulatory requirements. (524-Docket)

Comment: Comment 1 - The Proposed Rule is not based on sound data collection or modeling. The underlying inventory data is primarily survey-based, does not appropriately account for biased data, and does not reflect the real-world SORE sector use, age, or emissions. The data to support the Proposed Rule does not reflect SORE sector emission reductions or benefits. (524-Docket)

Comment: Rulemaking must be fact-based and rooted in accurate, reliable and complete data. For emissions rulemaking activities, such as the Proposed Rule, an accurate emissions inventory model is critical to understand the emissions contributions and the benefits of a proposed rule for a given sector. CARB's OFFROAD2007 and CARB SORE2020 model the SORE sector emissions for the purpose of developing the Proposed Rule. (524-Docket)

Since 2018, OPEI has engaged CARB staff to raise concerns with the outdated OFFROAD2007 and SORE2020 emission models. Unfortunately, OPEI is concerned that the updated and final SORE2020 fail to reflect real-world SORE emissions inventories, and as a result, emissions and benefits calculated by the modeled emissions and outlined in the Proposed Rule are significantly overestimated. One of the main reasons for this concern is that the underlying data is survey-based, with no evidence that respondents accurately understood, kept track of, or reported equipment use and age. OPEI outlines

these and additional survey and model concerns in additional detail in several of the following comments. (524-Docket)

Due to the unrepresentative sector modeling, which OPEI is concerned results in significant overestimation of the sector inventory in both past and current modeling, the need for and benefits of emissions reductions cannot be accurately determined. The Proposed Rule notes "Staff calculated emission benefits based on the difference in modeled emissions between the (SORE2020) Baseline Scenario and Proposed Amendments scenario each year for the regulatory horizon of 2023 through 2024".[2] [Footnote 2: CARB Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions – Staff Report: Initial Statement of Reasons (ISoR), pg. 63] Without accurate modeling, there is no evidence to support staff's conclusion that the sector contributes to compelling and extraordinary conditions, and benefits cannot be accurately quantified - including benefits from the "Incident Per-Ton Methodology" and "the social cost of carbon benefits" described in the Proposed Rule. (524-Docket)

Comment: The Inventory and Model also does not account for a reduced turnover (or "scrappage" rate) or for the loss of potential emissions reductions (or "leakage") due to increased out-of-state purchases, which will occur due to the increased product costs in California that will result from the Proposed SORE Amendments. (528-Docket)

**Agency Response:**

These comments include expressions of the commenters' opinions regarding the SORE2020 emissions inventory model and the potential for SORE equipment owners to accelerate the purchase of SORE equipment before MY 2024, retain their SORE equipment longer than they would in the absence of the Proposed Amendments or travel out of California to purchase SORE equipment. CARB disagrees with the commenters' conclusions and made no changes based on the comments.

Statements regarding "pre-buy/no-buy," "leakage" and "scrappage" are conclusory, with the authors citing themselves as the authorities on these topics without supporting their claims. The commenters offer no evidence that SORE equipment owners will accelerate the purchase of SORE equipment before MY 2024, retain their SORE equipment longer than they would in the absence of the Proposed Amendments ("scrappage") or travel out of California to purchase SORE equipment ("leakage"). The commenters do not provide a basis for the numbers proposed by AIR and NERA/Trinity for reduced scrappage of equipment and increased leakage. CARB disagrees that any of these changes should be incorporated into the SORE2020 emissions inventory model.

Additionally, CARB presumes full compliance with the SORE regulations when evaluating emissions inventories for SORE rulemaking activities. A person who imports SORE for introduction into commerce in California that is not CARB-certified violates CARB's regulations. (Title 13, California Code of Regulations (CCR), sections 2400, 2751l(a)(3)). Equally, a person who sells uncertified SORE equipment to someone who will use or operate the uncertified SORE equipment in California also violates CARB's regulations. (Title 13, CCR, sections 2400, 2751(a)(3).) Therefore, CARB does not expect leakage scenarios presented by AIR and NERA/Trinity to occur. Such leakage scenarios are not included in the SORE2020 emissions inventory because those scenarios will likely be violations of CARB regulations and subject violators to substantial penalties and because CARB would have no way of quantifying any out-of-state purchases that did occur.

Exhibit A in EMA's comments, titled "Comments on the Non-handheld Equipment Inventories in ARB's Small Engine Initial Statement Of Reasons (ISOR) Air Improvement Resource, Inc.," dated November 18, 2021, provides AIR's assessment of this rulemaking and the SORE2020 emissions inventory and model. The comments reiterate portions of EMA's comments, which are addressed in Agency Responses throughout this chapter, and discusses AIR's opinions regarding the SORE2020 emissions inventory model and the ISOR. The commenter states and discusses opinions that emissions are overestimated, that "leakage" and "scrappage" effects will occur, and that EMA's proposal will provide significant emission reductions without the impacts of "leakage" or slower fleet turnover (the "scrappage" effect). CARB disagrees with the commenter's assertions and conclusions, as discussed in Agency Responses throughout this section IV.A.14.

Comments discussing AIR's analysis seem to suggest that CARB consider an alternative to the emissions inventory model analysis used in the Proposed Amendments. CARB disagrees with the commenters' suggestions and conclusions. The SORE2020 emissions inventory model was based on the best available data. EMA has not submitted any evidence to show that emissions should be higher in the model or that CARB was not using the best available data. The commenters do not provide evidence for their assumptions regarding running-loss, diurnal, or resting-loss emissions, annual use of equipment, or equipment lifetimes. Most users indicate that they plan to keep equipment until it breaks or fails [CSUF SSRC, 2019[63]]. Therefore, it is not reasonable to assume the lifetime of gasoline-powered equipment will be extended any further. Commenters do not provide evidence that equipment owners' retention of their equipment will be extended any longer under the Proposed Amendments.

Please refer to the Agency Responses in sections IV.A.2.3.5, IV.A.2.4.2, IV.A.2.6.2, IV.A.2.6.3 and IV.A.15 for additional discussion of comments related to "leakage," "scrappage," EMA's Exhibit B, and EMA's multi-part alternative proposal.

In response to the statement, "Despite significant industry-led outreach, CARB's SORE2020 emissions inventory model ("SORE2020") largely ignores industry concerns and as a result fails to reasonably represent SORE sector emissions or the current ZEE trends which suggest continued growth and adoption of ZEE technologies in applications and uses where the technology currently permits,": This comment states the commenter's opinions regarding the SORE2020 emissions inventory model. CARB disagrees with the commenter's conclusions. The SORE2020 emissions inventory model was based on the best available data. APA does not require CARB to obtain agreement from industry stakeholders on the emissions inventory. Comments submitted by this commenter and others during the development of SORE2020 were addressed using the best available data (e.g., refer to "Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI." [CARB, 2022[64]]). The commenters did not provide evidence to support their claims regarding sales trends for ZEE in California

[63] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

[64] CARB. 2022. Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI. Microsoft Excel workbook prepared by staff of the Air Quality Planning and Science Division. March 2022.

during development of SORE2020, as discussed further in the Agency Response in section IV.A.14.6.

Comparison of the final activity estimates used in the SORE2020 inventory model to U.S. EPA's NONROAD model and past models developed by CARB, as well as lawn and garden surveys and models do not indicate any overestimation of annual usage or emissions by the SORE2020 inventory model [CARB, 2020, Appendix J[65]]. Even if emissions were overestimated in the emissions inventory, it would not mitigate the need for maximum emission reductions from SORE. Health and Safety Code section 43018 requires that CARB endeavors to achieve the maximum degree of technologically feasible, cost-effective emission reductions from SORE by the earliest practicable date. Please refer to the Agency Response in section IV.A.10 for additional discussion of similar comments.

In response to the statement, "Due to the unrepresentative sector modeling, which OPEI is concerned results in significant overestimation of the sector inventory in both past and current modeling, the need for and benefits of emissions reductions cannot be accurately determined," and subsequent statements: The commenter does not provide evidence for its claims. The commenter misquotes text on page 63 of the ISOR. The regulatory horizon is 2023 through 2043, not 2023 through 2024, as the commenter states. Please refer to the Agency Response in section IV.A.14.2 for additional discussion of emissions from SORE.

### *A.14.2. Emission Factors*

Comment: CARBs OFFROAD2007 emission factors were based on emission testing done in the early 2000s time frame and primarily focused on uncontrolled engines. To update these emission factors in SORE2020, CARB staff relied on the results from baseline as well as validation and compliance testing of a large number of small gasoline engines, ranging from lawn mowers to generators, performed from year 2016 to present. CARB SORE2020 final report tables 20 and 25 summarize the evaporative emission test results, respectively (see enclosure figure 1 and 2). (509-Docket)

CARB workshop presentation from March 25, 2020, slide 28 (see enclosure figure 3) and SORE 2020 tables 20 and 25 show the updated evaporative emission factors (hot soak plus 24-hr diurnal) utilized by the SORE2020 Model. The basis for the update was derived from the CARB compliance and validation evaporative emission test found in table 20. The test program did not test all equipment types included in the SORE2020 Model, therefore some equipment utilized a surrogate or the average of several equipment types to derive an updated evaporative emission factor. In addition, since running loss data was not collected, the emission factors were carried over from OFFROAD2007. (509-Docket)

Comment: Fifth, CARB assumed an average load factor of 0.68 for portable generators. This load factor is unreasonably high. According to a PGMA survey conducted in late 2018, the average load factor for portable generators in California is 0.38, or about half of the value assumed by CARB. This led to the estimated emissions of portable generators in California to be higher than it would have been otherwise. (515-Docket)

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[65] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

The emission factors assumed by CARB are unreasonable based on current regulations and manufacturing standards for both deterioration and the baseline levels of exhaust and evaporative emissions. This led to the estimated emissions of portable generators in California being higher than they otherwise would have been. (515-Docket)

Comment: The AIR Report also identifies concerns with other assumptions used by CARB Staff in the Final 2020 SORE Emissions Inventory and Model. AIR notes that both the exhaust and evaporative emission factors for the non-handheld engine segment are overly pessimistic. AIR also highlights the manner in which CARB staff overestimated engine "on-times" for SORE. (521-Docket)

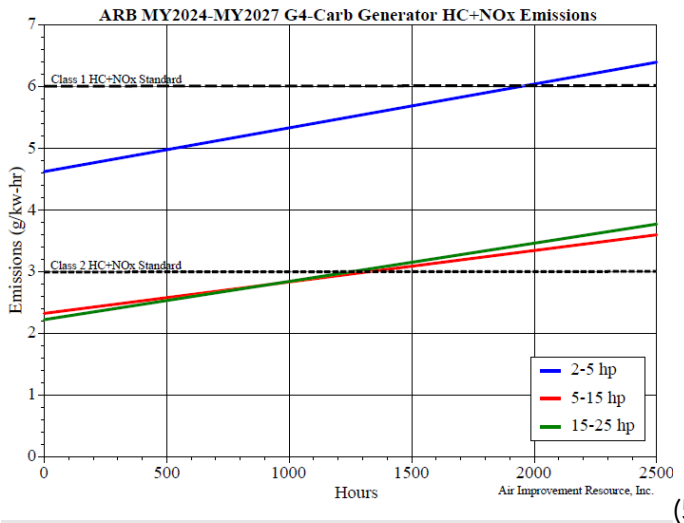
Comment: However, the most significant concerns relate to the assumptions CARB used for the evaporative emission factors. Specifically, CARB's generator running losses are based on an ATL study conducted in 2002–2003 in which only two generators were tested – a 1995 generator and a 2002 generator. No additional testing was done in that study despite CARB's intervening adoption of more stringent evaporative emission control regulations in 2006–2013, and the additional subsequent amendment of those tightened regulations in 2016. That has resulted in a significant overstatement of running losses in the SORE Emissions Inventory and Model over the useful life of the SORE at issue. In addition, the assumption for diurnal losses for lawnmowers is skewed by the inclusion in the emissions model of a 1973 lawnmower and a 1989 lawnmower, both of which are described as "liquid leakers." Including those outliers is simply unreasonable and not a reflection of the "actual" emissions from this product category. If CARB's assumptions are corrected, as they should be, the non-handheld emissions inventory for ROG + $NO_X$ is further reduced by 5 tpd, or nearly 15%. (See AIR Report, p. 10.) (521-Docket)

Comment: Another unreasonable aspect of CARB's cost-benefit assessment methodology is that it relies on emissions-component failure rates associated with components certified to the evaporative regulations that were revised in 2016 and implemented in MY2020, and on CSUF survey data related to engine maintenance, and then "extrapolates those rates" in the emissions inventory to justify additional evaporative emission reductions. (521-Docket)

Comment: CARB's evaporative running loss emissions for generators and lawnmowers are overly pessimistic. (521-ExhA-Docket)

Comment: 2. CARB's evaporative running loss emissions for current emission standard generators and lawnmowers are overly pessimistic.
AIR reviewed the in-use emissions in the SORE2020 model and found the exhaust emissions for current standard engines to be overly pessimistic. AIR also reviewed the in-use exhaust emissions for generators certified to the 6 and 3 g/kw-hr Class 1 and Class 2 emission standards proposed for model years 2024-2027 and found these in-use emissions projections by ARB for these standards to be reasonable. The in-use ROG+$NO_X$ emissions for these standards are shown in Figure 2. Since under either the ARB or EMA proposals emission standards would change to lower levels and durability periods would be lengthened, this analysis will spend no effort to critique ARB's in-use exhaust emissions for the current Class 1 and Class 2 emission standards. (521-ExhA-Docket)

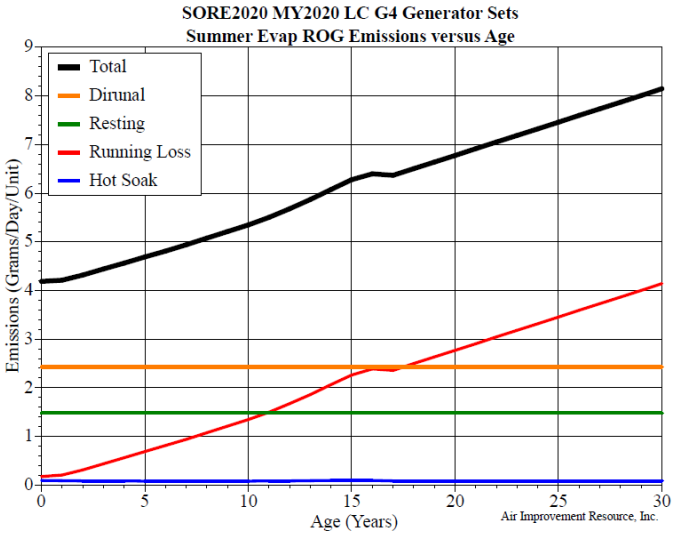
Figure 2




(521-ExhA-Docket)

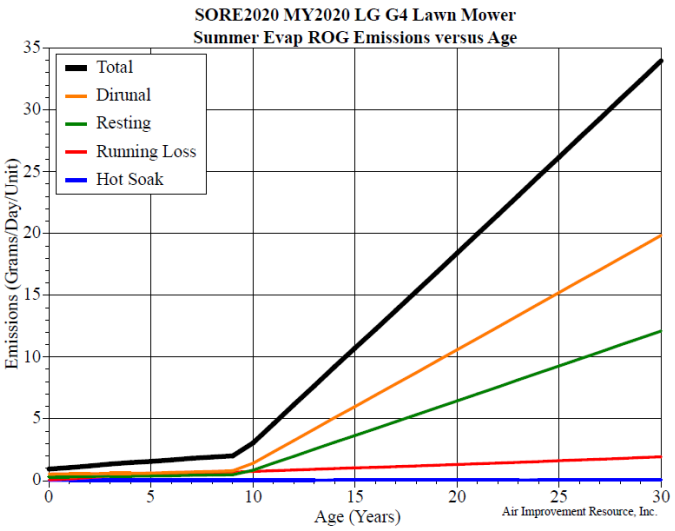
AIR also reviewed the in-use evaporative ROG emissions for non-handheld equipment. Evaporative emissions consist of hot soak, diurnal, resting loss, and running loss emissions. Evaporative emissions versus age for generators and lawnmowers are shown in Figures 3 and 4. (521-ExhA-Docket)

Figure 3




(521-ExhA-Docket)

Figure 4




(521-ExhA-Docket)

Figure 3 for generators shows a large increase in running loss emissions versus age, and the increase in running loss emissions drives total evaporative emissions higher. The other components are flat with age. Figure 4 for lawnmowers shows a large increase in diurnal and resting loss emissions for lawnmowers, which drives total emissions higher with age. (521-ExhA-Docket)

Generator Running Losses – ARB's generator running loss emissions are developed in an ARB report, and the data used come from a study by ATL.[8,9] [Footnote 8: OFFROAD Modeling Change Technical Document, Addition of Evaporative Emissions for Small Offroad Engines, W. Wong, Revised, 4/21/2003.] [Footnote 9: Collection of Evaporative Emissions Data from Off-Road Equipment, Automotive Testing Laboratory for ARB, November 24, 2003.] The testing was conducted in 2002-2003, and only 2 generator engines were tested. One of these engines is over twenty-five years old, and the other is over twenty. The two engines and their tests are show in Table 2. (521-ExhA-Docket)

**Table 2. Generator Tests**

| Generator | Model Year | Running Loss Test Result (g) |
|---|---|---|
| Honda EX5500 | 1995 | 19.45 |
| Coleman PL0545005 | 2002 | 1.80 |

(521-ExhA-Docket)

The two running loss results are quite different. Because the higher result was a somewhat older machine, ARB assumed running loss emissions were small when the equipment is new, and high when the equipment is old. However, there are only two tests, which does not provide a robust sample size, and ARB has not tested any additional generators for running loss emissions in the last twenty years. (521-ExhA-Docket)

Generators meeting ARB Tier 3 evaporative standards have evaporative system charcoal canisters and purge systems for the canister. These systems are designed to store gasoline vapor during ambient temperature increases so that the vapor can be burned in the engine once it is started. These systems would control running losses as well. When the engine is started, if the tank temperature increases due to the engine, gasoline vapor would travel to the canister, and then continuously be purged as long as the engine is running. Thus, it is not appropriate to use the 1995 engine to represent running

loss emissions for later model year generators that meet ARB MY2006+ emission standards. (521-ExhA-Docket)

We believe that it would be better to represent MY2006+ and later gasoline engines with the MY2002 Coleman, at 1.8 g/hr. The actual results could be even lower than this. Clearly, the MY1995 engine should not be used to represent generators meeting Tier 3 emission standards. (521-ExhA-Docket)

Lawnmower Diurnal and Resting Losses – Figure 5 shows steep deterioration after year 9 for lawnmower diurnal and resting losses. The OFFROAD Modeling Change Technical document referenced earlier shows that CARB based its diurnal and resting loss estimates on tests on 23 lawnmowers. They found that the emissions were highly influenced by one lawnmower - Mower23 – with emissions about ten times the average of the other 22 mowers. The mower, a 1989 model, had a liquid leak. ARB used this mower and one other old mower (Mower 20, a 1973 model) with lower emissions to develop its end of life emissions (at age 14) for lawnmowers in general. The estimated lawnmower emission rates developed by ARB are show in Table 3. (521-ExhA-Docket)

| Table 3. ARB Estimated Lawnmower Emission Rates (g/day) | | | |
|---|---|---|---|
| Age | Diurnal | Resting | Total |
| 0 | 2.05 | 1.15 | 3.20 |
| 7 | 2.72 | 1.53 | 4.25 |
| 14 | 8.94 | 5.03 | 13.97 |

(521-ExhA-Docket)

Comment: At age 14, emissions are estimated to be 4.4 times the emissions at age zero. Since only 2 mowers were used to determine the emissions at 14 years, ARB is assuming that 50% of all lawnmowers are leaking at the end of life. If one assumes that at age 7, none are leaking, there is a steep increase in the leaking mower assumption between age 7 and 14, as shown in Table 4 below. (521-ExhA-Docket)

| Table 4. ARB Assumed Leaking Rate for Mowers | |
|---|---|
| Age (years) | Assumed Percent Leaking (%) |
| 7 | 0.00 |
| 8 | 7.14 |
| 9 | 14.28 |
| 10 | 21.42 |
| 11 | 28.56 |
| 12 | 35.70 |
| 13 | 42.84 |
| 14 | 50.00 |

(521-ExhA-Docket)

ARB's comments on this assumption follow: The emissions estimates at fourteen years are the averages of two lawnmowers (mowers 20 and 23) one of which, mower 23, was found to have a liquid fuel leak. Because the deterioration rates beyond year seven are highly influenced by the emissions of this liquid leaker, staff surveyed a number of lawnmower repair shops and requested manufacturers input to determine how often these types of problems occur. Although it was confirmed that lawnmowers with fuel leaks are not uncommon, it was not possible to determine the incidence with accuracy. Staff found no compelling reason to exclude mower 23 from this analysis. However, by using this data at the end of equipment life, the impact is minimized because the majority of mowers (91%) are assumed to be age seven and newer at any given time. Only 0.1% of mowers are assumed

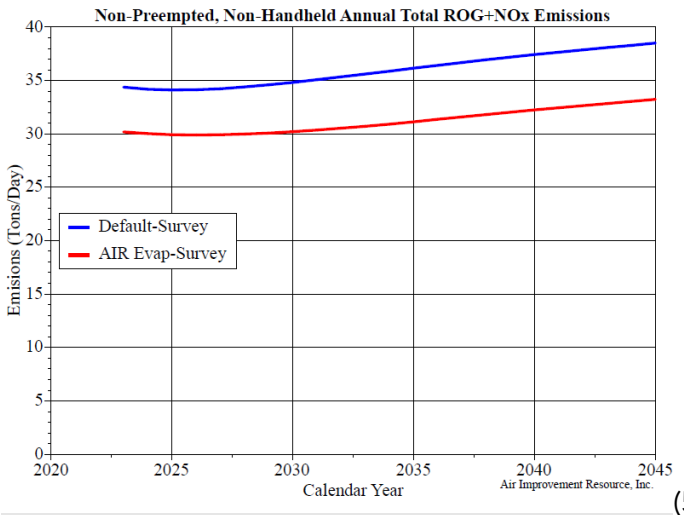
to reach the age of fourteen.[10] [Footnote 10: Technical Document, page 6 (see Reference 7)] (521-ExhA-Docket)

We have four comments on this analysis. First, is that CARB has changed equipment lifetimes in their latest model, based on the survey data, so it is likely their comments on the impact of the leaker assumption needs to be revisited. Second, if mower repair shops fix leaking lawnmowers, this means that leaking lawnmowers are getting fixed, so they do not stay as leaking lawnmowers as ARB is assuming. Third, it is completely unreasonable to assume a 50% leak rate at the end of life. And the fourth is that even if the percent of lawnmowers above age 7 is low, ages 7-12 or 13 still can have a large impact, even if their percent of the population is low. (521-Docket)

The CARB assumptions for evaporative emissions and leakage rates for gasoline lawnmowers appear to be overstated and should be revisited. In our analysis, we will assume linear deterioration of diurnal and resting losses after 7 years, instead of drastically accelerating this deterioration as ARB has done. (521-ExhA-Docket)

Impacts of AIR's Evaporative Estimates on Baseline Inventories
The impact of revising these evaporative emissions for generators and lawnmowers on ROG+$NO_X$ emissions baseline emissions is shown for both the ARB Survey and AIR Survey cases in Figure 5. Updating these evaporative emissions reduces the ROG+$NO_X$ inventory from non-preempted, non-handheld equipment by about 5 tpd. (521-ExhA-Docket)

Figure 5




(521-iq-Docket)

Comment: CARB's modeling of emissions benefits of their proposal significantly overstates the benefits of their proposal for the following reasons:
1. CARB's analysis of the survey data severely overstates equipment use
2. Baseline SORE exhaust and evaporative emission rates are outdated and are pessimistic
3. The baseline emission inventory does not include sufficient electrification in the future
4. The analysis does not take into account equipment leakage (purchases of equipment out of state) and slower fleet turnover due to higher prices (521-ExhA-Docket)

Comment: Additionally, the SIP reduction strategy includes emission reductions by "enhance(ing) enforcement of current emissions standards." In 2017, CARB adopted amendments to the current SORE regulations to address evaporative emissions non- compliance; however, the emission benefits

from these regulatory amendments are not reflected in SORE2020, or considered as part of the sectors progress towards reducing emissions in accordance with this SIP goal. This is a substantive flaw because "leakers" account for significant HC emissions in SORE2020 model though 2043, including products produced well beyond the adoption and enforcement of the 2017 evaporative amendments. (524-Docket)

Comment: Comment 16 - SORE2020 does not account for emissions reductions achieved through tighter evaporative and enforcement of emissions standards. SORE2020 continues to model several categories of equipment as "leakers" resulting in tons per day of evaporative emissions, despite the 2017 SORE evaporative emissions amendments and ongoing enforcement of those amendments. As a result, SORE2020 overestimates sector emissions for 2018 and later. (524-Docket)

The 2016 SIP includes multiple strategies to address SORE emissions reductions needs. Included in these strategies are: (1) promote increased use of zero- emissions equipment; (2) propose tighter exhaust and evaporative emissions standards; and (3) enhance enforcement of current emissions standards for SORE. To address strategies (2) in-part and (3), CARB adopted amendments to the evaporative emission regulations in 2017 and has been enforcing these amendments since 2018. The September 27, 2016, Amendments to the Evaporative Emissions Requirements for Small Off-Road Engines, Staff Report: Initial Statement of Reason states "the current proposal will increase compliance with the existing diurnal emission standards, ensuring the ROG emissions reductions needed for the (SIP) are achieved…," and that "the proposed amendments are intended to address the shortfall in emissions reductions." However, despite this rule making and CARB strict enforcement of the rule, SORE2020 continues to model walk-behind mowers, large leaf-blower vacuums (24-hour diurnal 3.278 g), large trimmers (24-hour diurnal 3.278 g), air-compressors (24-hour diurnal 8.178 g), and generators (24-hour from 2.460 to 4.350 g) on data collected for models before the adoption and enforcement of the evaporative amendments. The rule is effective and must be modeled accordingly to understand the current (benchmark) SORE emissions.[59] [Footnote 59: OPEI recognizes Air Compressors are Preempt, but due to the typical engine/fuel system integrated nature, we believe many of the air-compressors include fuel systems certified in California for non-preempt products, such as walk-behind mowers or wood splitters.] This comment is addressed in additional technical detail in Annex F. (524-Docket)

Comment: Comment 17 – SORE2020 determinations of zero-hour and deteriorated emissions and not supported by data and are overestimated. As a result emissions are overestimated for 2018 and later. OPEI understands SORE2020 uses certification-level exhaust emissions as the values for determining zero-hour emissions.[60] [Footnote 60: CARB Staff CARB/EMA Meeting Request for Additional Information on SORE2020 Model presentation, April 29, 2020, slide 12] SORE certification-level emissions reflect the deteriorated emissions at the end of the useful life, not the zero-hour emissions. As a result, SORE2020 overestimates the zero-hour emissions. Furthermore, SORE2020 assumes the emission at the useful life are equal the emissions limits, despite manufacturers running full durability periods and certifying Family Emissions Limits ("FELs") – In other words, the emissions CARB currently uses for the zero-hour estimates should be the useful life estimates. (524-Docket)

In 2004 Nine OPEI handheld product manufacturers presented to EPA data analyzing in-service emissions deterioration. Manufacturers collected 45 units in-service units, representing a variety of handheld product emission control techniques, to understand deterioration trends. Of the 45 units tested, 44 units were significantly lower than the FEL as-received or after general maintenance. Of the 18 units for which measurements were collected both before and after general maintenance, only two exceeded FELs. Many units experienced minimal decrease after general maintenance, and some units

even experienced minimal increase in emissions after maintenance. See Annex G. SORE2020 has no such dataset to support its assumption that emissions deteriorate to certification limits, in some cases well beyond volume-weighted FELs. Finally, SORE2020 extends the linear deterioration rate to 150% of the engines useful life without supporting data. (524-Docket)

Comment: As a result of assuming all products start at deteriorated emissions levels, then deteriorate to the emissions limits versus tested deteriorated values, and then continue to deteriorate beyond the emission limits for another 50% of the equipment's useful life, SORE2020 overestimates the sectors emissions. (524-Docket)

Comment: The CARB 2020 SORE Emissions Inventory and Model is further flawed because it continues to use data points from equipment that was manufactured between 1973 and 1995 to support claims of diurnal and running loss emissions. Additionally, CARB staff has failed to evaluate the effectiveness of the latest amendment package approved by OAL on November 13, 2017, for which CARB has not received a waiver from US EPA to enforce as required by the Clean Air Act. (528-Docket)

**Agency Response:**

These comments present criticisms of text in the ISOR and seem to suggest that CARB should change the SORE2020 emissions inventory model to reduce the emissions in the inventory. Some commenters describe their assessments of actions CARB has taken or analyses CARB has performed, such as conducting testing to develop emission factors. The commenters do not provide evidence to support their claims. CARB disagrees that the emissions inventory should be changed. CARB made no changes based on these comments.

In response to comments regarding running loss emissions: These comments seem to suggest that CARB should be using lower running loss emission factors in the inventory model. The commenter does not provide evidence that the emission factors used in the SORE2020 emissions inventory model are pessimistic or inaccurate. CARB considered the available data when developing the emission factors.

The generator diurnal component is flat because there is no deterioration factor applied to generators, due to a lack of data. If future testing indicates that a deterioration factor should be applied, CARB will consider those data when developing subsequent versions of a SORE emissions inventory model. Any test data internally developed at CARB or provided by industry will be carefully considered in future emissions inventory development.

Generator running loss emission data are based on testing in 2003 by Automotive Testing Laboratory [Automotive Testing Laboratory, 2003[66]]. The testing program included many off-road equipment types such as lawn mowers, trimmers, leaf blowers, chainsaws, and generators. CARB used the best data available to calculate running loss emissions for generators. Commenters do not provide evidence that different data should be used. Emissions inventory modeling is a continuing process and when new data become available, the emission factors are adjusted, as needed. Previous modeling of generator population was

[66] Automotive Testing Laboratories. 2003. Collection of Evaporative Emissions Data from Off-Road Equipment. Report prepared by the Automotive Testing Laboratories, Inc. for the California Air Resources Board and California Environmental Protection Agency, Air Resources Board Contract #00-315. November 24, 2003.

based on projections from 1990, and the estimates significantly undercounted the population of generators, as explained in detail in section IV.A.14.5.

In response to the statement, "Baseline SORE exhaust and evaporative emission rates are outdated and are pessimistic,": CARB disagrees with the commenter's assertion. The SORE2020 emissions inventory model is neither optimistic nor pessimistic. The emissions inventory model is based on the best available data. The inventory model serves as a tool for estimating emissions. The emissions modeled in the SORE2020 inventory model are similar to those in the U.S. EPA emissions inventory model and prior CARB emissions inventories [CARB, 2020[67]], providing further support for the current model.

In response to the statement, "Fifth, CARB assumed an average load factor of 0.68 for portable generators. This load factor is unreasonably high. According to a PGMA survey conducted in late 2018, the average load factor for portable generators in California is 0.38, or about half of the value assumed by CARB. This led to the estimated emissions of portable generators in California to be higher than it would have been otherwise,": This comment seems to suggest that CARB should use a lower load factor for generators in the SORE2020 emissions inventory model. A load factor is a measure of the fraction of available power that an engine uses on average. The load factor of 0.68 used by CARB in SORE2020 is the same as in the OFFROAD2007 emissions inventory model [CARB, 2020[68]]. The commenter did not provide the data from PGMA's 2018 study to CARB during development of SORE2020 or in its comments. The commenter's reference to its survey does not provide evidence that the load factor for SORE generators should be updated.

In response to comments about lawn mowers with liquid fuel leaks: These comments seem to suggest that CARB consider alternative emissions factors for lawn mowers in the SORE2020 emissions inventory model. CARB disagrees with the commenters' assessments and conclusions. Lawn mower emission factors are based on testing of lawn mowers, one of which leaked liquid gasoline. The initial lawn mower diurnal testing program tested 23 lawn mowers, seventeen new and six used, to develop evaporative emission factors and deterioration rates. The new lawn mowers were purchased by CARB or their contractors and had not been previously operated by users. The used lawn mowers were obtained from rental agencies or purchased or rented directly from owners and were assumed to be representative of the in-use lawn mower fleet [CARB, 2003[69]; Automotive Testing Laboratories, 2003[70]]. This is the best available data for determining deterioration. The comments seem to indicate that CARB

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[67] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[68] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[69] CARB. 2003. OFFROAD Modeling Change Technical Memo, Addition of Evaporative Emissions for Small Off-Road Engines. Revised April 21, 2003.

[70] Automotive Testing Laboratories. 2003. Collection of Evaporative Emissions Data from Off-Road Equipment. Report prepared by the Automotive Testing Laboratories, Inc. for the California Air Resources Board and California Environmental Protection Agency, Air Resources Board Contract #00-315. November 24, 2003.

should exclude data of liquid leakers from the emissions inventory analysis. CARB considered and evaluated all available data. CARB would need compelling evidence to exclude test results from the emissions inventory model. The best available data were used in development of emission factors for lawn mowers. It is clear that some lawn mowers develop leaks as they age, as shown by the equipment tested by CARB, the low rates of maintenance shown in the CSUF SSRC survey, and testing by the Consumer Protection Safety Commission [CARB, 2020[71]; CSUF SSRC, 2019[72]; USCPSC, 2015[73]]. The commenters offer criticisms and state opinions but do not provide evidence to support their statements.

In response to comments about the 2016 amendments to the SORE evaporative emission regulations: These comments seem to suggest that CARB should change the evaporative emission factors in the SORE2020 emissions inventory model to reflect lower emissions due to the 2016 amendments to the SORE evaporative emission regulations. Some commenters refer to 2017 as the year the amendments were finalized. They seem to assert that compliance will increase under the 2016 SORE amendments. Compliance testing by CARB of evaporative families certified after the 2016 amendments became effective on January 1, 2018, has shown a failure rate of 40 percent (evaporative families 23-32 in the "Technical Support Document: Compilation of Small Off-Road Engine Evaporative Compliance Testing Results." This failure rate is similar to the failure rate of engines certified before the 2016 amendments became effective [CARB, 2021[74]].

Evaporative emission factors in SORE2020 are based on the best data that were available at the time of development. As described on page 6 of the ISOR, CARB and manufacturer testing in validation studies found low rates of compliance with existing emission standards. A major purpose of the 2016 amendments was to increase compliance rates and facilitate compliance testing and enforcement actions. The evaporative emission factors in the SORE2020 emissions inventory model are based on compliance and validation testing as described in the SORE2020 technical report [CARB, 2020[75]].

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[71] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.,

[72] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

[73] USCPSC. 2015. Study of Fuel Leaks Associated with Outdoor Ground-Supported Gasoline-Powered Equipment. Report prepared by Han Lin, staff of the U.S. Consumer Product Safety Commission (USCPSC), Division of Combustion and Fire Sciences, Directorate for Engineering Sciences. September 2015.

[74] CARB. 2021. Technical Support Document: Compilation of Small Off-Road Engine Evaporative Compliance Testing Results. Microsoft Word document compiled by staff of the Monitoring and Laboratory Division. October 2021.

[75] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.,

The commenters mischaracterize the goals of the 2016 amendments. Those amendments were not intended to achieve new emission reductions through adoption of new emissions standards. They were intended to ensure that previously expected emission reductions from the 2003 adoption of the SORE evaporative emission regulations would be realized through better ensuring compliance with existing emission standards. The commenter also appears to suggest that SORE2020 only model emissions of new engines certified after January 1, 2018. SORE2020 models emissions of all SORE in California, and engines used in California have a large range of ages. Emission factors in SORE2020 reflect the various years in which engines were produced.

In response to comments regarding exhaust emission levels used in SORE2020 and the deterioration of exhaust emissions throughout the life of an engine: These comments seem to suggest that CARB consider an alternative to the SORE2020 emissions inventory model. They seem to suggest the zero-hour emissions are overestimated in the model and should be decreased. The commenters mischaracterize CARB's use of certification data and state opinions regarding emission factors. The commenters do not provide evidence to support their claims. CARB developed the zero-hour emission factors and deteriorated emissions based on the methodology and best available data as described from page 32 to 41 of the SORE2020 Technical Report [CARB, 2020[76]]. In emissions inventory development, CARB regularly uses the certification level emissions as new engine emissions, rather than deteriorated engine emissions.

In response to the statement, "In 2004 Nine OPEI handheld product manufacturers presented to EPA data analyzing in-service emissions deterioration. Manufacturers collected 45 units in-service units, representing a variety of handheld product emission control techniques, to understand deterioration trends," and subsequent statements: This comment includes expressions of the commenter's opinions and seems to suggest that CARB consider an alternative to the SORE2020 emissions inventory model. It seems to suggest that CARB should be using different data in development of the emission factors for the inventory model. Annex G in OPEI's comments, titled, "Manufacturer In-Service Emission Test Data (Comment 17)," includes a table titled "OPEI Handheld Manufacturers' Field Aging Data Comparison to FEL Values." The table contains limited information about the engines and some test results for the engines. Engine families are not identified. Although the commenter mentions sharing these data with EPA in 2004, some of the units appear to have been produced in February 2005. The test results appear to be for engines tested before and after maintenance in many cases. The test results do not seem to show the change in emissions for individual engines from the time they were new to the end of the emissions durability periods.

The commenter states that these data were presented in 2004 to the U.S. EPA. CARB was not given the data cited here, so it was not evaluated by CARB nor used in the emissions inventory model development. Throughout emissions inventory development, CARB met informally with stakeholders, including meetings with OPEI in January 2019 and March 2020. A draft of the SORE2020 emissions inventory model was presented at a workshop in March 2020. The final version of the emissions inventory model was published in September 2020. OPEI did not share these data with CARB at any point during that time. If CARB is able to attain a more complete description of the data cited here along with the full data set, CARB will be able to

[76] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

consider the data when developing future emissions inventories for SORE. Additionally, "general maintenance" was conducted on many of the units cited. It is known from the CSUF survey that only 38 percent of households, 47 percent of businesses, and 82 percent of landscape businesses perform any maintenance on their SORE equipment. The commenter does not specify what constitutes "general maintenance" or whether any adjustments were made to the engines during or prior to testing. The commenter does not describe whether the testing performed on the engines complied with U.S. EPA or CARB test procedures. The commenter does not provide evidence that these data or test data for equipment that has undergone "general maintenance" are representative of SORE equipment in California.

A commenter made a passing comment, without support or analysis, related to compliance of 2017 amendments to the SORE regulations with the Clean Air Act. CARB's adoption process of amendments to the SORE regulations in 2016 or 2017 is not at issue in this rulemaking. CARB made no changes in response to this comment.

Please refer to the Agency Responses in sections IV.A.14.1 and IV.A.15 for discussion of comments related to "scrappage" and "leakage."

Please refer to the Agency Responses in sections IV.A.14.5 and IV.A.14.6 for additional discussion of comments related to the CSUF survey, the SORE emissions inventory (including equipment use time), and future sales projections.

### *A.14.3. SORE contribution to statewide emissions*

Comment: While I appreciate the efforts of legislators and CARB to address California's air quality needs, the small engine-powered equipment category is a comparatively minimal contributor to the state's emissions. (34-Docket)

Comment: 70% of the pollution in the world comes from two countries China and India they burn coal and are responsible for the environment the way it is unless a change it's a waste of time for us to change and only make two or 3% difference in the world !! (67-Docket)

Comment: Any efforts to eliminate small engines should be abandoned. There are much more productive ways to mitigate carbon emissions such as proper Forest management. Small engines are a drop in the bucket of emissions compared to the hundreds of thousands of Acres of forest burned. Legislation like this costs residents of the state millions and millions of dollars. California is becoming less friendly to the poor and working-class people. (116-Docket)

Comment: Against the emissions produced by wildfire, the emissions reductions contemplated here strike as a comparatively small. (466-Docket)

Comment: If true, the SORE model significantly overestimates gas-powered equipment and emissions moving forward. Emission are not high, and -- are not as high and will not exceed cars. Regulations must be fact based. (3039-Oral Testimony)

Comment: While I appreciate the efforts of legislators and CARB to address California's air quality needs, the small engine-powered equipment category is a comparatively minimal contributor to the state's emissions. (Form Letter A-Email) (Form Letter B-Email) (Form Letter F-Email) (Form Letter G-Email) (Form Letter H-Email)

**Agency Response:**

These comments seem to suggest that CARB consider an alternative to the Proposed Amendments. They seem to suggest that CARB should not regulate SORE. The commenters assert that SORE are small contributors to air pollution in California or imply a belief that the United States of America is a small contributor to global air pollutant emissions. In fact, SORE are substantial contributors to smog-forming pollution in California. Smog-forming pollutants are the primary pollutants whose emissions the SORE regulations are intended to reduce. The emissions of smog-forming pollutants, reactive organic gases and oxides of nitrogen, from SORE are similar in magnitude to those emissions from light-duty passenger cars, as described on page 2 of the ISOR. The relative contributions of SORE do not mitigate the need for maximum emission reductions. Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from SORE by the earliest practicable date. Achieving emission standards of zero is feasible for SORE, regardless of the magnitude of the SORE emissions inventory.

### *A.14.4. SORE Fact Sheet*

Comment: **Subject: Small Off-Road Engines in California**
The SORE Fact Sheet is an excellent document. I'm doing research into sustainability to understand the scale of certain issues and was hoping there is additional data available, specifically on residential and lawn & garden equipment. Based on this fact sheet <https://ww2.arb.ca.gov/resources/fact-sheets/sore-small-engine-fact-sheet>, it appears that in 2021 ~150 tons of Smog Forming emissions per day were produced by SORE. Should the interpretation be that 55,000tons (365x150t) of CO2-eq emissions are produced from all SORE annually in the state of California? If there was a CO2-eq annual emissions dataset by category that would be ideal but I'm just not sure what is available. Also, understanding the methodology of the data would be very helpful. Any help you can provide would be greatly appreciated! (599-Email)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. CARB made no changes based on the comment. CARB responded to the sender on January 21, 2022, to answer his questions. The following response provides clarification and context for several points within the above comment. The smog-forming emissions referred to in the SORE Fact Sheet are reactive organic gases and oxides of nitrogen. These components are ozone-forming pollution, which affect air quality. Greenhouse gases are not the primary focus of SORE regulations. The SORE2020 emissions inventory model provides emissions of greenhouse gases.

### *A.14.5. CSUF Survey*

#### A.14.5.1. Survey Data

Comment: Second, the Proposed Amendments are premised on faulty data that overestimates both the population of spark-ignited portable generators in California and their associated emissions. (515-Docket)

Comment: The Proposed Amendments are Premised on Faulty Data
To properly regulate a bucket of emissions sources, it is imperative that CARB understand the

situation as it exists today. CARB's reliance on the 2018 Social Sciences Research Center ("SSRC") at California State University, Fullerton Survey ("SSRC Survey") has led to a serious overestimation of the emissions associated with portable generators and thus a faulty premise on which the phase out to zero emissions is based. (515-Docket)

Certain results from the SSRC Survey should have raised sufficient red flags to CARB staff to step back and question the validity of those results. In the first instance, the model that had been in use until relying on the SSRC Survey, the OFFROAD2007 survey estimated that there were 375,407 generators in use in California. The SORE2020 model estimated the population of generators to be more than five times that amount, or 1,947,188. That disparity alone should have been enough to question the SORE2020 model's accuracy as it relates to portable generators. According to a PGMA survey conducted in late 2018, the portable generator population in California is estimated to be 1,556,667 units. Thus, the CARB model estimate represents 25% more units when compared to the PGMA data. This potential overestimation of portable generator population likely corresponds to an overestimation of associated emissions as well. Examining the SSRC Survey and CARB's resulting SORE2020 model closely reveals many problems that likely led to this overestimation of generator use. (515-Docket)

First, the SSRC Survey was incomplete which led to inaccurate survey answers. An example of this was the household survey question ("Q15") that asked "Do you own at least one generator?". This is a very misleading question, since it does not distinguish between portable generators (which are subject to the potential amendments to SORE regulations) and stationary generators (which are not subject to the potential amendments to SORE regulations). The surveyor did not explain this important distinction to the people surveyed and this contributed to the estimate of the population of portable generators in California to be higher than it would have been otherwise. Indeed, the CARB 2020 Emissions Model for SORE estimates a total portable generator population (2018 baseline) in California of 1,947,188 units (515-Docket)

Second, the survey lacked sufficient quality control. Some answers given by people surveyed were obviously inaccurate but were still included in the survey results. This brings the accuracy of the entire model into question. (515-Docket)

As an example of an inaccurate answer, Respondent C239 (dentist office) reported using a generator 4 times per week for 9 hours per use (1,872 hours per year). First, this generator was most likely a stationary generator and not a portable generator based on its high usage. Second, commercial business generators are intended for backup power use, not as primary sources of power. They are not economical solutions to power facilities year-round. CARB should not have included this data in the SORE 2020 emissions model. (515-Docket)

As another example of an inaccurate answer, when asked the age and retention of a generator, a respondent stated that the unit was 45 years old, and that he planned to keep the unit for another 30 years. Small engine powered equipment that is greater than 30 years old is rare and expecting to keep equipment for 75 years is not a reasonable response. (515-Docket)

SSRC should not have included inaccurate answers such as the ones above in the survey results. This led to the estimated emissions of portable generators in California being higher than they otherwise would have been. (515-Docket)

Third, in the SSRC Survey Report dated May 15, 2019 ("SSRC Survey Report"), Table 50 shows that 16.6% of generators owned by households are not used at all. Inexplicably, the model does not

include these generators in the analysis of duration of use. This led to the estimated emissions of portable generators in California being higher than they otherwise would have been. (515-Docket)

Fourth, in the SSRC Survey Report, Table 52 shows that 39.4% of generators owned by households are at least ten years old. This is not aligned with the assumed life of portable generators in accordance with EPA durability guidelines on end of life (40 CFR §1054.107). In addition, according to the 2018 PGMA survey, the estimated average useful life of a portable generator, defined as the number of years it takes for 50% of a particular model year to be out of the market (i.e., no longer operating) is 6 years. This led to the estimated emissions of portable generators in California being higher than they otherwise would have been. (515-Docket)

Comment: The Proposed SORE Amendments are built, in essence, on a house of cards. CARB's ISOR overstates the relevant SORE population by relying on a fundamentally flawed survey conducted by CSUF. That survey was not reviewed using standard quality assurance/quality control (QA/QC) protocols prior to publication of the Report and the related Draft 2020 SORE Emission Inventory and Model. (See AIR Report and Comments, attached.) While CARB did delete a handful of survey responses based on industry comments on the Draft, the Final 2020 SORE Emissions Inventory and Model continues to include outlier responses and data which should not be included under standard QA/QC protocols. (Id.) If CARB had properly applied standard QA/QC protocols, the sample size in certain categories would no longer be sufficient or representative. Thus, CARB staff have acted arbitrarily by including inappropriate data in a transparent effort to preserve the otherwise unjustified claim that the CSUF survey is reflective of the relevant California SORE population. The resultant overstatement of the equipment population renders the anticipated emission reductions and cost-effectiveness of the Proposed Amendments similarly overstated as well. (See AIR Report; OPEI letter of June, 2020, which reviews every response to the survey identifying which responses should have been screened-out and why.) (521-Docket)

Comment: The Proposed SORE Amendments are arbitrary and capricious as they rely upon a CSUF survey which was not vetted with appropriate QA/QC protocols, as the basis for the Final 2020 CARB SORE Air Emission Inventory and Model. That has resulted in a significant overestimation of the SORE equipment population, as well as the relevant emissions inventory and the anticipated emission reductions. The 2020 SORE Emission Inventory and Model also relies upon invalid inputs for various specific emission factors. The result (again) is an overestimation of the expected emission reductions and benefits, and an underestimation of the likely costs of the Proposed Amendments. (521-Docket)

Comment: While CARB staff state that the main goal of the survey was to calculate a more accurate inventory of SORE for emissions modeling (SRIA p. 3), that goal was not achieved due to the manner in which the survey was conducted and used. It is well recognized by researchers, and acknowledged by CSUF staff, that the trade-off in seeking to obtain a higher number of responses through phone surveys is a significant loss in the precision and accuracy of those responses. Indeed, CARB's contract with CSUF specifically required that CSUF perform a quality assurance/quality control (QA/QC) review of the data generated by the phone survey (Task 9), but, contrary to that provision, no QA/QC was performed and no data was flagged or screened-out in the report issued by CSUF. In addition, even without excluding any data, the CSUF Survey Report acknowledges that there were not enough responses in some equipment categories (e.g. commercial non-handheld equipment) to constitute a representative sample, so surrogates were used to scale-up populations and subjective "weighting adjustments were made." (See p. 557 of the CSUF Survey.) However, even using those concededly arbitrary techniques, the sample size for various categories was still so small that the data was deemed unreliable. (521-Docket)

In addition, and again contrary both to the terms of the contract between CSUF and CARB (Task 12) and to standard research protocols, no interim data reviews were performed nor were any interim reports issued in order to identify potential issues with the data-collection and analysis efforts prior to the final report's completion. The absence of such analyses makes it very difficult if not impossible to assess or validate the underlying data and the assumptions and conclusions drawn from those data. In that regard, the entire survey could have been undermined if a serious issue had been identified through a proper QA/QC process, which was not conducted in this case. Notwithstanding all of those breaches of the basic and necessary QA/QC process, the CSUF Survey and Report nonetheless are the basis for CARB's underlying 2020 SORE Inventory and Model. The repeated breaches of the terms of the contract with CSUF, and the related disregard of standard research protocols, undermine the foundation of CARB's entire rulemaking. (521-Docket)

Comment: The Proposed Amendments to the SORE Regulations Overstate the Emissions from SORE and the Benefits of the Proposed Amendments
CARB's estimated SORE population is based on fundamentally flawed and inadequate data from a survey conducted on CARB's behalf by CSUF to support the update to CARB's SORE Emissions Inventory and Model. More specifically, CARB contracted with CSUF to conduct a "phone survey" to update the SORE emissions inventory and model in 2017. CARB staff selected a phone survey with the supposed objective of obtaining "real world" data, rather than expanding on CARB's previously-conducted field study in which equipment usage was actually metered in order to obtain a larger in-use data set. (521-Docket)

Comment: OPEI and EMA contracted with Air Improvement Resources (AIR) to assist with the review. During this third-party expert review AIR discovered that CSUF did not perform any QA/QC of the data summarized in their report - - the same data that CARB subsequently relied on for the Draft 2020 SORE Emissions Inventory and Model. The basic conclusion from AIR's Report, a copy of which is attached as Exhibit "A," is that "[C]ARB's small engine survey was flawed, leading to a significant overstatement of the small engine inventory." (521-Docket)

OPEI and EMA met with CARB staff on a number of occasions to explain AIR's analysis and concerns with the CSUF Survey, and to highlight the impact of the survey's failure to screen- out suspect and "outlier" data, which had resulted in a substantial overestimation of the California SORE population and hours of use, and had led to a significant overestimation of the SORE emissions inventory as a whole. A detailed discussion of the inherent problems with the underlying data is included in OPEI's Comments on the Draft 2020 SORE Inventory and Model, dated June 30, 2020 (incorporated by reference herein). (521-Docket)

While CARB staff made some minor adjustments to the final 2020 SORE Emissions Inventory and Model in response to the OPEI and EMA comments, an analysis of the non-handheld equipment segment performed by AIR still shows that the non-road emissions inventory continues to be significantly overstated. In particular, AIR's analysis reveals that the Final 2020 SORE Emission Inventory and Model still overstates the non-handheld SORE equipment population once standard QA/QC protocols are applied to the underlying survey data. (See Exhibit "A.") (521-Docket)

Comment: The Engine Manufacturers Association (EMA) and Outdoor Power Equipment Institute (OPEI) submitted comments on ARB's small engine survey on June 30, 2020.[4] [Footnote 4: Letter from Mr. Greg Knott of OPEI to ARB, June 30, 2020.] EMA and OPEI contracted with AIR, Inc. to review many parts of the survey. This review uncovered many problems with the survey data. A few of these problems were addressed by ARB in the finalization of the SORE2020 model, but many problems still remain. (521-ExhA-Docket)

Comment: AIR has now reviewed CARB's SORE2020 emissions model, and the small engine ISOR. In addition, AIR has modeled non-handheld small engine inventories for ARB's proposal, the EMA proposal, and has evaluated the effects of the different evaluations of the small engine survey data on emission inventories. Our comments on the SORE2020 model and the ISOR are as follows:
1. CARB's small engine survey was flawed, leading to a significant overestimate of the small engine inventory. (521-ExhA-Docket)

Comment: 1. CARB's small engine survey (conducted by California State University Fullerton (CSUF)) was flawed, leading to a significant overestimate of the small engine inventory. (521-ExhA-Docket)

AIR reviewed CARB's survey data extensively, and our analysis of these data were a part of both EMA's and OPEI's comments on the survey (referenced earlier). AIR used a two-step process to examine all of the data: (1) AIR used an outlier criteria to identify potentially erroneous data, and then (2) AIR examined all identified outliers determine whether to accept or reject each piece of data. (521-ExhA-Docket)

In its review of the process AIR used, CARB staff were critical of Step 1 used by AIR.[6] [Footnote 6: 2020 Emissions Model for Small Off-Road Engines – SORE2020, California Air Resources Board, September 2020, Appendix J, page 111.] However, Step 1 was never used to reject any data; instead, Step 1 was only used to identify data that was carefully reviewed in Step 2. The actual process AIR used to identify potential outliers is somewhat irrelevant; any number of processes could have been used to identify these data. Step 2 was the critical step used to determine whether the data should be accepted or rejected. AIR utilized additional information provided by respondents and publicly available data to triangulate accuracy of a given response. (521-ExhA-Docket)

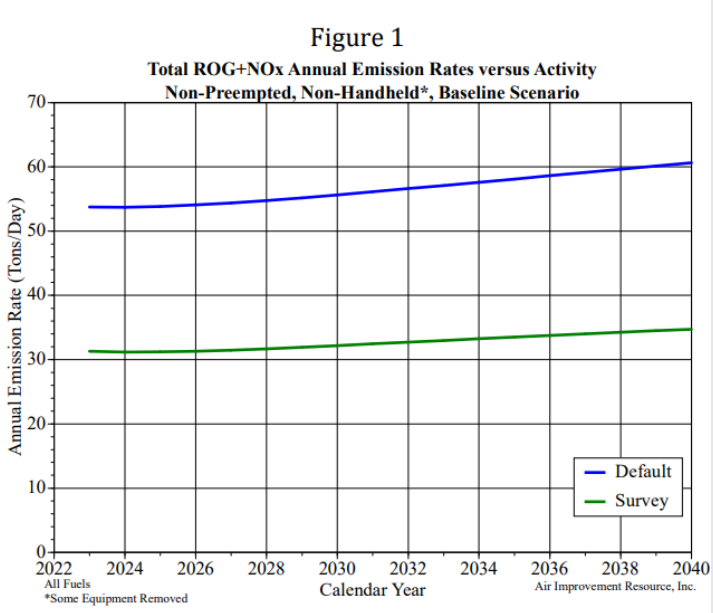
One of the most critical flaws in this survey was the inability of the surveyors to adequately determine engine-on times for equipment. For example, surveyors asked respondents how long they used their equipment each day. In several cases, landscapers indicated that they used a lawnmower "all day" and in many of these cases, surveyors inputted 8 hours for "all day." Clearly, landscapers cannot leave lawnmowers on for 8 hours a day, as they must travel from location-to-location and turn off the lawnmower when it is not in use. There was no survey question that required respondents to determine the fraction of the day that their equipment was actually "on."[7] [Footnote 7: ARB has commenced a survey of marine engine use, and has addressed this problem in the marine survey. Respondents are asked to provide information on the percent of time that their engines are "on" while they are boating.] This was a very common problem, not just for lawnmowers, but for other equipment as well. Additionally, this contemplates that the maximum hours worked per day would have been 8, when the number could actually be higher. A comparison of sample sizes and average use between our analysis of the survey data and ARB's is shown in Table 1 (521-ExhA-Docket)

| Table 1. Comparison of Equipment Sample Sizes and Activity | | | | | | |
|---|---|---|---|---|---|---|
| | Business | | Residential | | Vendor | |
| Equipment | AIR | ARB | AIR | ARB | AIR | ARB |
| | Sample Sizes | | | | | |
| Generator | 76 | 87 | 103 | 127 | 77 | 100 |
| Lawn Mower | 62 | 83 | 278 | 306 | 354 | 434 |
| Power Washer | 82 | 99 | 55 | 68 | 120 | 146 |
| Riding Mower | 3 | 4 | 3 | 7 | 71 | 96 |
| | Average Annual Use (annual hours) | | | | | |
| Generator | 103 | 167 | 11.3 | 46.2 | 69 | 66 |
| Lawn Mower | 57 | 85 | 14.8 | 18.6 | 172 | 249 |
| Power Washer | 34 | 77 | 11.0 | 29.3 | 25.3 | 30.0 |
| Riding Mower | 40 | 147 | | | 198 | 258 |

(521-ExhA-Docket)

There were many other concerns with the survey data as well which are discussed in the earlier 2020 comments by OPEI and EMA. In this section, however, we evaluated the impacts of the different analysis of the survey data on small engine inventories, both current and future. To determine the emission inventory effects of the two analyses of the survey data, we first replicated ARB's emission inventories using the "default" SORE2020 model, which ARB has made publicly available. Next, we inputted the activities shown in Table 1, and re-ran the model. Results are shown in Figure 1; "Default" means the ARB's analysis of survey data, "Survey" means AIR/OPEI/EMA analysis of survey data. (521-ExhA-Docket)

Figure 1: Total ROG+$NO_X$ Annual Emission Rates versus Activity Non-Preempted, Non-Handheld*, Baseline Scenario




(521-ExhA-Docket)

Figure 1 shows much lower small engine inventories for the more realistic activities calculated by AIR which was the main goal of the CSUF survey was to calculate a more accurate inventory of SORE emissions and modeling - than for the default ARB inventories. (521-ExhA-Docket)

Comment: CARB's analysis of the survey data severely overstates equipment use (521-ExhA-Docket)

Comment: Comment 12 – The Cal-State University – Fullerton (CSU-F) survey and CARB SORE2020 emission inventory model are the datasets at the core of the Proposed Rule. SORE2020 is used to determine emissions, cost and health benefits described in the Proposed Rule. However, the CSU-F survey, the underlying dataset for much of SORE2020, does not accurately reflect real-world SORE equipment age or use patterns. Based on unreliable and inaccurate, SORE2020 significantly overestimates the sectors emissions contributions and related emission reductions needed to meet federal air quality standards. (524-Docket)

The SORE2020 model relies significantly on telephone-based survey data collected by CSU-F's Social Research Center between 2017 and 2019 to determine product annual use (average hours/year), fleet size and age distribution. These factors are critical emissions modeling factors, and overestimates in these specific factors easily lead to overestimates of the sectors emissions. (524-Docket)

CARB staff first presented survey results in the form of the SORE2020 draft model during a CARB SORE Workshop in March 2020. During the workshop OPEI expressed concerns with the model and survey results, highlighting significant differences in past and proposed model assumptions. OPEI was provided survey data in April 2020 and immediately identified critical concerns with the survey dataset. (524-Docket)

Based on the CSU-F survey data, as well as OPEI's own survey efforts, OPEI concludes that machine use and age metrics are not commonly tracked by operators for outdoor power equipment and/or that respondents do not understand the intent of the survey is to collect equipment run-time (vs. total task time), and therefore these metrics cannot be accurately assessed exclusively by a telephone survey. Based on OPEI's close analysis of the survey data, it is apparent that CSU-F survey responses were often inaccurate guesses, misleading, based on misunderstandings of the intent of questions, incorrectly recorded, or not reflective of average product age and use ("outliers"). Given these issues, OPEI strongly recommends that staff perform additional analysis of these responses. Specifically, to resolve these concerns, an in-service data collection program must be conducted to understand the accuracy of survey responses and develop an accurate dataset which could be used for modeling and to establish rulemaking needs. Without an additional study to understand the correlation of survey responses to real-world use the benefits included in the Proposed Rule must be heavily discounted. (524-Docket)

Successful execution of the subject survey required in-depth knowledge of dozens of products by data analysts at both CSU-F and CARB, and a robust real-time quality control plan to be able to evaluate the real-world likelihood of responses. The survey datasets used to develop CSU-F's *Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations* and draft SORE2020 models suggest additional product expertise and training were needed to execute the survey and develop the SORE2020 model. The original datasets used to develop the SORE2020 draft included residential responses of chainsaws and go-karts being used 24-hours at a time, residential lawnmowers and welders being used 7 days a week 365 days a year, schools and dentist offices using portable generators 40 hours per week, 52 weeks a year, and landscapers using outdoor power equipment more than 40 hours per employee per week – sometimes more than 100 hours per employee per week. These responses, and many others like them, are not reasonable responses. (524-Docket)

Due to concerns with the survey and underlying dataset, Industry conducted a deep-dive study of the dataset. Industry employed multiple tools to review data for outliers, including product expert review, correlation (triangulation) of survey responses, and a mathematical approach know as Interquartile Range (IQR) analysis. Based on the combination of these analyses techniques, Industry identified

more than 200 potential outliers. Industry provided these outliers to CARB in June 2020. See Annex C. (524-Docket)

In response to Industry outlier concerns, CSU-F and CARB conducted limited survey quality control investigations (years after the original survey). In July 2020 CSU- F attempted to contact just three of more than 3000 respondents, and more than 200 Industry-identified potential outlier respondents. CSU-F was able to discuss responses with just one respondent. This single follow-up resulted in CARB reporting "With the assistance of SSRC from CSUF, staff was able to clearly understand those response with relatively high usages. For instance, SSRC discovered that respondent R555 owns a large, 3-acre farming property, which correlated with the high annual activity for the various equipment reported." Offering that CSU-F and CARB staff "clearly understand responses with relatively high usages"[41] after publishing reports and draft models suggesting minimal product understanding and expertise is concerning. [Footnote 41: CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020, pg 112] (524-Docket)

Finally, to OPEI's knowledge, there is no evidence of any studies to correlate survey responses to real-world equipment use – for recent or past surveys. It is OPEI's understanding that no efforts were made to visit respondents, or otherwise seek to correlate survey comprehension, or reliability of the responses, including for test surveys and a limited number of surveys conducted in-person. The responses were assumed as factual, despite dozens of responses that suggest misunderstandings of the survey questions, and/or uncertain or untruthful responses, and/or errors by the interviewer. (524-Docket)

OPEI confirms staff and industry members participated in survey questionnaire development with CARB in 2017 and 2018, and we believe this collaborative effort was helpful to develop the initial survey; however, that was Industry's only participation in the process. There was no additional training or data review/discussion until March 2020. Industry received the final survey report in November 2019, and the survey datasets themselves in April 2020. OPEI is confident had it participated in the training and test surveys along-side CSU-F and CARB staff that significant concerns could have been identified early on in the survey execution and collectively addressed. OPEI would have certainly drawn attention to test survey residential respondent R3 that reported using his lawnmower 12 hours per use and a riding mower 32 hours per year, despite having a landscaper or gardener 30 minutes per visit, and reporting several products older than 30 years old with plans to keep products for many more years (in some cases another 30 or 40 years), and reporting products to be used 12 hours per use and over 100 times per year. OPEI would have also drawn attention to R11 who provided identical age and use responses for three separate generators. A few of the outlier examples are discussed below. (524-Docket)

Example 12-1: Respondent Residential Survey Respondent 555 (R555)
R555 is single senior citizen male. The respondent reported living in a mobile or modular home with no lawn, garden or landscapable area. Despite these factors, and despite initially responding "don't know" to 55 survey questions, the residential respondent eventually reported using outdoor power equipment in excess of 125 hours/week. Responses included using one (of three) riding tractors 7 times/week for 2- 3 hours/use, two electric chain saws 7 times/week for 2-3 hours/use, and a golf car 7 times/week for 1-2 hours/use. These products alone suggest equipment use of 9 hours/day, 365 days a year. This is not realistic. In addition, the respondent reports using a second tractor 4 days a week for 2-3 hours, a third tractor for 12 hours/use, using two gas-powered chain saws "more than 2-3 days" and "couple of days" and using multiple leaf blowers and string trimmers throughout the year. R555 also suggests using multiple generators several times a week, for hundreds of hours a year. (524-Docket)

R555 is the lone respondent with whom CSU-F was able to follow-up. As a result of the follow-up CSU-F and CARB staff concluded "R555 owns a large, 3-acre farming property, which correlated with the high annual activity for the various equipment reported." In follow-up, the respondent reported for three of four generators "they are all there in case of power outages at the farm," including one generator originally reported to be used 50-70 times/year for 2-2.5 hours/use and a second generator used 3 times a week for "sometimes 5 minutes, sometimes 6 days." (The inconsistency of this response should raise concerns – How can someone operate a single generator for 6 days in a row 3 days per week?) For reasons unknown, during the July 2020 follow-up, CSU-F did not ask to confirm the riding mowers or golf car responses, despite OPEI's reported concerns. (524-Docket)

OPEI believes the July 2020 response that all three generators are used for power outages is inconsistent with the January 15, 2018, survey responses, which include one generator used 3 times/week for "varies 5mins – 6 days", a second generator used 5 times/year for 1 hour, and a third generator used 50-70 times/year for 2-2.5 hr/use. OPEI does not believe it is likely, nor would it be representative of normal homeowners to experience power outages 3 times a week, 52 weeks a year (156+ power outages a year) for prolonged periods. Nonetheless, in response, CARB randomly, without sufficient explanation of why the data was deemed inaccurate, removed only the riding tractor reported to be used 7 times a week and changed the respondent's response for the generator originally reported to be used 3 times/week for "varies 5mins – 6days." CARB staff did not redact the generator data (like they did with the riding mower), or update the data based on a new number during the July 2020 follow-up, or use the average of the R555's generator use, or use the average of the complete CSU-F dataset. CARB staff changed the response from "varies 5mins – 6days" to 2.25 hr/use, "based on the other generator usage," despite one generator being reported a 1 hr/use and one being reported at 2.25 hr/use. The change of data is random. OPEI believes it is unconventional to change a survey respondent's reply in this way. OPEI agrees the redacted / revised responses were not accurately reported or recorded, but CARB provides no rationale or data to support why these are inaccurate, why some data was redacted, and some was changed, or why other higher than average responses from R555 are held as true and correct. (524-Docket)

CSU-F provided OPEI the phone numbers of the three July 2020 follow-up respondents, including R555. OPEI was able to confirm with high confidence R555's property via an online telephone search and Google Maps.[42] [Footnote 42: OPEI was able to correlate the first name according to the CSU-F follow-up tracking file 1710SOR_2020DataConfirmation_Outcomes_7-1-20, the county from the survey dataset, and the property size reported to public records. Additionally, the several boats observed on the property in the Google Maps overhead correspond to R555 confirming he operated a marine research and development business on the property.] See Figure 12-1 below. (524-Docket)

OPEI's concerns that R555's responses are not realistic responses and are not reflective of average California homeowners are confirmed by the property view and remain unresolved by the action CARB undertook to address the outlier. First, CARB includes the 3-acre farming property with multiple structures in the residential dataset without appropriate bias adjustment. According to HomeAdvisor.com,[43] [Footnote 43: https://www.homeadvisor.com/r/average-yard-size-by-state/] California has the second smallest average property and landscapable area in the U.S. – The average California lot size is 0.17 acres with a landscapable area of 0.13 acres. R555's property, at approximately three acres is 18 times the average California property size – CARB does not adjust the results for this bias. In fact, because the respondent reported to be single and living in a mobile home, CSU-F assigned an adjustment weighting factor of 1.53 to their calculations for the number of pieces of equipment owned by this respondent. Moreover, to support the reported use, CARB suggests it's a "farming" property,[44] implying a large portion of it may be used for "farming" which would support the reported high use of outdoor power equipment. It is not. Finally, one of the

images suggests the grass is brown, dormant. It is unclear if this is summer drought conditions or winter in Shasta county (Northern California), but such conditions would not require frequent use of lawn mowers or tractors (every day or every other day), string trimmers or other similar types of outdoor power equipment reported to be used frequently. Significantly, appropriate seasonal adjustment appears to be needed. CARB denied OPEI's recommendation included in its outlier summary that seasonal adjustment may be needed based on the residents location. There is nothing that supports the collective or individual tractor use reported, annually or seasonally, or 35 hours/week of electric chain saw felling and limbing – responses which CARB staff did not redact. [Footnote 44: According to CSU-F follow-up tracking file 1710SOR_2020DataConfirmation_Outcomes_7-1-20, R555 refers to the property as "the farm".] (524-Docket)

Figure 12-1 – Arial views of R555 property (524-Docket)

The accuracy and importance of R555's responses are substantive. The residential survey resulted in just 13 gas-powered tractors reported (just 10 out of 1202 residential respondents reported owing a lawn tractor), three of which were owned by R555. Inclusion of all 3 tractors in R555's response resulted in an increase of the Annual Use (average hours/year) from a reasonable 29 hours/year average in CARB's OFFROAD2007 model to an unrealistic 145 hours/year average in the first and second CARB SORE2020 draft models. Removing R555's first tractor (7x/week, 2-3 hr/use) but inclusion of R555's second tractor (4x/week, 2-3 hr/use) results in 83 hour/years average in the published CARB SORE2020 model, nearly 4 times previously surveyed and modeled estimate of 29 hours. Exclusion of all of R555's responses would result in a more reasonable average tractor use of 46 hours/year, and decrease the residential tractor HC+$NO_X$ emissions by almost 50% versus the published CARB SORE2020 model. (524-Docket)

As a result of the collective concerns, OPEI concludes that R555 responses are not an accurate or realistic reflection of normal equipment use over any given day, week or year, and the complete R555 response should have been redacted. (524-Docket)

Example 12-2: Respondent Residential Survey Respondent 658 (R658)
Residential respondent 658 (R658) reports abnormally high use of equipment. R658 reports lawnmower use for 14 hours/week, using three gas-powered chain saws a combined 10 hours/week, a gas-powered string trimmer 4 hours/week, 2 gas-powered pressure washers a combined 24 hours/week, an electric pump 12 hours/week, and a rare gas-powered welder 42 hours/week. These products alone result in more than 106 hours/week of equipment run-time. In total, R658 reports using gas-powered equipment more than 5,400 hours/year. Regardless of the property size or features, these are not reasonable responses. (524-Docket)

R658 was the 2nd (of 3) "outliers" CSU-F attempted to reach in July 2020. Despite several attempts, and several answered calls, the respondents refused to cooperate with CSU-F staff in follow-up. Nonetheless, in response, CARB randomly, without sufficient explanation of why the data was deemed inaccurate, removed the lawnmower and welder reported being used 7 times a week. OPEI agrees the redacted responses are not accurately reported, but CARB provides no logical rationale or data to support why these are not likely correct and why other higher than average responses are true and correct, including more than 500 hours a year of chain saw use for residential purposes. (524-Docket)

In discussions with CSU-F, CSU-F provided OPEI the name and phone number of the three July 2020 follow-up respondents, including R658. OPEI was able to identify three properties that were linked to the respondent's phone number. See Image 12-2 below. One owner is reported to live at two significantly larger than average properties during the time of the survey, and a second owner is reported to live in a slightly larger than average property with minimal landscape and trees. These results pose significantly different concerns for the data. (524-Docket)


Image 12-2 – Ariel view of potential R658 properties (524-Docket)

OPEI's concerns that the R658 responses are not realistic and are not reflective of average California homeowners are confirmed by the property overhead views and remain unresolved by the action CARB staff undertook to correct the data. According to on-line telephone number searches, the first potential respondent is reported to live at the top two images during the time of the survey. These properties are 3.64 and 10.37 acres respectively, 21.4 and 61 times the average California property size. Importantly, CARB does not adjust the results for this bias. (Bias aside, OPEI does not believe more than 500 hours a year of chain saw use is reasonable for any homeowner.) The second potential respondent has a property with a lot size of 0.34 acres with 2 trees. This would not support any of the equipment use reported by the respondent, including 7 day a week walk-behind lawn mower use and more than 500 hours a year of chain saw use. The accuracy of R658's responses are critical. R658 reports the 3rd highest residential chain saw use behind only R555 (see above), and R594 (OPEI has

similar concerns with R594 reporting to use three chainsaws 200 hrs/yr each). R658's responses alone resulted in an increase of residential chain saw Annual Use (average hours/year) by 3 hours, an increase of approximately 15%. As a result, R658 is alone responsible for a 15% increase modeled residential chain saw emissions. Considering a handful of similar outliers, OPEI believes residential chain saw emissions may be overestimated as much 4 times the CARB SORE2020 modeled emissions. (524-Docket)

OPEI's concerns regarding the modeling data are not limited to residential respondent outliers. Commercial and Vendor/Landscaper responses likewise appear questionable many times. (524-Docket)

Example 12-3: Respondent Landscaper Survey Respondent 15 (V15-G2)
Vendor/Landscaper respondent 15 (V15-G2) reports abnormally high use of equipment. V15-G2 reports to be a single employee landscaper servicing 30 clients each once per week, for 2-4 hours per client – For a total of 90 hours every week. This is not reasonable or reflective of average landscapers. V15-G2 reports owning six chain saws, operating all six chain saws every day (SORE2020 assumes 6-days a week for calculations purposes) for more than an hour per chain saw (SORE2020 assumes 1.25 hour/use for "bulk" product reporting such as this), a lawnmower that they do not know how often or for how long they use, but when provided options said they use it at least once a day for 31-60 minutes per use, a string trimmer used 6 times per week for 2 hours per use, a hedge trimmer used once a month for 1 hour per use, 3 leaf blowers used at least once a week for 16-30 minutes per use. In total, V15-G2 reports 3710.09 hours of machine run-time a year, or 71 hours of run-time a week with a single employee and with just two 2-gallon gas cans refueled at least once a month but less than once a week. Based on the above responses, V15-G2 reports that the single employee businessperson is running equipment more than 10 hours per day, six days a week. (524-Docket)

These are not reasonable responses of equipment run-time, especially for chain saws (minimum 7.5 hours/day run-time every day for a single employee is not a realistic assumption for any one person, regardless of the business). Chainsaws typically have a 30-45 minute run-time on a single tank of gas,[45] [Footnote 45: SEE YouTube LINK <embedded link: https://www.youtube.com/watch?v=86qasvXzBTM&lc=UgybIqiflGQa3TP9XwV4AaABAg.9HjD_IsZyn49HjX4M-g9ys>] meaning they would refuel every chain saw at least once per day. Additionally, chain sharpening is needed between refueling to maintain saw performance, which takes time. Also, chain saw work is dirty, resulting in a lot of wood that needs to be cleared. Based on first-hand experience and studies discussed later in these comments, OPEI estimates at least half the amount of tree trimming / felling work for landscapers and homeowners can be attributed to clean-up, without consideration of splitting wood. With 7.5 hours of run-time a day, it is not unreasonable to assume 15 hours per day of just chain saw related time (including cutting and clean-up) for a single employee. The amount of gas reported similarly does not substantiate such use. It is not practical to assume the user refuels the units at the gas-station (most products are 2-cycle), and the cost of canned fuel would be an extraordinary assumption, considering they also carry gas cans. Finally, the respondent notes his wife conducts maintenance, but only reports one employee. This is inconsistent yet critically important as it relates to adjusting data for bias based on business size. (524-Docket)

The accuracy of V15-G2 and other high hour use per employee responses are significant. OPEI attempted to calculate vendor/landscaper chain saw annual use using the CSU-F weighting factors; however, as a "single employee" landscaper, V15-G2 had the highest weighting factor of 2.25, which resulted in a weighted chainsaw use of 26,654 hours per year. This is not reasonable and ruins any opportunity to address survey bias. (524-Docket)

The above examples are three of more than 200 potential "outlier" responses Industry provided to CARB in June 2020. Industry provided preliminary analyses of "outliers" in each category, including dozens in each Residential, Commercial (non- landscaper businesses) and Vendor (landscapers) categories. Unfortunately, CSU-F would not share additional residential or commercial business phone numbers with OPEI for additional "outlier" investigation which could substantiate responses. (524-Docket)

To address Industry outlier concerns, CARB staff updated some data before the published CARB SORE2020 model. OPEI commends CARB staff for its consideration of Industry data and efforts to update the model after its initial draft publications; however, OPEI remains very concerned that the final datasets and CARB SORE2020 model significantly overestimate equipment use given OPEI findings that end-users likely overestimated equipment age and use, and limited and random CARB data redaction. CARB staff decisions to remove select responses were random and inconsistent, and not based on real-world use of and/or expertise with outdoor power equipment. For example, CARB staff removed R482 lawnmower used 15 hours/use due to "atypical duration for that equipment", but left R3 lawnmower used 12 hours/use. CARB staff removed R518 chain saws used 24 hour/use, but left R284 who responded two chain saws were used 18 hours/use and 12 hours/use respectively. CARB staff removed V18-G4 (vendor/landscaper) leaf blower used 5 hours/use due to "high usage", and V138-G1 (vendor/landscaper) string trimmer used 5 hours/use due to "high use," but left many of other pieces of similar equipment reported to be used significantly longer than 5 hours/use. CARB removed several units from V362-G1 (vendor/landscaper) because inclusion of these units resulted in "the weekly operating hours highly exceeded the total employee work hours"; however, CARB provided no evidence of what expected employee work hours were, how "work hours" typically relate to equipment use (landscapers typically need time between jobs, which equipment is not operating during), or why one piece of equipment was completely removed, verses impeding a piece of data with an average, or lowering the use of all the respondents reported equipment in a way that would bring the overall equipment use below "total employee work hours".[46] [Footnote 46: 2020 Emissions Model for Small Off-Road Engines – SORE2020, Table J1 & pgs. 113-114] Similarly, CARB removed V2-G4 (vendor/landscaper) 2 hedge trimmers used once/day for 1+ hours, but left identically used hedge trimmers and leaf blowers, apparently to reduce the hours of equipment run-time per employee from 53 hours/employee to approximately 40 hours/employee. The removal of these products, versus others is random and impacts the average use of products across the dataset. Furthermore, the single employee V2-G3 reported servicing 33 clients a week for a total of 25 hours, which CARB did not account for in redacting data to result in approximately 40 hours/week/employee of equipment use. Despite removing product from V362-G1 and V2-G3 due to "operating hours highly exceed the total employee work hours", CARB made no adjustments to V15-G2 discussed above, whose responses resulted in more than 71 hours per week of equipment run-time for the single employee landscaper. While OPEI agrees a reasonable assumption for a normal work week is 40 hours, we do not believe it is reasonable to assume landscaping employees would run equipment non-stop for a full 40 hours per week. At a bare minimum, time between jobs, breaks and refueling would need to be considered. (524-Docket)

It is also unclear if when redacting ("Remove…") data CARB assumed values to be zero (0 hours), meaning the equipment was indeed real, but was not being used, or if the use was deleted all together. This is significant because assuming they still own the equipment, setting the use to zero could lower the average more than just removing the value all together. Additionally, if the units were redacted ("removed") for the purpose of determining Annual Use and age-distribution, these units should have also been removed form the CSU-F and CARB estimates for populations. Based on no changes in the populations from the May 2020 draft to the September 2020 final model, it does not appear CSU-F or CARB re-calculated fleet sizes with these units "removed". (524-Docket)

In highlighting these examples, it must be noted that CARB redacted only select responses by particular respondents, not entire respondents. In removing only select responses, CARB cherry-picked data and offered little or no rational as to why some of one individual respondent responses were redacted, while other responses for the same individual were held as true and correct, including some cases where landscaper equipment use was identical for equipment removed and equipment retained in the dataset. (524-Docket)

*Industry Follow-up with CSU-F*
On Friday November 13, 2020 and Friday, November 20, 2020 OPEI and EMA staff met virtually with the CSU-F Social Science Research Center (SSRC) Director assigned to the project to discuss development and execution of the survey. While OPEI and EMA appreciate the candid discussion with the SSRC staff, the responses highlight OPEI's concerns about the quality of the dataset and survey execution, and the use of this data to develop SORE emissions models for rulemaking purposes. (524-Docket)

During the November 13, 2020, call the Director noted responses like chain saws and go-karts being used 24 hour/use were "obvious outlier data points" and noted that it was the job the CSU-F analysis to review data for quality. The Director noted outlier data may be imputed (to the average value) or such datapoints are thrown out altogether. As previously discussed, this did not happen. No quality control was conducted until after Industry was allowed to review the data, several years after surveys were completed. OPEI is concerned as to why quality assurance and quality control of the data this did not happen earlier. Regarding accuracy of interview responses, the Director noted "sometimes people are just snarky or sarcastic, or intentionally misleading," adding that she wondered if these results should have been included in the CSU-F analysis. (524-Docket)

During the November 20, 2020 meeting, when discussing residential respondents R659 and R695, both reporting to use chain saws 24 hour per use, responses recorded within just one survey day of each other, the Director expressed concerns that the interviewer could have extrapolated "24 hrs/use" from a more general response, such as "all day." This admission was contrary to what the Director offered during the November 13, 2020 call, that interviewer extrapolation of non-specific responses (such as "I use it all day" to "8 hours" or "24 hours") would not happen, and that interviewer would have pursued more specific answers. The Director also addressed OPEI's concerns about repetitive (duplicative) responses across multiple products and questions, noting that she found the patterns that Industry pointed out "a little alarming, but not surprising as people are just trying to get though the survey as quickly as they could." The Director noted that surveys like this are prone to respondents that think "I don't want to engage in this survey," which creates a tendency of "speeders" who provide pattern non-random data. Regarding landscaper responses, the Director noted that landscapers do not appear to account lunch, time between jobs, etc. when estimating use. The Director noted that short of shadowing or tracking with a journal, an accurate collection of use data may be unfeasible. The Director responses support OPEI's conclusion that the survey responses are not reliable. (524-Docket)

During the November 20, 2020 call, the Director also discussed the quality assurance/control for conducting the survey. The Director noted they would typically look for "don't know" patterns, which she admits "got through us," and (prefaced with "this is going to kill me") outliers and missing data. Again, OPEI is concerned these practices were not followed for the survey. (524-Docket)

The Director noted that CARB staff identified no data as "problematic" as it was provided to them during the ongoing survey, during development of the CSU-F survey report, or during the

development of CARB modeling, and that no data was discarded or imputed when compiling the data. (524-Docket)

*A Better Survey Method*
In its SORE2020 model report CARB staff offered the following view regarding surveys: (524-Docket)

"Since surveys are based on the recollection of past events, another way to obtain accurate data on usage would be to install a data logger on a pool of randomly selected SORE equipment for a designated duration period and download real-word data for analysis. However, such a study would be time-consuming, labor intensive, and cost- prohibitive for a large sample size;" and
"While staff acknowledges the level of uncertainty associated with surveys, this method is currently considered the best available approach to estimate the equipment usage for the purpose of inventory development. If there are ample resources available in the future, staff may consider adding the data logger component as part of the data collection efforts." (524-Docket)

OPEI agrees that a data-collector based survey is better and necessary to accurately understand the SORE sector emissions, and in-turn accurately model emissions, cost and health benefits of any proposal. While the cost will be more, at a minimum, some data-collection is needed to understand the correlation of survey responses to real-world use. Neither CSU-F nor CARB have ever conducted such a survey response to real-world use correlation study, including question and data- collection based surveys used to develop SORE2020 and the Proposed Rule. The Proposed Rule has estimated costs and benefits in the billions of dollars, yet is based largely on a $250,000 telephone survey in which CSU-F staff raises major concerns about and CARB staff acknowledges has significant levels of uncertainty and that better survey methods exist. (524-Docket)

*Comment 12 Summary*
Based on the CSU-F survey data, as well as OPEI's own survey efforts, OPEI concludes machine use and age metrics are not commonly tracked for outdoor power equipment, and therefore cannot be accurately assessed by a telephone survey. OPEI concludes CSU-F survey responses were often inaccurate guesses, and/or misleading, and/or incorrectly recorded, and/or not reflective of average product age and use, and/or that the intent of questions was not understood, and/or not reflective of "average" California households, collectively "outliers", and in-turn require additional analyses. These "outliers" have significant impact on the calculations of annual use and age distribution, both of which lead to overestimated 'baseline' emissions if they are not accurate. Based on these unresolved outliers, SORE2020 significantly overestimates the sectors emissions contributions and emission reductions needed to meet federal air quality standards. As a result, there is no factual evidence to support that the Proposed Rule reductions are needed to address compelling and extraordinary conditions, and therefore the Proposed Rule is arbitrary and capricious or without a reasonable or rational basis. (524-Docket)

Comment 13 – CARB SORE2020 overestimates product Annual Hours (hour per year). CSU-F survey and CARB SORE2020 emission inventory model are the datasets at the core of the Proposed Rule. (524-Docket)

Comment: Annual Use is a critical emission model factor. Exhaust emissions factors are directly multiplied by the Annual Use (average number of hours of use per year, per type of equipment and application/use) to determine yearly product emissions. Additionally, both exhaust and evaporative emissions deterioration factors are determined by the number of hours equipment is operated. Consequently, overestimates in Annual Use result in greater overestimates of exhaust emissions. (524-Docket)

*OPEI Survey Correlation*
As previously discussed, OPEI concludes CSU-F telephone survey metrics, including how often and for how long equipment is used are not typically tracked for outdoor power equipment, and therefore, cannot be accurately assessed by a telephone survey. CSU-F survey responses were often inaccurate guesses, and/or misleading, and/or incorrectly recorded, and/or not reflective of average product age and use, and/or that the intent of questions was not understood, and/or not reflective of "average" California households. Based on surveys conducted, OPEI concludes survey responses are more frequently overestimates of actual age and use, and in-turn require additional analyses. For these reasons, CARB SORE2020 overestimates the sectors emissions and the benefits of the Proposed Rule. (524-Docket)

In August 2020 OPEI staff initiated an effort to better understand survey comprehension, responses, and real-world use correlation. To achieve this, OPEI approached landscapers in the field and asked them to participate in a brief survey about their equipment use. Staff identified itself as OPEI, noting that it was collecting product information to better understand equipment use. Respondents were given a $20 fast food gift certificate for their participation. OPEI asked landscapers the same CSU-F survey use and age questions for commercial riding and walk-behind mowers. OPEI focused exclusively on these equipment types because they are typically instrumented with hour meters. OPEI was able to follow-up with most landscapers several times and gather additional hour meter readings. Based on reported and confirmed equipment age and hour meter readings, and follow-up readings, OPEI was able to calculate and compare response age-hours and weekly use (hours) to survey responses to gauge respondents' understanding of the survey questions and real-world use correlation. The results are clear, respondents grossly overestimated equipment use. Given this, SORE2020 significantly overestimates the sectors emissions and the benefits of the Proposed Rule. (524-Docket)

OPEI surveyed 7 landscaping crews in Grand Rapids, MI and 2 municipalities / landscapers in California. In total, OPEI surveyed 22 commercial riding and walk-behind mowers, for which OPEI was able to conduct at least one follow-up visit for 17 of these mowers. Of the 20 units surveyed for which the hour meter was operational, the survey response age-hours (frequency of use x length of use x age) exceeded the hour meter reading on 18 units. The reported age-hours exceeded the real-world hour meter readings by thousands of hours in many cases. In the 2 cases where the hour meter readings exceeded the reported age-hours, both operators noted the units were used less frequently before providing responses, and minimally understated the use. For the 17 units for which OPEI was able to conduct follow-up inspections, where an accurate weekly use estimate could be calculated based on hour-meter readings, OPEI calculates that on average the respondents overestimated use by 135-150%,[47] or more than double the actual use hours. See OPEI Survey Results in Annex D. [Footnote 47: OPEI provides a range here because 2 units were observed being used by different crews (of the same respective companies). As discussed in the comments, surveying separate users for the same units resulted in significantly different survey response. As a result, OPEI calculated the average use considering responses for the same machine in separate calculations, using the high responses to calculate the high average of 1042 hr/year, or 152% above the hour meter average of 414 hr/year, and the low response to calculate the low average or 972 hr/year, or of 135% above the hour meter average of 414 hr/year.] (524-Docket)

It is difficult to say why use responses are so grossly overestimated. Based on the response, OPEI speculates respondents do not discern time spent between jobs, and/or on breaks, and/or time using other equipment when considering responses. In many cases, it appears they respond as if they run the subject piece of equipment the entire day, without consideration of breaks, yard preparation/clean up time, or time using other equipment. OPEI believes this could be true for

respondents of all categories considering the responses and overall high average Annual Use factors in SORE2020. A homeowner may not discern the time a lawnmower is running versus the time they are working outdoors on yardwork. This conclusion could explain why several landscaper respondents in both the OPEI and CUS-F surveys reported using equipment 5-6 days/week for 6-8 hours a day. In reality OPEI found these units were used just 5- 10 hours/week. For example, survey Landscaper1 reports using a walk-behind mower 5-6 days/week for 10 hours/day, for a calculated total of 55 hours/week. However, based on five hour meter readings between August and October 2020, the unit averaged 20.5 hours/week (the highest weekly average of all units tracked), overestimating use by almost triple. The landscaping crew that maintains municipal property in South Pasadena reports to use its ZEE ZTR a calculated total 17.5 hours/week, but based on four hour meter readings between August 2020 and September 2021, the unit averages at maximum 10.5 hours/week, overestimating use by almost double versus its survey responses. (524-Docket)

The OPEI survey correlation study yielded a few additional findings. First, when OPEI surveyed different respondents for the same units, responses were significantly different, all drastically overestimating equipment run times. For example, when OPEI surveyed a crew from Landscaper5 on September 1, the respondent reported using a walk-behind mower 6 days/week for 8-9 hours/day (51 hours/week or 1636 hours/year), but when OPEI surveyed another crew from Landscaper5 on September 22, the respondent reported using the same walk-behind mower 5 days/week for 6-7 hours/day (985 hours/year). Both respondents significantly overestimated the use based on the hour meter readings of 374 and 423 hours at the respective interview times, and based on the calculated annual use of 643 hours by extrapolation of four hour meter readings. A unit from Landscaper6 was surveyed twice with similarly inconsistent and overestimated responses. Additionally, when OPEI first surveyed Landscaper6 on September 4, the respondent offered a specific unit was "old, 2005," but his colleague interrupted offering the unit was "much newer, 2011 or 2012." These inconsistencies support OPEI's reported concerns that minutes or hours of use are not accurately tracked, and/or that the survey questions are not clear, and that as a result, the survey does not reflect real-world equipment use. Second, the responses from South Pasadena highlight concern about reported use and actual use. Specifically, the respondent stated that the ZEE riding mower (with a fixed battery system) was used 5 hours/use, but later responded that the battery lasted 3-5 hours. These responses are inconsistent and should raise questions. (For additional context, the respondent from Ojai with the same ZEE unit responded the battery lasts 2.5 hours.) This is similar to OPEI's survey outlier investigation fuel correlation which suggested insufficient fuel for the number of hours of use reported for many respondents. Third, several of the OPEI surveyed units had engine replacements. Multiple respondents offered this information without prompting, and OPEI was able to confirm several others by inspection of the emissions label. OPEI expressed this concern to CARB both before and after the survey. It is not uncommon for professional landscapers to rebuild or replace engines, especially on lawnmowers and chain saws, which in-effect resets the engine emissions to new and must be accounted for in modeling to not overestimate the sector's emissions. CARB modeling does not account for this common landscaper practice based on its survey findings. Finally, the survey questions resulted in almost every respondent providing non-specific responses at least once, including responses such as "everyday," "almost all day," or "same." This highlights OPEI's previous concern that interviewers may have been confronted by these responses frequently and may have extrapolated their own understandings of these responses. OPEI is concerned that no CARB or CSU-F training materials addressed this, and that there was no mention of non-specific responses in the survey report, despite multiple responses having unreasonable hours of use (for example residential chain saws being used 12, 16 or 24 hours per use) and many identical responses from a respondent for the same and different equipment types. Regarding OPEI surveyed units for

which respondents initially responded "same," hour meter readings always resulted in significant real-world equipment usage differences. (524-Docket)

Unfortunately, due to the COVID pandemic, OPEI was unable to conduct additional research. However, the investigation strongly supports OPEI's concerns that respondents do not accurately track equipment use in the survey terms, and consequently grossly overestimate equipment use, and in-turn equipment emissions. At a minimum CSU-F and CARB must consider additional survey correlation to understand the accuracy of survey results and the impact of survey responses on emissions modeling before proceeding with SORE rulemaking. (524-Docket)

*Additional Analysis*
To further understand real-world equipment use OPEI applied mathematical techniques and studied YouTube videos and Facebook pages for some applications. From these analyses, OPEI has determined CSU-F survey-based Annual Use averages (hours/year) are significantly overestimated and result in SORE2020 overestimating the sectors emissions. (524-Docket)

Example 13-1: Residential Lawnmowers
According to HomeAdvisor.com, California has the second smallest average property and landscapable area in the U.S. The average Californian has an average lot size of 0.17 acres and a landscapable area of 0.13 acres. Exmark Manufacturing, a leading manufacturer of lawnmowers, hosts a blog committed to productivity which includes a productivity table based on mower size, speed, and cutting area.[48] [Footnote 48: https://blog.exmark.com/2015/04/understanding-productivity/] The table reports a 21" lawnmower, at 80% cutting efficiency, at 2.0mph[49] will cut 0.34 acre per hour. At 3.0mph the 21" lawnmower will cut 0.51 acre per hour. SORE2020 estimates 45 minutes per-use for the average residential lawnmower. Comparing the productivity chart to the SORE2020 model, a 21" lawnmower at 80% efficiency will cut 0.26 and 0.39 acre respectively in 45 minutes, 2 to 3 times as much area as the average California residential property size. Based on this, SORE2020 likely overestimates average residential lawnmower use by 2 to 3 times, and in-turn overestimating the product emissions by more than 2 to 3 times. [Footnote 49: According to healthline.com, the CDC estimates the average walking speed to be 3-4 mph. https://www.healthline.com/health/exercise-fitness/average-walking-speed#average-speed-by-sex] (524-Docket)

Example 13-2: Residential Chain Saws
SORE2020 estimates the average homeowner chain saw is used 18 hours per year, 1.8 hours per use, and that each homeowner that owns a chain saw owns 1.41 chain saws. In summary, CSU-F and SORE2020 estimate that the average homeowner that owns a chain saw operates (run-time) the units for more than 25 hours per year. This is not reasonable. In comparison, OFFROAD2007 estimated a more reasonable 4 hours year use. (524-Docket)

During the pandemic OPEI conducted extensive research on YouTube to better understand chain saw use. Additionally, staff purchased 2 chain saws to understand use, felling and cutting multiple trees at a nearby 23-wooded-acre residential property. 18 or 25 hours of usage per year is not reasonable for the average homeowner. Cutting wood comes with several related tasks - cutting wood, and/or moving wood, and/or cleaning and disposing of wood, and/or splitting and stacking wood. It is OPEI's belief that many users may not differentiate these activities when responding to a question such as "how often do you use your chain saw" and "for how long each time do you use your chain saw." Users may confuse the tasks related to cutting wood with actual chain saw run-time. (524-Docket)

OPEI studied a couple that lives "off the grid" in Alaska and hosts a YouTube channel. In one episode, the couple documented its collection of firewood for the season over three days; the process of bucking (cutting), moving, splitting and stacking wood.[50] [Footnote 50: https://www.youtube.com/watch?v=9_nH1yqEtbo&t=383s] The couple cut and moved logs on day one, split logs on day two and stacked logs on day three. The result of the work was 4 cords (128 cubic feet) of cut and stacked wood, enough to last them for the year. Watching the video, based on daylight, commentary, cutting, refueling and sharpening, and moving wood, OPEI estimates approximately four hours of saw run-time, or one hour per cord of wood – for a couple that lives off the grid and uses the wood year-around for heat and cooking. (524-Docket)

OPEI additionally studied a part-time firewood business in Wisconsin that hosts a YouTube channel.[51] [Footnote 51: https://www.youtube.com/c/InTheWoodyard] In multiple episodes, the business owner reports cutting a truck load of wood, or approximately 12-13 cords, in 8-12 hours.[52,53] [Footnote 52: https://www.youtube.com/watch?v=mXSes4wPuCA&t=517s] [Footnote 53: https://www.youtube.com/watch?v=JuNu0NawKoo&t=43s] In response to one episode about firewood delivery, the host offers that his brother, who relies exclusively on a wood burner for heat in Wisconsin, uses 7-8 full cords of wood a year,[54] or approximately 7-8 hours of chain-saw run-time. [Footnote 54: See YouTube LINK <embedded link: https://www.youtube.com/watch?v=TyCCXzBzvqw&lc=UgwfKNQnggjdlztoC294AaABAg.9I0PaGTtEgN9I1zIlrDZRM>] (524-Docket)

OPEI does not believe the Alaska couple or Wisconsin wood burning stove examples are reflective of the average California household, let alone 3 to 4 times this use (25 hours per year for the average California chain saw owner) as indicated by the CSU-F survey and SORE2020. OPEI is significantly concerned about chain saw use reports from R205 (104 hours/year), R289 (285 hours/year), R500 (111 hours/year), R594 (600 hours/year), R607 (144 hours/year), R658 (520 hours/year), R855 (156 hours/year), R971 (156 hours/year), and R1086 (96 hours/year) and the impact these outliers have on the "average" use overall in the model. Additionally, OPEI believes many residential chain saws are purchased for storm clean-up, for a one-time or very limited use basis, which is not reflected in the CSU-F responses or SORE2020 average. Finally, OPEI is concerned some survey users may have properties many times larger than the "average" California landscape, and their use may not be reflective of the average homeowner with adjustment for bias. Based on the data collected, and with consideration of the average California landscape size, OPEI is concerned SORE2020 may overestimate average residential lawnmower use by four or more times, and in-turn overestimate the product emissions estimates by more than four or more times. (524-Docket)

Example 13-3: Residential Riding Mowers
SORE2020 estimates the average homeowner riding mower is used 83 hours per year. The CSU-F residential survey resulted in just 13 gas-powered tractors reported (just 10 out of 1202 residential respondents reported owing a lawn tractor), three of which were owned by R555. In comparison, CARB OFFROAD2007 assumed an average of 29 hours per year. First, OPEI is concerned such an average could be statistically relevant with just 12 tractors data (CARB removed one of R555 units). Second, inclusion of all three tractors in R555's dataset resulted in an increase of the Annual Use (average hours/year) from a previously assumed 29 hours per year average to an unrealistic 145 hours per year average in the first and second CARB SORE2020 draft models. Removing R555's first tractor (7x/week, 2-3 hr/use) but inclusion of R555's second tractor (4x/week, 2-3 hr/use) results in 83 hour/year average in the published CARB SORE2020 model – nearly three times previously surveyed and modeled estimate of 29 hours. Exclusion of all of R555's responses would result in a more reasonable average tractor use of 46 hours/year and decrease the residential tractor $HC+NO_X$ emissions by almost 50% versus the published CARB SORE2020 model. To better understand riding

mower use OPEI initiated a study of warranty analysis from major manufacturers. OPEI focused on riding equipment because it typically has hour-meters and the unit hours reported for warranty are likely more accurate. Of 216,106 50-state residential zero-turn riding mowers included, the average ranged from 36 to 80 hours/year depending on a series of reasonable averaging assumptions.[55] OPEI believes 36 to 48 hours a year reflects the most reasonable residential use assumptions. Of 201,659 50-state residential lawn tractors included, the average ranged from 36 to 60 hours/year depending on series of reasonable averaging assumptions[56]. OPEI believes 36 to 48 hours a year reflects the most reasonable residential riding mower use assumptions. Collectively, based on OPEI analysis of more than 400,000 warranty claims, an average of 40 hours a year may be more reflective of the average. Based on this, and with consideration of the average California landscape size, OPEI is concerned the SORE2020 83 hour per year average may overestimate average residential riding mower use by more than twice the real-world use, and in-turn overestimate the product emissions estimates by more than double. [Footnote 55: Residential ZTR as reported by the OEM. Since data was reported for 50-states and seasonality could not be accurately adjusted, OPEI focused on warranty claims between 11 and 13 months and 23 and 25 months. Additionally, considering reasonable use and the potential that some "Residential" units may be used for commercial products, OPEI averaged the dataset with and without units reported to be used in excess of 15 hours per month.] [Footnote 56: See footnote 55. Additionally, tractors were not subcategorized into commercial or residential for the purpose of reporting to OPEI.] (524-Docket)

Example 13-4: Wood Splitters
SORE2020 estimates the average homeowner wood splitter is used 48 hours per year. The CSU-F residential survey resulted in just one gas-powered wood splitter reported (just one out of 1202 residential respondents reported owning a wood splitter). In comparison, CARB OFFROAD2007 assumed an average of 1.1 hours per year. First, OPEI is concerned such an average could be statistically relevant with just one wood splitter data point. Second, previously mentioned studies suggest wood splitter productivity of approximately one to two cords per hour.[57] [Footnote 57: https://www.youtube.com/watch?v=fkgTpmBmd1I&t=12s] As previously noted, a couple living off the grid in Alaska uses less than four cords a year, while a homeowner in Wisconsin using a wood burner to heat his house uses between 7-8 cords a year. It is unclear to OPEI how or why the average California residential wood splitter owner could or would cut 24-48 cords of wood every year for non-income generating use. OPEI believes that 48 hours a year, based on one survey response, is a gross overestimation of average residential wood splitter use, and in-turn so are the modeled emissions. (524-Docket)

Comment: Example 13-5 Business and Landscaper Equipment Age vs Miles Comparison
Many respondents reported unrealistic equipment age-hours (age * hours/year) for products. While not exclusive to commercial and landscaper use, high age-hour responses were more common by business and commercial users. For example, V30- G1 reports four lawnmowers each with 13,104 hours, three leaf blower each with 10,920 hours and a riding mower with 10,920 hours. V115-G1 reports a lawn mower with 8,320 hours and a leaf blower with 14,560 hours. V151-G1 reports a riding mower with 18,720 hours. V174-G1 reported a lawn mower with 17,680 hours and two leaf blowers with 8,736 hours each. V196-G1 reported a lawn mower with 15,288 hours and a leaf blower with 6,552 hours. V218-G reported a hedge trimmer with 8,112 hours. V284-G1 reported 5 identical chain saws with 7280 hours each. V324-G1 reported a riding mower with 18,200 hours. V376-G1 reported two hedge trimmers, one lawnmower and two string trimmers all with an identical 10,400 hours. The LA PD reported owning a utility vehicle with 23,000 hours. There are many more examples. These are not reasonable responses. See Annex D for real-world examples of landscaper equipment age, use and hours in comparison to reported responses. (524-Docket)

To additionally understand the likelihood of commercial survey responses, OPEI evaluated the number of engine revolutions needed to reach the reported age-hours. OPEI then compared these revolutions to those of an automobile operating under average conditions for context and comparison. A string trimmer reported to be used 1820 hours (87,360,000 two-stroke engine revolutions), such as two of the three units reported by V3-G2, would be equivalent to a car running at 2400 rpm and 40 mph for 250,000 miles. The third string trimmer reported by V3-G2 at 5460 hours (2,620,800,00 two-stroke engine revolutions) would be equivalent to a car running for 1,050,000 miles. A string trimmer running 10,400 hours as reported by V376-G1 would be equivalent to a car running more than one million miles. Chain saws, leaf blowers and hedge trimmers operating at similar engine rpm ranges would result in comparable auto miles traveled. A lawnmower reported to be used for 3650 hours (744,600,000 four-stroke engine revolutions), such as the unit reported by V10-G3 would be equivalent to a car running for approximately 200,000 miles. While OPEI is aware of riding lawnmowers engines with more than 3650 hours of use, we do not believe it is reflective of the average, much like an auto of 200,000 miles is not reflective of average. A lawnmower reported to be used 11,648 hours (2,376,192,000 four-stroke engine revolutions), such as the four units reported by V89-G1 would be equivalent to a car running approximately 650,000 miles. (524-Docket)

Respondent V30-G1 reports four lawnmowers each with 13,104 hours, equivalent to approximately 750,000 car miles; three leaf blower each with 10,920 hours, equivalent to approximately 1M – 1.25M car miles (depending on if blowers are 2-stroke or 4-stroke); and a riding mower with 10,920 hours, equivalent to approximately 600,000 car miles. V30-G1 responded that they conduct maintenance "only when it stops working or breaks." These are not realistic responses. (524-Docket)

In its SORE2020 final report CARB discounts OPEI's calculations and concerns offering that the survey was "intended to collect only the most recent activity from the past year and should not be assumed constant for all previous years, as external factors may cause variations in past usage," however in the same paragraph CARB offers "as noted in Appendix E, the usage of SORE equipment varies with age, with new equipment used more frequently as compared to older equipment." These statements are contradictory to CARB discounting OPEI's age-hour calculations. If it is assumed equipment is used more in its earlier life, than OPEI's estimates of annual use x age are underestimates and therefore conservative. The examples above are minimum age- hour calculations, further supporting OPEI's concerns that responses are not realistic. Furthermore, despite stating that the survey "should not be assumed constant for all previous years" in the SORE2020 report, CARB staff later uses the data in a way identical to OPEI's analysis to determine the 75th percentile durability period of survey responses and to suggest that much higher durability periods are needed. Of course the survey would suggest that, littered with dozens of products reported to far exceed the more sophisticated automotive engine technology. (524-Docket)

Comment: Collectively, based on OPEI analyses of field units summarized in Annex D, with real-world product expertise, and with auto comparisons, it is clear that SORE2020 likely overestimates average use and age of the fleet by several times, and in-turn overestimates the product emissions estimates significantly. (524-Docket)

Comment: Comment 14 – SORE2020 overestimates product Age (year), and in-turn engine durability periods. (524-Docket)

Comment: However, the CSU-F survey, the underlying dataset for much of SORE2020, does not accurately reflect real-world SORE equipment age or use patterns. Based on unreliable and inaccurate data, SORE2020 significantly overestimates the sectors emissions contributions and emission reductions needed to meet federal air quality standards. (524-Docket)

Age is a critical emission model factor. Age represents the age of the equipment in years. Annual hours are multiplied by Age to determine how much equipment's emissions deteriorate each year for modeling purposes. The Age-based deteriorated emissions are then multiplied by the Annual Hours to determine yearly product emissions. As a result, overestimates in equipment Age result in overestimates in the aged emissions factors used to calculate annual emissions. (524-Docket)

Based on the CSU-F survey data, OPEI concludes machine use and age metrics are not commonly tracked for outdoor power equipment, and therefore cannot be accurately assessed by a telephone survey. OPEI concludes CSU-F survey responses were often inaccurate guesses, and/or misleading, and/or incorrectly recorded, and/or not reflective of average product age and use, and/or that the intent of questions was not understood, and/or not reflective of "average" California households, collectively "outliers", and in-turn require additional analysis. These "outliers" have significant impacts on the calculations of annual use and age distribution, both of which will result in overestimated emissions deterioration and 'baseline' emissions if not accurate. Based on outlier data, SORE2020 significantly overestimates the sectors emissions contributions and emission reductions needed to meet federal air quality standards. As a result, there is no factual evidence to support that the Proposed Rule reductions are needed to address compelling and extraordinary conditions, rendering the rule is arbitrary and capricious or without a reasonable or rational basis. This comment is addressed in additional technical detail in Annex E. (524-Docket)

Comment: Comment 15 — SORE2020 overestimates product Annual Use (hours per year), Age (years) and engine durability periods. In calculating emissions factors from survey data, CARB did not apply appropriate weighting factors to use and age responses to address survey bias. (524-Docket)

Survey data must be weighed to account for bias. CSU-F and CARB developed criteria to address bias and to weight survey data. OPEI is concerned that the criteria for addressing bias are unsupported and that CARB did not address bias in evaluating use and age of surveyed equipment. Consequently, the CSU-F survey and SORE2020 are not reflective of real-world average use or age. (524-Docket)

CSU-F and CARB identified two variables of interest by which data diverged for the residential survey: resident type and household size.[58] [Footnote 58: Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations, May 15, 2019, pg 393.] These criteria were used to address bias resulting from representativeness. However, no research was presented, nor does the survey support that these are the correct or necessary factors to weight residential outdoor power equipment survey responses. OPEI understands resident type plays a role, in-part, as apartment residents are unlikely to have outdoor power equipment. However, not all residential types should suggest different uses. For example, there is no evidence to suggest that a single-family home would trend differently than a manufactured mobile home and that they need different weighting. Additionally, OPEI does not believe there is significant evidence to assume the household size (number of people) influences the weight of outdoor power equipment a respondent may have. In fact, R555 discussed above, with one of the largest residential fleets, with one of the highest residential uses, has the second highest weighting factor due to reporting he was single and resided in a manufactured or mobile home. (524-Docket)

Unfortunately, property size was not considered for the residential survey and to address bias. In hindsight, OPEI believes the landscapable area of home may be an appropriate method for considering bias as it relates to many types of outdoor power equipment. For example, California has the second smallest average property (0.17 acres) and landscapable (0.13 acres) area in the U.S. It is reasonable to believe that homeowners with landscape sizes above average will use outdoor power

equipment longer than the homeowner with the average 0.13 acre. In the case of R555, CSU-F, and OPEI were able to confirm the respondent's property size of 3 acres, 18 times the average California property size. It is reasonable to believe, based on the property being a "large, 3-acre farming property," outdoor power equipment use such as lawn mowers and chain saws would be above average; however this important factor was not considered when developing the survey, including foresight into how survey bias would be addressed. The same holds true for R658 discussed above who may have resided on a 3.64 and/or 10.37-acre property, 21.4 and 61 times the average California property size, and reported chain saw use of more than 500 hours of chain saw use annually. Including property size in the survey would also have provided another opportunity for analysts to evaluate responses for reasonableness. (524-Docket)

Similarly, for the business survey response, CSU-F and CARB identified two variables of interest by which data diverged: industry and number of employees. However, there is no evidence, nor does the survey support that these are the correct and necessary factors to weight commercial outdoor power equipment survey responses. OPEI understands industry in-part plays a role; a golf course and an auto shop likely will have significantly different equipment use patterns. However, OPEI does not believe there is significant evidence to assume the number of employees influences the weight of outdoor power equipment a respondent may have. Some survey responses have high numbers of employees with no landscape area (they may be in a mall or office building), while other survey responses had small numbers of employees with significant landscape area (such as a dry storage marina). (524-Docket)

OPEI does concur that business size may be an appropriate measure of bias when surveying landscapers. It may be safe to assume a landscaper with more employees would have higher equipment use; however, the subsectors of "landscaper" should be additionally considered when considering bias. The Census definition of landscaper includes a wide range of businesses that do not likely use equipment similarly, such as a traditional yard care landscaper versus tree-trimmers vs landscape architects. If the survey responses are overrepresented with tree trimmers, it's reasonable to conclude that chain saw and hedge trimmer use may be overrepresented. These biases also need to be accounted for by CARB. (524-Docket)

While additional factors should be considered, OPEI is concerned the landscaper survey may not accurately address bias by company size. This is an important factor because according to the CSU-F survey and U.S. Census, 86% of landscapers are sole proprietorships (single employee businesses) and survey data must be weighted appropriately. According to survey results, just 32.9% of those surveyed were sole proprietorships, and 67.1% were businesses with employees. As a result, a weighting factor of 2.25 was applied to sole proprietorships. However, in the SORE2020 report, CARB staff discounted OPEI's concerns about the number of hours of equipment use per employee for some landscapers stating "business owners may hire part-time workers as the work load fluctuates based on a growing season." This is a major concern for OPEI as explained in Comment 12. (524-Docket)

Comment: The accuracy of the employee response for V15-G2, who reported to be a single employee but also reported his wife conducts his equipment maintenance, is substantive in this regard. OPEI attempted to calculate chain saw annual use using the CSU-F weighting factors; however, as a "single employee" landscaper V15-G2 was assigned the highest weighting factor of 2.25, and the weighted use of their 7.5 hours per day, every day, of chain saw use resulted in 26,654 weighted hours per year. This is not reasonable and eliminates the opportunity to address survey bias based on this reasonable factor. Had V15-G2's wife or any part- time employees been included in the weighting, the weighted results would have been significantly different. (524-Docket)

Finally, CARB did not address bias in its calculations of annual use or age- distribution. Setting aside OPEI's concerns about bias and weighting factors selected by CSU-F and CARB, and outliers, survey data must be adjusted for bias. There is no evidence that CARB surveys have ever been adjusted for appropriate and/or reasonable bias. As a result, all survey work and resulting models must be considered with extreme caution. However, outliers must be appropriately addressed, including concerns in use, age, and number of employees before weighted calculations can be computed. (524-Docket)

Comment: Comment 18 – CSU-F Survey does not adequately take into consideration seasonal use of products. Furthermore, SORE2020 applies seasonal use factors. As a result, SORE2020 overestimates Annual Hours and Summer emissions. (524-Docket)

The CSU-F survey included many responses of residents, commercial businesses and landscapers using products every day, several times a week, every week or every month. While these response may reflect general annual use trends for some products and for some portions of the state, other products and portions of the state likely require adjustment for seasonal use. For example, respondents in Northern California counties reported using lawnmowers every day or every week, despite Northern California experiencing seasonal trends which would not require lawnmower use. (524-Docket)

There were no survey questions regarding seasonal use. Nevertheless, some respondents qualified responses by noting responded use seasonal. Residential respondent R672 reports using 2 leaf blowers once a week for 30 minutes each, however reported "it depends on the seasons when the equipment its used." Commercial respondent C1303 reports using an air compressor every week but also reports the business is seasonal (6 months a year). Vendor/Landscaper respondent V379 reports using multiple product 5 times a week, however reported "(use) responses depend upon the seasons/seasonal. For example: string trimmer, hedge trimmer – these are used mostly during winter." V500 reports five chain saws are used every day and another three are used at least once a month, however reported "this business is only open for seven months of the year, so all questions are in regards to the seven months span (the business) is open." Despite these hints, no seasonal-use adjustments were made to the survey dataset. As a result, SORE2020 Annual Use, and in-turn emission deterioration rates, are likely be overstated with bias towards year-round use. (524-Docket)

Comment: In addition to not accounting for seasonal bias in survey responses, SORE2020 increases "Summer" use and emissions estimates by a factor of approximately 1.1 for many equipment types. Both assumptions that survey responses of every week, multiple times a week, or month are accurate, AND assuming use is greater in the summer cannot be true. CARB may ignore seasonal use in survey responses, OR it may adjust for seasonal use in modeling, but it cannot do both. Ignoring seasonal use in survey responses, while at the same time adjusting the model for "summer" seasonal use results in significant overestimates of the SORE sector emissions. CARB must address seasonal use in survey responses and/or remove season use factors from SORE2020 to accurately reflect Annual Use and deteriorated emission estimates. (524-Docket)

Setting the aforementioned concerns aside, OPEI is interested in further understanding how CARB determined seasonal use factors for SORE. OPEI believes the most populated portions of the state experience a similar climate year-round, and as a result equipment use may be consistent year-round. However, considering drought and rain trends, the "grown seasons" (highest use, if there is any need for adjustment), may not correlate to "summer" months. Additionally, OPEI believes some equipment, such as commercial air-compressors and generators use would be consistent year- round. (524-Docket)

Comment: **Imprecise CARB 2020 Emissions Model -** Generac feels the assertion of a 19% emissions contribution from portable generators is inaccurate due to CARB's imprecise data model. The statewide phone survey failed to distinguish between portable and stationary generators by asking only if the respondent owned at least one "generator". The CARB model concluded the California fleet of portable generators to be about 25% greater than the best industry data of ~1.5mm (Portable Generator Manufacturer Association 2018 survey). With proper modeling, the emission reductions needed to meet the State Implementation Plan is obtainable with EFI, closed-loop feedback, and aftertreatment. Such reductions will not only allow meeting the SIP, but also allow use of spark ignited portables beyond 2028. (527-Docket)

Comment: WPGA respectfully asks that CARB: Re-evaluate data used for this regulation that overestimates both the population of spark- ignited portable generators in California and their associated emissions; (539-Docket)

Comment: **1. CARB's Inventory Model Does Not Reflect True SORE Emissions**
CARB's estimated SORE population is based on fundamentally flawed and inadequate data from a survey conducted on CARB's behalf by California State University - Fullerton (CSUF) to support the update to CARB's SORE Emissions Inventory and Model. More specifically, CARB contracted with CSUF to conduct a "phone survey" to update the SORE emissions inventory and model in 2017. CARB staff selected a phone survey with the supposed objective of obtaining "real world" data, rather than expanding on CARB's previously-conducted field study, which actually metered equipment usage, in order to obtain a larger in-use data set. (528-Docket)

Reviewing just one example illustrates the problem with the survey. Respondent 555's improbable responses were largely ignored by staff, but those responses had a significant impact on the survey results. This respondent's total equipment usage defied reality, reporting greater than 9 hours per day for 365 days per year. This respondent also originally answered the survey as being a single male living in a mobile home with no landscapable area. However, the data generated from this response drove an increase in riding tractor usage from 29 hours/year in the OFFROAD2007 model to 83 hours/year in the CARBSORE 2020 Model. (528-Docket)

Air Improvement Resources (AIR), jointly contracted by OPEI and EMA, reviewed the data collection process and quality assurance / quality control ("QA/QC") process conducted to support this rulemaking. Through this review, AIR identified multiple issues that call into question the reliability of the survey, including deviations from the CARB/CSUF contract relating to QA/QC procedures and insufficient response rates. (528-Docket)

Comment: The proposed rule is rooted in flawed data. For example, the underlying survey and model assumes the average household that owns a chainsaw owns 1.41 saws and operates them more than 25 hours per year. That's equivalent to approximately 37 to 50 full tanks of gas every year, and on average enough firewood to fill a 1.5 car garage every year, 57 percent of those saws modeled in LA, San Diego, Orange, Riverside, Santa Clarita, and San Bernardino counties, some of the most densely populated areas of the U.S. This is not reasonably modeled product use or emissions for South Coast and neighboring air districts. (3039-Oral Testimony)

**Agency Response:**

These comments present a criticism of the SORE2020 emissions inventory model and the CSUF survey and recommend an alternative to the Proposed Amendments. The commenters suggest that CARB should not use some of the data collected in the CSUF survey to estimate

emissions with the SORE2020 inventory model and that CARB should reevaluate the SORE2020 emissions inventory model to lower the emissions inventory. CARB disagrees with the assertions that SORE2020 includes data that should be excluded and that the CSUF survey is fundamentally flawed. The CSUF survey was conducted following generally accepted protocols for phone survey administration and sufficient sample sizes were achieved to obtain a 95% confidence level with a margin of error of ±3.5 points [CSUF SSRC, 2019[77]].

The CSUF survey was conducted by the Social Science Research Center (SSRC), a nonprofit organization at California State University, Fullerton. SSRC was established in 1987 to provide research services to community organizations and research support to university faculty. SSRC has extensive experience conducting telephone surveys of this type. SSRC offers the expertise of full-time research scientists and high-quality research services utilizing state-of-the-art hardware, software, and methodology. SSRC conducts mailed, telephone, and web-based surveys, evaluation research, and needs assessments, and ensures the development of linguistically and culturally appropriate research instruments and methods. SSRC has experience conducting surveys for clients spanning a diverse range of fields, including healthcare, environmental justice, public safety, immigration, education, and housing initiatives. The SORE survey conducted by SSRC for CARB was done in accordance with standard best practices for telephone surveys.

SSRC staff conducting interviews were extensively trained [CSUF SSRC, 2018a[78] and 2018b[79]]. The staff conducted pilot studies which were used to practice data collection and evaluate the survey tools before conducted the rest of the survey [CSUF SSRC, 2018c[80]].

The commenters state their opinions and conclusions about the validity of certain survey responses and reiterate information they submitted following a SORE2020 emissions inventory workshop [OPEI, 2020[81]]. Commenters mention information such as their warranty analyses and surveys but do not provide the complete data for those studies. They make claims based on information they have but do not provide evidence to support their claims for CARB's consideration.

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[77] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

[78] CSUF SSRC. 2018a. Social Science Research Center New Hire Training Guide. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF). December 5, 2018.

[79] CSUF SSRC. 2018b. Social Science Research Center Shift Supervisor Training Manual. Prepared by CSUF SSRC. September 24, 2018.

[80] CSUF SSRC. 2018c. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Household Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. December 12, 2018.

[81] OPEI. 2020. OPEI Comments to CARB 6/9 Potential SORE Regulations Workshop. Letter from the Outdoor Power Equipment Institute (OPEI) to the California Air Resources Board (CARB). June 30, 2020.

In response to statements such as, "Some answers given by people surveyed were obviously inaccurate but were still included in the survey results,": The commenters' opinions are not sufficient evidence to exclude specific responses from the data used to develop SORE2020. The commenters express their doubt that certain respondents would use equipment as they reported to CSUF but do not demonstrate that the respondents do not use their equipment as reported to CSUF. Extensive use or use of equipment in ways the commenters believe to be unusual or unlikely do not provide a basis to exclude responses. The activity or annual hours of operation of off-road equipment may vary by equipment type, horsepower and occupational sector. In the SORE2020 emissions inventory model, activity is calculated from the CSUF survey [CSUF SSRC, 2019[82]]. The equipment activities calculated for SORE2020 are similar to the activities that were used by CARB in OFFROAD2007 and by the U.S. EPA in the NONROAD model [CARB, 2020[83]]. The commenters provide no evidence that the activities used in SORE2020 are unreasonable.

The commenters also assert that some respondents are not "average" for California, either because of their equipment use or property size or other parameters. The commenters state opinions regarding the potential inclusion of survey respondents with larger than average properties but do not provide evidence to support their claims. When using randomly-sampled data, individual respondents are not expected to be precisely average. Rather, the sampled data are expected to represent the full range of the whole data set (in this case, SORE equipment in the state of California). Some respondents live on large properties and use their SORE equipment frequently, as would be expected in a state with diversity of properties and land types, such as California [CSUF SSRC, 2019[84]]. Comments regarding the time it takes to mow a lawn are speculative and do not demonstrate that respondents provided inaccurate responses for the amount of time they use their lawn mowers.

CARB carefully reviewed data that OPEI, EMA, and AIR claimed were "outliers," which were submitted to CARB after the SORE2020 emissions inventory workshop in 2020 [OPEI, 2020[85]]. The outlier analysis performed by OPEI, EMA, and AIR was inappropriate for the CSUF survey data set. The outliers were determined using the interquartile range (IQR) method, which

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[82] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

[83] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[84] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

[85] OPEI. 2020. OPEI Comments to CARB 6/9 Potential SORE Regulations Workshop. Letter from the Outdoor Power Equipment Institute (OPEI) to the California Air Resources Board (CARB). June 30, 2020.

assumes that data are distributed according to a normal distribution [Howell, 2010[86]], also known as a bell curve. Normally distributed data can be described by their average and a measure of their dispersion: a standard deviation. Data are distributed symmetrically around the average with fewer data points occurring farther from the average. With the average and standard deviation, one can predict the proportions of data that should fall within specific ranges. For example, approximately 95 percent of the data should be contained within two standard deviations of the average, and approximately 99.7 percent of data should be contained within three standard deviations of the average. Assuming that data are normally distributed, the IQR method identifies data points as outliers if they are sufficiently unlikely to occur because they are too far from the average. Further explanation of normal distributions, descriptive statistics, and other statistical methods, including those used in development of the SORE2020 emissions inventory model can be found in *Statistical Methods in Psychology* [Howell, 2010[87]]. Statistical methods used in development of the SORE2020 emissions inventory model can be found in the SORE2020 inventory report [CARB, 2020[88]].

The CSUF survey data are not normally distributed, which makes the IQR approach invalid [CSUF SSRC, 2018[89], 2019a[90] and 2019b[91]]. The CSUF survey data have boundaries at zero—neither the number of pieces of equipment nor minutes of use can be negative—which prevents the data from being symmetrically distributed. Therefore, the IQR method should not be used [Hubert and Vandervieren, 2008[92]; Seo, 2006[93]]. Because many respondents are at the boundaries (i.e., they have zero pieces of equipment) the boundary plays an important role in the distribution of the data. Beyond violating the assumption of symmetry, the concentration at zero biases the estimate of dispersion for the portion of the distribution above zero since users with zero equipment have, by definition, no dispersion. Even once the so-called

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[86] Howell, David C. 2010. *Statistical Methods for Psychology, Seventh Edition*. Belmont, California: Cengage Wadsworth.

[87] Howell, David C. 2010. *Statistical Methods for Psychology, Seventh Edition*. Belmont, California: Cengage Wadsworth.

[88] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[89] CSUF SSRC. 2018. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Household Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. December 12, 2018.

[90] CSUF SSRC. 2019a. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Vendor Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. May 10, 2019.

[91] CSUF SSRC. 2019b. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Business Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. May 30, 2019.

[92] Hubert, Mia, and E. Vandervieren. 2008. An adjusted boxplot for skewed distributions. Computational Statistics & Data Analysis, 52(12), 5186-5201. DOI: 10.1016/j.csda.2007.11.008.

[93] Seo, Songwon. 2006. A review and comparison of methods for detecting outliers in univariate data sets. Master of Science Thesis, University of Pittsburgh.

"outliers" are removed, the remaining data do not fit a normal distribution. This finding is in line with expectations for the data given the circumstances: many people are expected not to have or use equipment, while others are expected to be heavy users. There is no way for a user to be the symmetric counterpart to a heavy user. Instead, the data are expected to have many who never use equipment and several users who are far above the average.

High values in the CSUF survey data represent actual responses and should not be considered outliers solely because they are larger values than those reported by most respondents. Because the CSUF survey data are not normally distributed, the inappropriate IQR analysis resulted in OPEI, EMA, and AIR only excluding data on the high end of the distribution for equipment number and use time. No data on the low end appear to be outliers due to the boundary of zero. Given the concentration of responses at zero, the IQR method could only result in excluding data that contribute to higher emissions in the emissions inventory. The commenters do not provide evidence to suggest that respondents are more likely to overestimate the number of pieces of equipment they use or their use of equipment than they are to underestimate. The commenters suggest overestimates from respondents contribute to an overestimation of emissions with SORE2020. Underestimates from respondents would contribute to an underestimation of emissions with SORE2020.

The IQR is a useful method for identifying outliers when data are normally distributed. The data from the CSUF survey are not expected to be normally distributed and empirically are not normally distributed even after removing data identified as outliers by the IQR method, violating the core assumption of the method. The typical concerns regarding outliers that the IQR method is intended to address was mitigated by survey design, in which respondents were unable to report excessively high usage. Instead, the IQR method applied to this setting results in the exclusion of high, yet reasonable, data points being removed to achieve lower estimated emissions than the full data set indicates.

Despite these shortcomings in the OPEI, EMA, and AIR analysis, CARB staff evaluated every data point posed as an outlier by OPEI, EMA, and AIR in their 2020 letter [OPEI, 2020[94]] and followed eight steps, including reviewing OPEI's claims, checking the county the respondent resides in, looking at other characteristics of businesses or landscapers, and synthesizing all data using good engineering judgement, to decide whether to exclude each point in the data used for inventory development [CARB, 2022[95]]. The reason for exclusion of each data point was provided in the SORE2020 report [CARB, 2020[96]]. The reasons for not excluding other data questioned by OPEI, EMA, and AIR are specified in "Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI." [CARB, 2022[97]].

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[94] OPEI. 2020. OPEI Comments to CARB 6/9 Potential SORE Regulations Workshop. Letter from the Outdoor Power Equipment Institute (OPEI) to the California Air Resources Board (CARB). June 30, 2020.

[95] CARB. 2022. Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI. Microsoft Excel workbook prepared by staff of the Air Quality Planning and Science Division. March 2022.

[96] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[97] CARB. 2022. Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI. Microsoft Excel workbook prepared by staff of the Air Quality Planning and Science Division. March 2022.

The commenters have not submitted substantial evidence to demonstrate that survey responses used in the development of the final version of SORE2020 should be removed. Watching YouTube videos and analyzing Google Earth views of respondents' properties do not present evidence sufficient to exclude responses from use in the inventory development because it is not information that can verifiably refute survey respondents' answers to survey questions. Rather, such information merely presents SORE equipment user scenarios that may be possible, but do not supplant the direct evidence received from the survey respondents' explanation of their actual experience in using their SORE equipment.

In response to comments regarding the potential lifetime use of equipment: These comments present criticism of the CSUF survey and claim that it overestimates lifetime equipment use. The commenters mischaracterize the survey data. The survey and SORE2020 do not determine lifetime equipment use, which the commenter refers to as "equipment age-hours," for individual units, as the commenters suggest. The comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. A commenter's expression of an opinion that the responses are not reasonable is not evidence that responses are inaccurate or should be excluded from the analysis of equipment use in California.

In response to comments regarding weighting of survey responses: Commenters offer criticisms and state opinions regarding CARB's weighting of survey data but do not provide evidence to support their claims. The commenters suggest that CARB should have used different weighting factors for calculating population from the CSUF SSRC survey results [CSUF SSRC, 2019[98]]. CARB disagrees with the commenters' conclusions. CARB made no change based on these comments.

CSUF weighted residential responses by property type and household size. CARB weighted the data by geographic area and property type. From the SORE2020 technical document (Appendix A), "staff assessed that a revised weighting method should be utilized to take into account geographical areas separated by northern, central/upper, and southern portions of the state. As a result, in the SORE2020 Model, geographical weights are used to proportionally reflect the higher concentration of households primarily in the northern and southern regions of the state, as compared to the rural regions of central and upper region, with regions defined in the SORE2020 technical report [CARB, 2020[99]]. The data obtained from the surveys are further aggregated by respondent dwelling: single family residence (SFR) or non-SFR (apartment/condo/town house/mobile home). In addition, single family homes are distinguished from apartment/condo dwellings as a weighting factor, due to the greater likelihood of possessing small engine equipment." [CARB, 2020[100]]. CARB's reweighting of the

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[98] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

[99] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[100] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

data results in populations within the 95 percent confidence interval of CSUF SSRC's results. OPEI presents no data showing the populations derived by CARB or CSUF are inaccurate or that the weighting is inappropriate.

CSUF weighted responses in the landscaper survey depending on whether a landscaping business had employees. Weighting the survey responses makes the landscaper survey results more representative. CARB used the same weighting factor as CSUF for the SORE2020 inventory model [CARB, 2020[101]]. OPEI provides no evidence that the weighting used by CSUF and CARB is inappropriate or that other weighting factors would result in a more accurate equipment population.

CSUF weighted the results of the business survey by industry and number of employees. Weighting the survey responses makes the business survey results more representative. CARB used the same weighting factors as CSUF SSRC for the SORE2020 inventory model [CARB, 2020[102]]. OPEI provides no evidence that the weighting used by CSUF and CARB is inappropriate or that other weighting factors would result in a more accurate equipment population.

In response to comments about the amount of time an engine is running: CARB disagrees with commenters' assertions that the survey questions were flawed. The commenters do not provide evidence that survey responses regarding use time were generally inaccurate, that respondents generally misunderstood their use of equipment, or that respondents were more likely to overestimate than to underestimate their equipment use time. One commenter states, "Clearly, landscapers cannot leave lawnmowers on for 8 hours a day," and, "Additionally, this contemplates that the maximum hours worked per day would have been 8, when the number could actually be higher." CARB agrees that some landscapers may work more than 8 hours in a day. The commenter's expressions of opinions and beliefs do not demonstrate that a landscaper could not use a lawn mower for 8 hours per day. Comments about a marine engine survey are beyond the scope of the Proposed Amendments. The commenter does not demonstrate that a question about marine engine use indicates a flaw in the CSUF survey or that use of marine engines and use of SORE are comparable. For example, marine vessels may use sails in addition to propulsion engines, or may drift without the use of propulsion engines at times. The commenter does not provide information, and CARB does not have information, to suggest SORE equipment is operated with the engine not running.

In response to comments regarding seasonal use of equipment: These comments suggest that the CSUF survey does not adequately account for seasonal use of equipment and that CARB should remove any seasonal adjustment from the inventory model. CARB disagrees with commenters' statements that the SORE2020 emissions inventory model overestimates emissions due to seasonal adjustment factors. The commenter does not provide evidence that the assessment of equipment use or the seasonal adjustments in SORE2020 results in the overestimation of SORE emissions.

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[101] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[102] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

The CSUF survey did not ask users how often they use their equipment in each season in separate questions. Respondents answered the question, "On average, how often is this piece of equipment used at your location throughout the year?" when describing their use of equipment. Respondents may use some equipment more during some seasons than others. By providing responses about their average use throughout the year, respondents accounted for seasonal variability.

The seasonal factors in the SORE2020 model come from the previous SORE emissions inventory model, OFFROAD2007. OFFROAD2007 seasonal use inputs were obtained from a research report done for CARB in 1997 by Energy and Environmental Analysis Inc. [Energy and Environmental Analysis, 1997[103]]. Seasonal factors appropriately adjust responses that are based on average use throughout the year to account for variable use throughout the year. The commenters' expressions of its beliefs and speculative statements do not provide evidence to support a change in seasonal factors.

In response to the statement, "OPEI agrees that a data-collector based survey is better and necessary to accurately understand the SORE sector emissions," and similar comments regarding the potential use of data loggers to estimate equipment use: CARB did not make such a statement. CARB disagrees with the commenter's statement. A data logger study could provide a different source of data, but not necessarily better data. The commenter does not provide evidence to support its conclusions that a data logger study would be better or necessary. The commenter does not demonstrate that a data logger study with sufficient sample size to be meaningful would be practical. To have a 5 percent margin of error and 95 percent confidence interval from a data logger study of household equipment use, equipment from at least 385 households would have to be equipped with loggers [NBRI, 2022[104]; Rea and Parker, 2014[105]]. This assumes there are 14 million households in California and a 50 percent distribution. A 50 percent distribution is the most conservative choice when the distribution of data is unknown [Hazra and Gogtay, 2016[106]]. A larger sample would actually be required to account for any missing data. Similar sample sizes would be required for studies of businesses and landscapers. It is not known what the prevalence of missing data or malfunctions would be in a data logger study. Moreover, installing data loggers on all of the equipment from 385 randomly selected households and hundreds of businesses and landscapers may be so time-

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[103] Energy and Environmental Analysis. 1997. Documentation of Input Factors for the New Off-Road Mobile Source Emissions Inventory Model. Report prepared by Energy and Analysis, Inc., for the California Air Resources Board. February 1997.

[104] National Business Research Institute. 2022. Sample Size Calculator. Available at: https://www.nbrii.com/sample-size-calculator/. Last accessed: May 16, 2022.

[105] Rea and Parker. 2014. Designing and Conducting Survey Research: A Comprehensive Guide, Fourth Edition. Louis M. Rea and Richard A. Parker; Wiley. "Determinants of Sampling Accuracy", pages 163-166. September 2014.

[106] Hazra and Gogtay. 2016. "Biostatistics Series Module 5: Determining Sample Size." Indian Journal of Dermatology 61(5). DOI: 10.4103/0019-5154.190119.

consuming as to significantly delay completion of the survey. An extended delay could jeopardize achievement of emission reductions and attainment of NAAQS.

The SORE2020 emissions inventory model was developed based on the best available data at the time of development. Given that no licensing or registration is required for SORE equipment, a survey is the best method to obtain a comprehensive estimate of the population and use of SORE equipment in California. Surveys have been used in development of prior inventories of SORE emissions [e.g., CARB, 2018[107]] and in development of many other inventories [e.g., AACOG, 2013[108]; ATB, 2017[109]; EHP&A, Inc., 1997[110]; TERI, 2022[111]]. In development of the SORE2020 inventory, CARB staff asked stakeholders, including OPEI, for any data they thought could enhance the accuracy of the inventory model. OPEI declined to provide data that CARB could use. As described in Chapter X.A of the ISOR, meetings of the SORE Working Group were held to get feedback on the survey questions. OPEI participated in those meetings. At each stage of the survey, all parties were invited to give feedback on the questions to be asked, and the survey questionnaires were improved as a result. In their response, OPEI presents no substantive evidence that the survey yielded inappropriate data for emissions inventory development. OPEI also provides no substantive evidence to support its assertions that, "survey responses were often inaccurate guesses, and/or misleading, and/or incorrectly recorded, and/or not reflective of average product age and use, and/or that the intent of questions was not understood, and/or not reflective of "average" California households..."

Annex D in OPEI's comments, titled "(Comment 13) OPEI Landscaper Survey Analysis," includes a table titled "OPEI Landscaper Survey & Tracking August 2020 - October 2021." The table includes responses from municipal grounds crews in California and landscapers in Michigan to questions OPEI asked regarding the number of mowers the respondents owned,

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[107] CARB. 2018. 2012 California Survey of Residential Lawn and Garden Equipment Owners: Population and Activity. Prepared by staff of the Air Quality Planning and Sciences Division. Revised October 1, 2018.

[108] AACOG. 2013. Commercial Lawn and Garden Emission Inventory. Technical Report. Alamo Area Council of Governments; Natural Resources/Transportation Department (AACOG). December 31, 2013. Available at: https://www.aacog.com/ DocumentCenter/View/36123/Commerical_Lawn_and_Garden_Report_123113---PDF?bidId=. Last accessed: May 2, 2022.

[109] ATB. 2017. Challenges of Inventory Preparation: Activity Data, Emission Factors and Models. Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB). Presented by Professor Dr. Barbara Amon at the International Symposium on Emissions of Gas and Dust from Livestock, EmiLi 2017. May 22, 2017. Available at: https://colloque.inrae.fr/emili2017_eng/content/download/4097/44257/version/1/file/B_Amon_inventories_EMILI2017.pdf. Last accessed: May 2, 2022.

[110] EHP&A, Inc. 1997. Guidance for Estimating Lawn and Garden Equipment Activity Levels; Volume IV, Chapter 3. Prepared by E. H. Pechan & Assoc., Inc. (EHP&A) for U.S. Environmental Protection Agency, Mobile Source Committee Emission Inventory Improvement Program. September 1997. Available at: https://www.epa.gov/sites/default/files/2015-08/documents/iv03.pdf. Last accessed: May 2, 2022.

[111] TERI. 2022. Catalogue of Indian Emission Inventory Reports. The Energy and Resources Institute (TERI) and Environmental Defense Fund. January 2022. Available at: https://www.globalcleanair.org/files/2022/01/Indian-Emission-Inventory-Report_DIGITAL-FILE.pdf. Last accessed: May 2, 2022.

how often the respondents use the mowers, the mowers' ages, how many months per year the respondents mow, and how long batteries last. The table includes calculated annual and lifetime use of mowers ("equipment age-hours," as described in this Agency Response), and mower hour meter readings recorded by OPEI.

In response to the statement, "The results are clear, respondents grossly overestimated equipment use. Given this, SORE2020 significantly overestimates the sectors emissions and the benefits of the Proposed Rule," and similar statements: The commenter relates anecdotal information and discusses some of its observations from its Annex D but does not provide sufficient information about its survey to support its assertions. CARB cannot rely on the information provided in these comments. The data the commenter discusses and the commenter's speculations do not constitute evidence that the CSUF survey is inaccurate or inappropriate for use in estimating the SORE emissions inventory. There is also no indication that OPEI complied with the same survey quality assurance standards employed by CSUF in its SORE survey. [CSUF SSRC, 2018[112]] The data do demonstrate significant use of SORE riding mowers, in many cases well beyond the longest potential emissions durability period of 1,000 hours for the engines used in these riding mowers. The commenter's data also suggest landscapers use SORE riding mowers 419 hours per year on average, significantly higher than the 246 hours per year in SORE2020. The commenter has provided comments that suggest SORE are used well beyond their emissions durability periods and significantly more extensively than the estimate in SORE2020, which contradict the commenter's comments claiming engine use and emissions deterioration are overestimated in SORE2020 (refer to, e.g., the Agency Responses in section IV.A.14.1 and IV.A.14.2). The commenter's contradictory claims and anecdotal data do not support the claim that SORE2020 overestimates emissions.

In response to the statement, "the survey questions resulted in almost every respondent providing nonspecific responses at least once, including responses such as "everyday," "almost all day," or "same." This highlights OPEI's previous concern that interviewers may have been confronted by these responses frequently and may have extrapolated their own understandings of these responses. OPEI is concerned that no CARB or CSU-F training materials addressed this, and that there was no mention of nonspecific responses in the survey report, despite multiple responses having unreasonable hours of use (for example residential chain saws being used 12, 16 or 24 hours per use) and many identical responses from a respondent for the same and different equipment types.": The commenter speculates regarding CSUF interviewers' reactions to hypothetical responses to questions but does not provide evidence to support these claims or speculations. CARB disagrees with the commenters' claims and speculations.

In response to comments regarding industry stakeholder input on the CSUF survey and discussions between CSUF and OPEI: These comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. The comments include expressions of the commenter's opinions and conclusions but do not include evidence to support those opinions or conclusions. The expertise of OPEI was not needed in training

[112] CSUF SSRC. 2018. Social Science Research Center New Hire Training Guide. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF). December 5, 2018.

SSRC staff. SSRC staff is trained to ask questions in exactly the same way each time. As the new hire training guide states, "Telephone interviewing is a scientific procedure. As data collectors, we deliver a stimulus (the question) to interviewees and they, in turn, provide a response. With this in mind, it is important that we deliver the stimulus consistently and in the same manner every time an interview is conducted. Standardizing questionnaire administration produces clean data. Asking questions in different ways introduces bias." [CSUF SSRC, 2018[113]]. Industry expertise would only serve to introduce bias into the way data is collected.

The commenter describes a conversation with SSRC and states the commenter's opinions, speculations and conclusions. These do not demonstrate that the CSUF survey was insufficient or inappropriate. The commenter does not offer an alternative to the CSUF survey, either. The CSUF survey is the best source of data to estimate population and use of SORE in California. In response to comments regarding quality assurance, quality control, and draft or interim survey reports: The commenters offer opinions regarding their assessments of work performed by CSUF and CARB, stating, for example, "no QA/QC was performed" and "no interim data reviews were performed nor were any interim reports issued" but do not offer evidence to support those claims. CARB disagrees with the commenters' statements and conclusions.

In response to the statement, "Third, in the SSRC Survey Report dated May 15, 2019 ("SSRC Survey Report"), Table 50 shows that 16.6% of generators owned by households are not used at all. Inexplicably, the model does not include these generators in the analysis of duration of use. This led to the estimated emissions of portable generators in California being higher than they otherwise would have been": This comment does not request a change to the Proposed Amendments. The commenter provides no evidence to support its claims. CARB made no changes based on the comment. The SORE2020 emissions inventory model does account for the 16.6 percent of generators that are not used. The generator activity calculation included 125 gas generator and 21 of them had zero activity. The 21 generators with zero activity account for 16.8 percent of the 125 used in calculating generator activity.

In response to the statement, "Fourth, in the SSRC Survey Report, Table 52 shows that 39.4% of generators owned by households are at least ten years old. This is not aligned with the assumed life of portable generators in accordance with EPA durability guidelines on end of life (40 CFR §1054.107). In addition, according to the 2018 PGMA survey, the estimated average useful life of a portable generator, defined as the number of years it takes for 50% of a particular model year to be out of the market (i.e., no longer operating) is 6 years. This led to the estimated emissions of portable generators in California being higher than they otherwise would have been,": This comment does not request a change to the Proposed Amendments. CARB made no change based on this comment. This comment seems to suggest that CARB should decrease the lifetime of generators used in the SORE2020 emissions model. The commenter does not provide evidence to support its conclusions or demonstrate that the lifetime of generators in SORE2020 is overestimated. CARB disagrees with the suggestion that the lifetime for generators used in the SORE2020 emissions model should be decreased. The CSUF survey report included sufficient respondents to obtain a 95 percent level of confidence

[113] CSUF SSRC. 2018. Social Science Research Center New Hire Training Guide. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF). December 5, 2018.

[CSUF SSRC, 2018[114]]. Using data from the CSUF survey, the SORE2020 emissions inventory model has a median generator lifetime of 7 years. This is not substantially different from the average useful life of 6 years presented by PGMA. The useful life period for meeting exhaust emission standards in 40 CFR §1054.107 is a requirement for engine manufacturers and does not determine the actual lifetime of generators in California. Generator owners are not required to stop using their generators at the end of an emission compliance period.

In response to the statement, "Based on no changes in the populations from the May 2020 draft to the September 2020 final model, it does not appear CSU-F or CARB re-calculated fleet sizes with these units "removed",": The commenter suggests that the fleet size in the SORE2020 emissions inventory model should be recalculated after some responses on use time were removed from the model. The commenter provides no evidence that a response that has been removed should be assigned an annual use time of zero. CARB disagrees with the commenter's statements and conclusions. CARB did not recalculate the fleet size due to the removal of data points in the equipment activity calculation. The commenter does not provide evidence that the removal of a small number of equipment would change the 95 percent confidence interval of the population for a specific type of SORE equipment. CARB made no change based on this comment.

In response to comments regarding the population of generators: The comments suggest that CARB should reduce the number of SORE generators included in the SORE emissions inventory. CARB disagrees with statements that suggest the number of generators included in the SORE emissions inventory is overestimated. In OFFROAD2007, the prior version of the SORE emissions inventory, the total number of generators was underestimated, as it was approximately equal to the number of new generator sales reported for one model year under Production Line Testing (PLT) Reports [CARB, 2022[115]]. That would imply that nearly all generators would be taken out of service every year and replaced with new generators. The total population of generators in SORE2020 is higher than in OFFROAD2007 and is a reasonable estimate from annual sales of generators from the 2018 PLT Reports, 231,454 new SORE generators, and the median lifetime of a generator, 7 years. Together, they result in a total population of 1,620,178 SORE generators in 2018, which is close to the 1,639,897 SORE generators included in the SORE2020 emissions inventory model. The CSUF survey was more comprehensive in its assessment of SORE population in California, reaching a wider spectrum of businesses and assessing population of more equipment types than previous surveys of SORE in California. This resulted in a more comprehensive estimate of SORE population in California when using SORE2020 than with OFFROAD2007.

In response to the statement, "According to a PGMA survey conducted in late 2018, the portable generator population in California is estimated to be 1,556,667 units. Thus, the CARB model estimate represents 25% more units when compared to the PGMA data. This potential overestimation of portable generator population likely corresponds to an overestimation of associated emissions as well,": The commenter does not provide the details of its 2018 survey

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[114] CSUF SSRC. 2018. Technical Support Document: Telephone Survey of SORE Population and Usage in California, Household Survey Results. Data prepared for CARB and the California Environmental Protection Agency by CSUF SSRC. Workbook prepared by CARB staff. December 12, 2018.

[115] CARB. 2022. Technical Support Document: Model Year 2018 Small Off-Road Engine Generator California Production Volume Based on Production Line Testing Reports, Redacted. Summary table prepared by staff of the Monitoring and Laboratory Division. March 2022.

to support its claims. It is unclear whether PGMA included zero-emission generators in their survey. The SORE2020 emissions inventory model includes a SORE generator population of 1,639,897 in 2018, which is 5 percent higher than PGMA's estimate. The additional 307,291 electric generators in SORE2020 do not contribute to emissions and may account for the majority of the difference in population between SORE2020 and PGMA's survey.

In response to statements about the question "Do you own at least one generator?": The introduction provided by interviewers at the beginning of the survey included the statement, "This survey takes about 15 to 20 minutes to complete and consists of questions about your household's use of lawn and garden as well other types of outdoor power equipment." [CSUF SSRC, 2019[116]] The commenter does not provide evidence to suggest that survey respondents would be misled by this question. The commenter does not provide evidence to suggest that survey respondents would consider stationary generators to be lawn and garden equipment or outdoor power equipment. CARB does not have evidence to suggest that survey respondents would be misled by this question or consider stationary generators to be lawn and garden equipment or outdoor power equipment.

In response to the statement, "With proper modeling, the emission reductions needed to meet the State Implementation Plan is obtainable with EFI, closed-loop feedback, and aftertreatment. Such reductions will not only allow meeting the SIP, but also allow use of spark ignited portables beyond 2028,": The Proposed Amendments do not preclude the certification of SORE after MY 2027. Emission reduction credits may be used to certify SORE after MY 2027. Some engine families currently use electronic fuel injection, closed-loop feedback, and aftertreatment. Manufacturers may continue to use these technologies in the future. As described in Chapter IV of the ISOR, the Proposed Amendments will enable emission reductions that exceed the expected emission reductions from SORE in the 2016 State SIP Strategy and result in lower overall emissions from SORE.

Please refer to the Agency Response in section IV.A.10 for discussion of comments that mention CAA or claim the Proposed Amendments are arbitrary and capricious.

Please refer to the Agency Responses in other subsections of IV.A.14 for additional discussion of comments related to the CSUF survey and its use in the development of SORE2020.

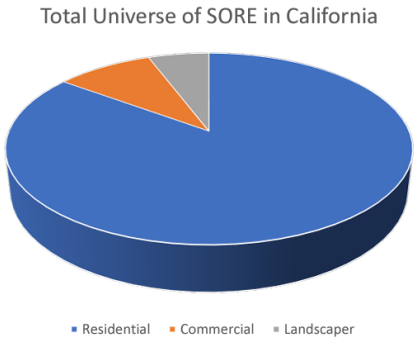
### A.14.5.2. Professional-grade Equipment

Comment: CARB relied upon a survey conducted by California State University of Fullerton (CSUF) to compile a large portion of their data. Within this survey it was concluded that only 3% of chain saws, 3.5% of lawn mowers, 0.3% of riding mowers, and 5.9% of trimmers used by professional landscape companies in California are ZEE, compared to over 50% for residential homeowners. (533-Docket) (533-AppA-Docket) (542-Docket)

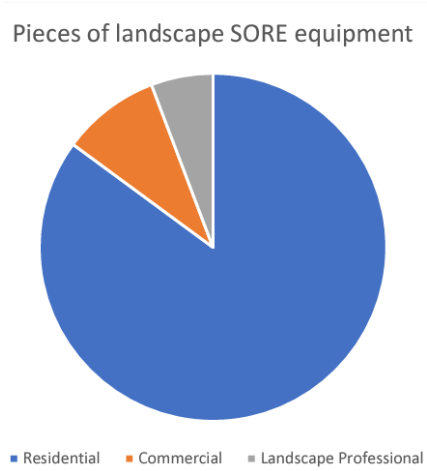
Comment: According to the CSUF survey the current universe of SORE in the state of California that is gas powered and needs to be transitioned out is 12,813,596. Of this number 10,902,041 (85%) is

[116] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

used by residential while the remaining 1,911,555 (15%) is used by businesses and landscape professionals. Further looking at the data only 738,875 (6%) of existing non-ZEE SORE is used by the landscape industry. Of the 15 % of non-ZEE SORE used by commercial businesses we recognize a small percentage may not be commercial/professional grade equipment. Despite asking CARB directly, a determination of the amount of commercial/professional grade equipment is not available, but it is certainly LESS than 15% of all the non-ZEE SORE in California today. (533-Docket) (533-AppA-Docket) (542-Docket)




(533-Docket)




(542-Docket)

Comment: Sandra Giarde here with the California Landscape Contractors Association. Eighty-five percent of SORE landscaping equipment is used by residential users according to Cal State Fullerton. The remaining 15 percent is used by various businesses across our state, schools, golf courses, local governments, theme parks, and yes, landscape professionals. (3037-Oral Testimony)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. These comments discuss the commenters' assessments of the portion of SORE equipment and ZEE that are professional-grade or used by professional users in California. The following provides responses to and clarification for the comments.

Residential- and professional-grade equipment may be purchased or used by any user. The SORE regulations do not require professional users to purchase or use professional-grade equipment. While professional-grade equipment may not be as large a portion of all SORE equipment in California as is residential-grade equipment, it is often used much more frequently. For example, the average lawn mower owned by a resident is used 19 hours per year, while a lawn mower owned by a landscaper is used for an average of 240 hours per year [CARB, 2020[117]]. Therefore, while equipment owned by landscapers may be less numerous than equipment owned by residential users, it has an outsized influence on total emissions from SORE.

[117] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

### *A.14.6. Small off-road equipment market trends*

Comment: CARB staff are also inconsistent in their use of ZEE market-penetration estimates depending on the point they wish to put forth. On the one hand, the ISOR includes numerous statements regarding the growing market penetration of ZEE products in the SORE segment as evidence for a feasible rapid transition to ZEE products - - a transition that has already taken place in for multiple products in the SORE segment, and which will continue, without any regulation. And yet, staff also have taken the position that additional regulation is required in order to force the transition of the market to ZEE. CARB cannot have it both ways. In that regard, the 2020 SORE Emission Inventory and Model are overly conservative in their estimates of SORE-product ZEE penetration rates based on current market data. The AIR Report provides a more realistic analysis of the anticipated emissions inventory reductions that will occur without any additional regulatory action. (521-Docket)

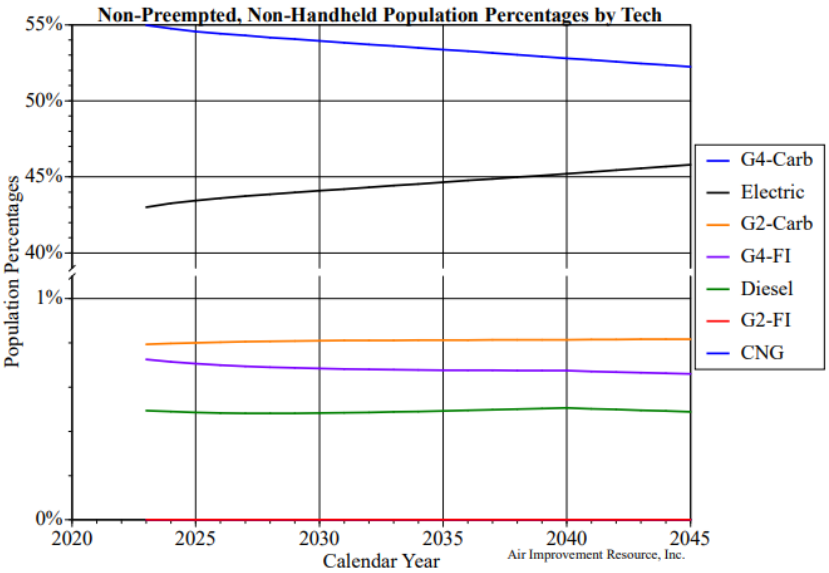
Comment: CARB's predictions of electric equipment penetration for non-handheld equipment for the baseline case appear to be overly conservative. (521-ExhA-Docket)

Comment: 3. CARB's predictions of the penetration of electric equipment for the baseline case appear to be overly conservative. (521-ExhA-Docket)

Figure 6 shows the penetration of electric equipment predicted by the SORE2020 model for non-handheld, non-preempted equipment for the 2023 to 2045 calendar years. The figure shows that the current electric percentage is about 43%, with growth over the next 22 years of only about 3%. This seems to be a very conservative projection for the baseline. The lower this projection is, the more benefit ARB can claim for its SORE regulation. There is little justification for this low of an electric fraction increase for the baseline in the SRIA or the ISOR based on the information provided in the Staff Report and SRIA, industry data provided by OPEI and publicly available data. (521-ExhA-Docket)

Comment: Figure 6
Non-Preempted, Non-Handheld Population Percentages by Tech

Figure 6




(521-ExhA-Docket)

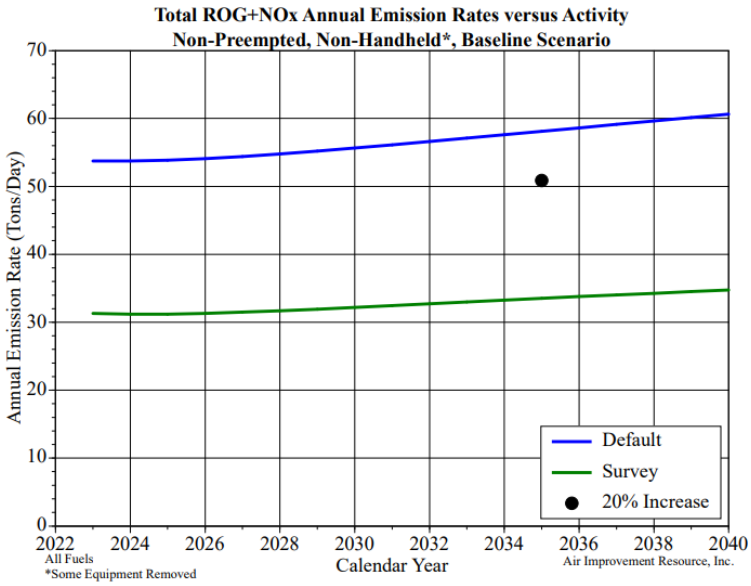
Electric equipment can be either corded or battery-powered. CARB staff do not expect much growth in corded electric equipment. However, for battery powered equipment and projected battery costs in the baseline, CARB staff cite a 2019 study by Bloomberg that indicates that battery costs will drop from $131 per kw-hr in 2021 to $70 per kw-hr in 2030.[11] [Footnote 11: Amendments to the Small Off-Road Engine Exhaust and Evaporative Emission Regulations, Standardized Regulatory Impact Assessment (SRIA), ARB, September 20, 2021, page 41.] CARB also indicates that some ZEE equipment would have lower cost than SORE equipment. If these projections are true, it should result in further battery-powered electrification of non-handheld equipment types under the baseline scenario. (521-ExhA-Docket)

AIR evaluated a sensitivity case where we assumed that the electrification of non- handheld equipment would grow to be 20% higher than CARB staff estimates in 2035 in the baseline case. In this modeling, we used CARB's default activity estimates. Results are shown in Figure 7. The baseline inventory for 2035 drops from about 58 tpd to 51 tpd. (521-ExhA-Docket)

Comment: Figure 7
Total ROG+$NO_X$ Annual Emission Rates versus Activity, Non-Preempted, Non-Handheld*, Baseline

Scenario

Figure 7




(521-ExhA-Docket)

Comment: The baseline emission inventory does not include sufficient electrification in the future (521-ExhA-Docket)

Comment: Comment 5 – The Proposed Rule and SORE2020 emissions model suggest gas- powered equipment sales will remain flat through 2040, that ZEE will only continue to increase marginally to accommodate the change in housing percentage, and consequently, SORE sector emissions will not decrease. These assumptions are contrary to market statistic facts which reflect a substantial increase in ZEE purchases, and a resulting decrease in SORE sector emissions. As battery technology continues to advance and develop, consumers are purchasing ZEE in record numbers, and those trends are expected to continue for applications where today's ZEE technology meets user needs. As a result, ZEE growth is significantly underestimated, and the long-term gas-powered equipment fleet is significantly overestimated, resulting in substantial overestimates of sector emissions in SORE2020 and reductions achieved by the Proposed Rule. (524-Docket)

Comment: The rulemaking Standardized Regulatory Impact Assessment (SRIA) suggests: "Further deployment of ZEE is not expected to occur without the Proposed Amendments. Without further regulation, the SORE equipment population is projected to be higher in 2043 than it is in 2021".[18] [Footnote 18: SRIA, pg 10]. Market statistics data collected by OPEI do not support this claim. Increased ZEE demand was one key factor in record industry sales in 2020. (524-Docket)

Comment: Despite peaks in 2020 due record product demand during the COVID pandemic, shipment trends for gas-powered walk-behind mowers, handheld leaf blowers, and trimmers / brushcutters slope significantly downward, while percentage of ZEE equipment shipments generally continue to rise. See Figures 5-1 to Figure 5-4. Residential ZEE walk-behind mowers accounted for just 6% of products shipped in 2014 but will exceed 36% of products shipped in 2021. The handheld leaf blower category is already 80% ZEE. Chain saw shipments do suggest gas-powered equipment sales may continue to increase, although there were consecutive years of diminishing gas-powered chain saw shipments prior to the COVID pandemic, and the data does not differentiate between chain saws under 45cc within CARB SORE scope, versus over 45cc and federally exempted from CARB

regulations.[19,20] [Footnote 19: The market data presented in these comments is based on OPEI's "Market Statistics" program which collects national shipment data from its member original equipment manufacturers. The leading OPEI Market Statistics program is more than 20 years old. Using a third-party to protect the confidentiality and security of the data, members report their U.S. shipments of industry products every month, which OPEI's third-party then aggregates to publish timely monthly market data reports. In the case of most domestic OPE categories, OPEI members and the aggregated data represent between 85-100% of the U.S. market. With consideration of OPEI member reported data, and offset factors for volumes not represented by the association and/or in the reporting program, OPEI adjusts U.S. market shipments for the purpose of quarterly industry forecasting. The totals and percentages included in the above tables are taken from these OPEI forecast projections. As a general matter all such data is the express copyright of OPEI, proprietary to member companies, and not available to the public.] [Footnote 20: The data provided in the charts represents products sales on a 50 statewide basis. Figures specific for California ZEE sales as compared to SORE products are likely even higher than the nationwide average.] (Additional analysis would be needed in this category to fully understand how to update models and rulemaking assumptions appropriately.) Importantly, all products exhibit trends of increasing penetration of ZEE through 2021 and beyond. These trends towards ZEE are significantly different that the 2018 Freedonia Group estimates outlined in the CARB SORE2020 report, which include an estimate of just 13% ZEE walk-behind lawnmower market share, and flat from 2007 to 2022.[21] [Footnote 21: CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020, September 2020, Figure 6, pg. 22] (524-Docket)

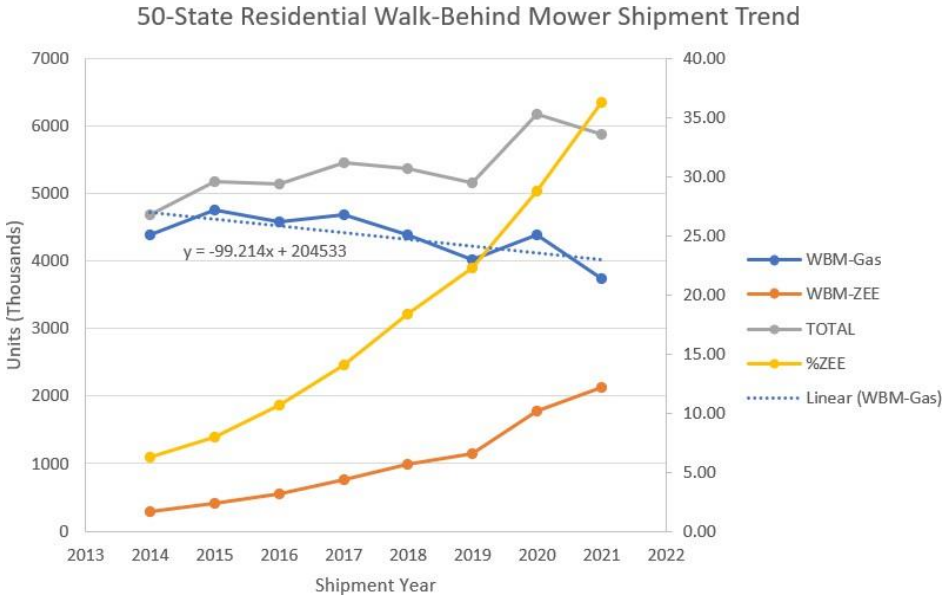



Figure 5-1 – 50-State Residential Walk-Behind Mower Shipments, 2014-2020. 2021 is forecasted as of September 2021. ZEE% is on the secondary (right) Y-Axis. (524-Docket)

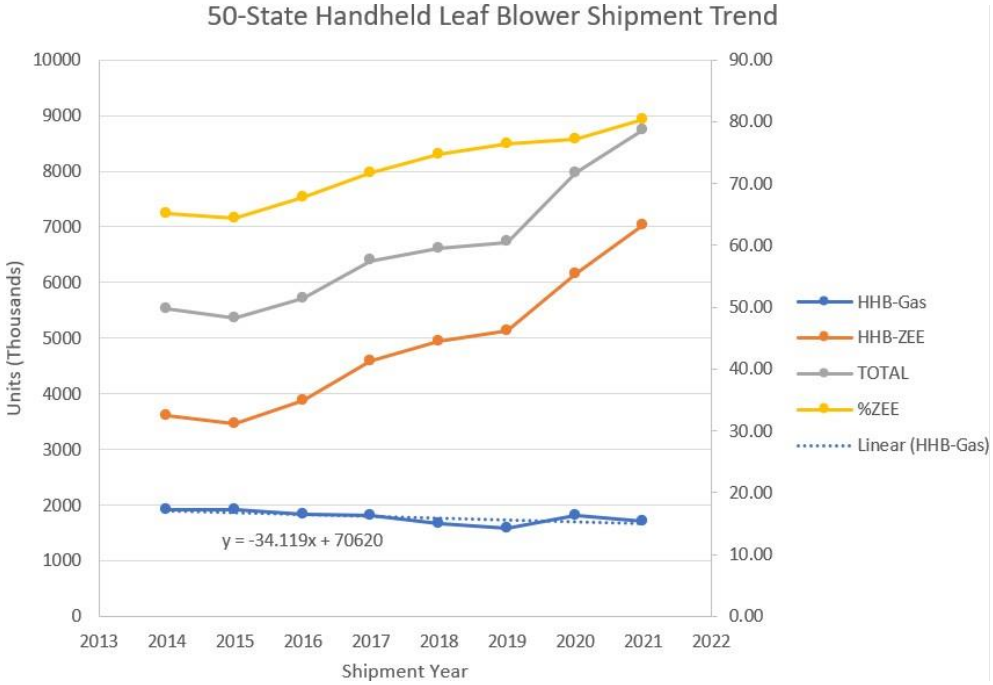



Figure 5-2 – 50-State Handheld Leaf Blower Shipments, 2014-2020. 2021 is forecasted as of September 2021. ZEE% is on the secondary (right) Y-Axis. (524-Docket)


Figure 5-3 – 50-State Handheld Trimmer / Brushcutter Shipments, 2014-2020. 2021 is forecasted as of September 2021. (524-Docket)

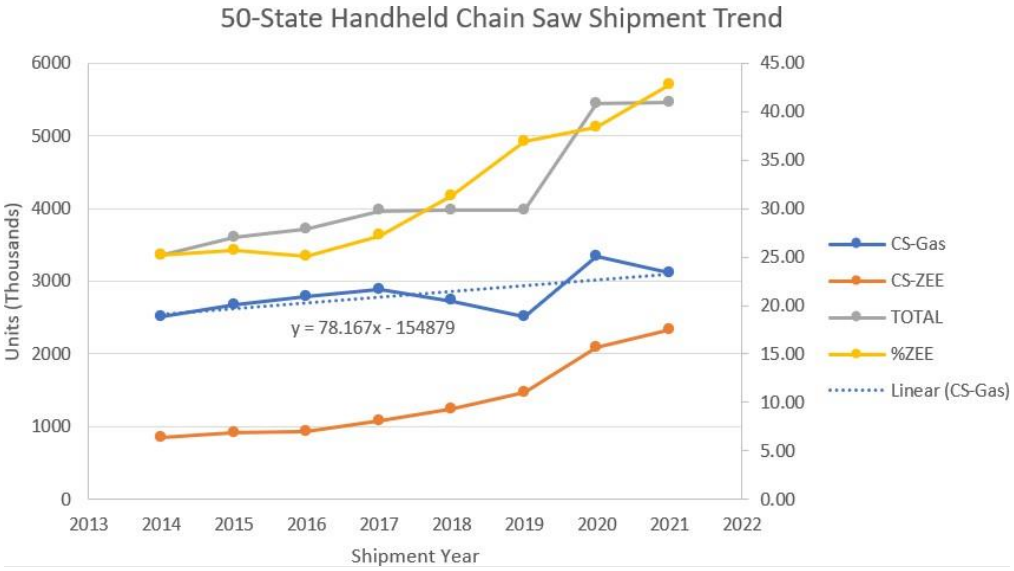



Figure 5-4 – 50-State Chain Saw Shipments, 2014-2020. 2021 is forecasted as of September 2021. ZEE% is on the secondary (right) Y-Axis. (524-Docket)

Comment: The assumptions included in the Proposed Rule and SORE2020 are also contrary to manufacturer 50-state EPA Production Line Testing reports. At OPEI's request, EPA provides OPEI annual PLT estimated U.S. directed engine production summaries. Total and handheld engine sales exhibit negative trends from 2016 to 2020. See Figure 5.5. (524-Docket)

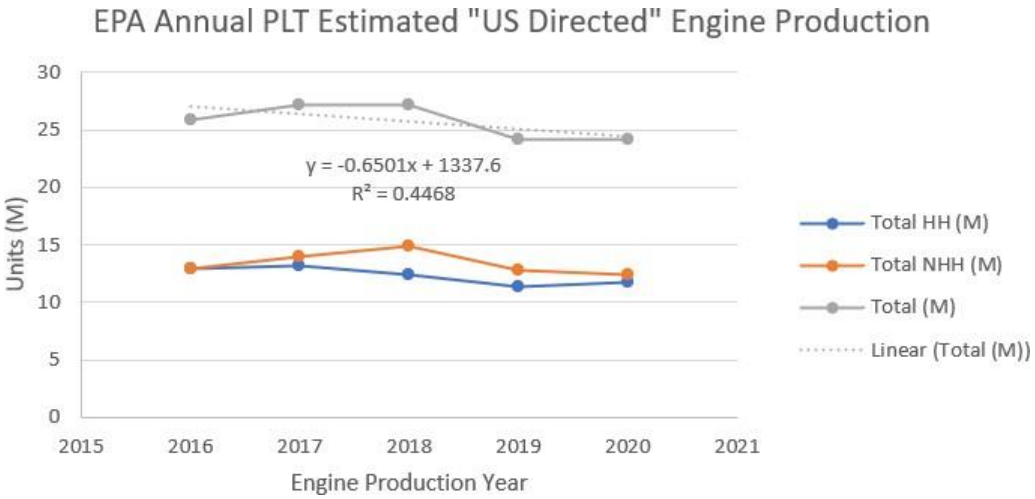



Figure 5-5 – EPA Annual PLT Estimated U.S. Directed Engine Production (524-Docket)

**Agency Response:**

These comments do not request changes to the Proposed Amendments but do include the commenters' criticisms of CARB's analyses. The commenters discuss their members' data and include graphical representations of nationwide sales trends for SORE equipment, rather than California-specific sales. The commenters do not provide sales data for SORE in California, but speculate "Figures specific for California ZEE sales as compared to SORE products are likely even higher than the nationwide average." The commenters do not provide evidence to support their claims and concede that the alleged data supporting their claims is not public information. The unsupported statements regarding ZEE sales information provided by

commenters do not demonstrate that the data CARB used for SORE population and sales in California, which take into consideration manufacturers' sales reports for California [CARB, 2020[118]], are inaccurate. Commenters make unsupported claims about likely future sales trends for SORE equipment and ZEE and state their opinions that emissions from SORE and emission reductions from the Proposed Amendments are overestimated but do not provide evidence to support those claims.

Population estimates in SORE2020 are based on the CSUF survey, production line testing (PLT) reports from MYs 2002 through 2018, and MY 2018 SORE evaporative emission control system production volume reports. PLT data provided to CARB from manufacturers have both U.S. and California production volume. PLT data do not indicate which equipment type each engine is installed in, but manufacturers list the possible equipment types, as discussed in page 20 of SORE2020 technical document [CARB, 2020[119]]. Analysis of PLT data from MYs 2012 through 2018 suggests that handheld engine production volume has been steady and production volume of engines for nonhandheld equipment (lawn mowers, generators, compressors, and pressure washers) is increasing.

CARB used the market research report from the Freedonia Group to project trends in electrification, as described in the SORE2020 report on page 22 [Freedonia Group, 2018[120]; CARB, 2020[121]]. The Freedonia Group report was published in 2018, so newer data may show different trends; however, the report was the best available data on electrification at the time of development of SORE2020.

In response to the statement, "CARB staff are also inconsistent in their use of ZEE market-penetration estimates depending on the point they wish to put forth…CARB cannot have it both ways," and similar statements: The commenters express opinions regarding statements in the ISOR. The commenters do not provide evidence that an increase in sales of ZEE in California would correspond to an equivalent decrease in sales of SORE equipment in California or that sales of SORE in California will decrease without further regulation. In the SORE2020 emissions inventory, CARB staff assumed that all growth in the handheld lawn and garden equipment came from greater adoption of ZEE [CARB, 2020[122]]. This is consistent with OPEI's 10-year shipment history shown by Melka [2019[123]], which shows constant shipments of gasoline-powered handheld equipment in the U.S. CARB disagrees with the commenters'

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[118] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[119] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[120] The Freedonia Group. 2018. Power Lawn & Garden Equipment. Industry Study #3674. September 2018.

[121] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[122] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[123] Melka, Brian. 2019. Presentation to OPEESA. March 4, 2019.

conclusions. Emissions from SORE in California are determined by the population and use of SORE in California, not by sales of ZEE.

Please refer to the Agency Response in section IV.A.10 for discussion of comments claiming the Proposed Amendments are arbitrary and capricious. Please refer to the Agency Response in section IV.A.14.1 for additional discussion of comments related to EMA's Exhibit A, which the commenter refers to as "the AIR Report."

## A.15. Environmental analysis

Comment: Sixth, CARB's reliance on the 2016 Environmental Assessment for the State Implementation Plan is not supported because CARB has a significant amount of new, specific information it needs to analyze to support the broad conclusions in that document. (515-Docket)

Comment: **VI. CARB's Reliance on The 2016 EA Is Not Supported and CARB Should Undertake Additional CEQA Review**
CARB is relying on the Final Environmental Analysis for the Revised Proposed 2016 State Strategy for the State Implementation Plan ("2016 EA") to support adopting the Proposed Amendments. But the new specificity of the Proposed Amendments raises substantial evidence that there will be impacts not addressed in the 2016 EA and the impacts that were addressed may be substantially more severe. (515-Docket)

The 2016 EA was explicit that additional CEQA review would occur when specific regulatory actions are taken to reduce criteria air pollutants:

> "The level of detail in this Final EA reflects that the State SIP Strategy is a broad program; consequently, **the analysis does not provide the level of detail that will be provided in subsequent environmental documents prepared for specific regulatory actions that ARB or other agencies may decide to pursue to reduce criteria air pollutant (CAP) emissions** (Cal. Code Regs., tit. 14, § 15152.) As ARB pursues regulations to implement any of the measures discussed in the State SIP Strategy, **each regulation would go through a project-specific environmental analysis**, and, as part of the Administrative Procedure Act (APA) process, a rigorous public review process."[37] [Footnote 37: 2016 EA, at p. 3 (emphasis added).]

The ISOR includes no critical analysis to determine the environmental impacts associated with these specific Proposed Amendments. One of CEQA's basic purposes is to inform government decision-makers and the public about the potential significant environmental effects of proposed projects[38] and to disclose to the public the reasons for approval of a project that may have significant environmental effects.[39] Courts have repeatedly stated that informed decision making and public disclosure are fundamental purposes of the CEQA process.[40] CARB has far more information available to it today (e.g., the SSRC Survey data) that it could use to more precisely analyze potential impacts of the Proposed Amendments compared to the broad and high-level analysis associated with the 2016 EA. [Footnote 38: 14 Cal Code Regs §15002(a)(1).] [Footnote 39: 14 Cal Code Regs §15002(a)(4).] [Footnote 40: See Union of Med. Marijuana Patients, Inc. v City of San Diego (2019) 7 Cal.5th 1171, 1184; Friends of the Eel River v North Coast R.R. Auth. (2017) 3 Cal.5th 677, 711; California Bldg. Indus. Ass'n v Bay Area Air Quality Mgmt. Dist. (2015) 62 Cal.4th 369, 381; Citizens of Goleta Valley v Board of Supervisors (1990) 52 Cal.3d 553; Laurel Heights Improvement Ass'n v Regents of Univ. of Cal. (1988) 47 Cal.3d 376; No Oil, Inc. v City of Los Angeles (1974) 13 Cal.3d 68.] (515-Docket)

Comment: The entire extent of the analysis in the 2016 EA for what environmental impacts would arise from a compliance measure to "increase the penetration of zero-emission technology" was as follows: "Reasonably foreseeable compliance responses under this measure would include an increase in manufacturing, production and use of zero-emission technology in small off-road engines. This could require the construction or modification of associated manufacturing facilities to increase the supply of zero-emission technology for small off- road engines, including battery electric- powered equipment. Increased demand for lithium batteries could increase production, along with associated increases in lithium mining and exports from source countries or other states would be anticipated. Disposal of any portion of vehicles, including batteries, would be subject to, and be in compliance with existing laws and regulations governing solid waste, such as California's Universal Waste Rule (Cal. Code Regs., tit. 22, Chapter 23). That is, disposal of used batteries into landfills is prohibited; however, they could be refurbished or re-used. To meet an increased demand of refurbishing or reusing batteries, new facilities, or modifications to existing facilities, are anticipated to accommodate battery recycling activities. Turnover may result in recycling or selling old equipment."[41] [Footnote 41: 2016 EA, at p. 36.] This cursory analysis of potential impacts is nowhere near the level of detail required to adopt specific regulations such as the Proposed Amendments. Below are just a few of the potential environmental impacts that the 2016 EA did not address that are relevant to CARB's decision to adopt the Proposed Amendments. (515-Docket)

Comment: 1. Air Quality Impacts
The 2016 EA does not include any accounting for people holding on to gas powered equipment for longer than they currently do, thus undercutting air quality benefits touted by the regulation. Further, there was no critical analysis about how individuals will respond to these regulations. For instance, will they run their cars/trucks to charge batteries instead of buying additional batteries? This is clearly a foreseeable result of the Proposed Amendments as many people will have their SORE equipment with them away from their homes and grid power. When people idle their cars for the sole purpose of charging their ZEE equipment, there will be additional pollution. Additionally, it is very likely that many consumers will choose to travel to nearby states to purchase spark- ignited portable generators. Therefore, new spark-ignited portable generators will still be coming into the state even after the phase out of California sales. These emissions were not accounted for in the 2016 EA nor the ISOR. (515-Docket)

Comment: 2. Energy Use
The 2016 EA does not analyze the potential energy impacts of the Proposed Amendments. CARB staff issued a "Technical Support Document" that purports to analyze the potential increase in electricity demand from added charging requirements for ZEE SORE equipment ("Electricity Demand Support Document"). However, this document was not a CEQA document and does not analyze the issue from a CEQA perspective. The CEQA Appendix G thresholds of significant ask whether the Proposed Amendments would "conflict or obstruct a state or local plan for renewable energy or energy efficiency?". The Electricity Demand Support Document concludes that by 2043, when 99 percent of small off-road equipment subject to the SORE regulations would be ZEE, there would be an additional 581 GWh of electricity required as compared to 2020. While the Electricity Demand Support Document summarily concludes that this amount of additional electricity required "is a fraction of a percent of the statewide electricity consumption in 2020", there is absolutely no analysis on how this added load will affect California's statutory requirement to have 100 percent zero-carbon electricity by 2045. How many more utility scale solar farms will be required to fill this need? (515-Docket)

The Electricity Demand Support Document concludes that "it is technologically feasible that the increase in electricity demand due to the Proposed Amendments can be met by the current electricity

infrastructure", but it does not include any analysis as to whether it can be met by the future electricity infrastructure that is required to be 100 percent zero- carbon. Without this analysis, CARB cannot conclude that the Proposed Amendments will have less than significant impact on Energy Resources pursuant to CEQA. (515-Docket)

Comment: 3. Wildfire Impacts
The Proposed Amendments' wildfire impacts were not analyzed at all in the 2016 EA. As described above, a majority of California consumers use portable generators for the purpose of home backup power, and generator purchases spike in times of high fire danger. The lack of spark-ignited portable generators would hinder homeowners in fighting and withstanding wildfires. Further, with the widespread adoption of electric vehicles expected in the coming decades, the ability to charge cars without grid power in the case of emergencies will become even more paramount. Without access to spark- ignited portable generators, folks may be stranded if their electric vehicles do not have enough charge to safely get them away from a fire. (515-Docket)

Comment: 4. Mineral Resources
The 2016 EA's less than significant conclusion needs to be reevaluated now that CARB can better calculate the quantity of lithium that would be required to implement the amendments. CARB has specific data it is relying on for these Proposed Amendments that it can use to predict the quantity of minerals required to convert spark-ignited equipment to ZEE. Without this analysis, it is impossible to determine whether the impacts to mineral resources will be significant. Until CARB conducts this additional analysis, its finding that the 2016 EA properly analyzed the Proposed Amendments will be unfounded. (515-Docket)

Comment: Alternatively, the Amendments will compel those small businesses to buy any new products out- of-state, and then use those products in California, an anticipated market response that will cause "leakage" in the hoped-for emissions reductions in California. As a result, CARB's projected environmental and social/health benefits of the Proposed SORE Amendments are inherently over-stated and simply will not be achieved. (521-Docket)

Comment: In addition, the Proposed Amendments will spur the development of a growing used-equipment market in and around California, and will drive users to purchase equipment that does not meet CARB's emissions-performance requirements outside of California for subsequent use in the State. (521-Docket)

Comment: The Amendments also will increase the purchase of equipment outside of California for use in the State, which will result in significant adverse air quality impacts in California, and which will significantly diminish the assumed benefits of the Proposed Amendments. (521-Docket)

Comment: d. CARB has failed to conduct the required Environmental Analysis for this rulemaking CARB is taking the position that it does not need to conduct an Environmental Analysis (EA) for the Proposed SORE Amendments because CARB staff completed an EA five years ago in connection with the 27 potential mitigation measures outlined in CARB's 2016 State SIP Strategy, including a potential mitigation concept for SORE, and that should be good enough. CARB further asserts that the Proposed SORE Amendments are "substantially similar" to the "regulatory concept measure" for SORE that was outlined in the 2016 SIP Strategy. (See ISOR, p. ES-8, Section V.) (521-Docket)

CARB's attempt to evade the requirement to conduct a fulsome EA by pointing to a few pages of analysis done for a five-year-old SIP Strategy is without merit. Section 60004 of Title 17 of the California Code of Regulations (CCR) requires that CARB prepare an EA for all proposed regulations,

and further requires that the EA be a separate chapter of or appendix to the ISOR for the proposed regulations. Section 60004(b) goes on to specify the required content of the EA, all of which relates to conducting a full assessment of whether the proposed regulations could have a significant effect on the environment. (521-Docket)

CARB can avoid undertaking and completing a full EA for a proposed regulation only under limited circumstances, including if there is a prior EA that "remains applicable to and is adequate for" the proposed rulemaking. (17 CCR §60004(b)(1)(B).) That is not the case here. (521-Docket)

The EA that CARB is relying on and that was put together for the 2016 State SIP Strategy covered 27 potential mitigation measures that CARB proposed to implement to meet the State's NAAQS-attainment obligations. In that SIP Strategy, CARB noted that, among the various potential mitigation efforts, it intended to propose a control measure for small off-road engines in 2018, and that CARB hoped to achieve $NO_x$ reductions of 4 tons-per-day (tpd), ROG reductions of 36 tpd, and PM2.5 reductions of less than 0.1 tpd by 2031. CARB described the potential SORE control measure as one that "will be developed for transitioning to zero-emission technologies, *including initial focus on incentives* for use of zero-emission equipment coupled with increasingly stringent emission standard for criteria pollutants and GHGs." (2016 State SIP Strategy, p. 115.) (Emphasis added.) (521-Docket)

The EA for the SIP Strategy did not include any separate or distinct analysis of the potential environment impacts from the "regulatory concept" for SORE, and so included no separate analysis regarding the substantially increased storage, use, recycling and disposal of the lithium iodide batteries that would result from the envisioned SORE measure. CARB admitted as much in that EA, and specifically noted that more specific EAs *would need to be included in supplemental environmental documents*:

> The level of detail in this Draft EA reflects that the State SIP Strategy is a broad program; consequently, **the analysis does not provide the level of detail that will be provided in subsequent environmental documents prepared for specific regulatory actions that ARB or other agencies may decide to pursue to reduce criteria air pollutant (CAP) emissions** (Cal. Code Regs, tit. 14 §15152.) As ARB pursues regulations to implement any of the measures discussed in the State SIP Strategy, each regulation would go through a project-specific environment analysis, and, as part of the Administrative Procedure Act (APA) process, a rigorous public review process. The Initial Statement of Reasons prepared for each proposed ARB regulation, also known as the Staff Report, would include a project-specific EA.
> (Draft SIP EA, p.3.) (Emphasis added.)
>
> * * *
>
> The level of detail of impact analysis [in the 2016 SIP Strategy] is necessarily and appropriately general, because the State SIP Strategy is a strategy and is itself programmatic. Furthermore, decisions by entities regarding the specific location and design of new facilities that may be undertaken in response to implementation of measures within the State SIP Strategy are speculative, if not impossible, to predict with precision at this stage given the lack of specificity of implementation of the specific measures, the unknown nature of new facilities that may be proposed, the influence of the business and market considerations in those decisions, and the numerous locations where such facilities might be built. **Specific development projects undertaken in response to specific measures to implement the State SIP Strategy would undergo required project level environmental review** and compliance processes at the time they are proposed. (Draft SIP EA, p.4) (Emphasis added.) (521-Docket)

Contrary to its own assertions and assurances in the 2016 State SIP Strategy, CARB is now claiming that, despite its prior admissions, it does not need to conduct a regulation-specific EA after all, and that the general EA developed five years ago for the 2016 SIP is fine, even though CARB previously conceded that the generic EA "does not provide the level of detail that will be produced in subsequent environmental documents." CARB's attempt to duck its responsibility to conduct an actual regulation-specific EA for the SORE Amendments is revealed to be improper and invalid by CARB's own words. (521-Docket)

As noted, the broad and non-specific SIP-related EA assumed that CARB would adopt SORE mitigation measures in 2018, with implementation beginning in 2022. (Draft SIP EA, p. 12.) In describing the mitigation measures for SORE that the generic EA evaluated, CARB stated that it would "develop and propose a regulation to tighten exhaust and evaporative emission standards for SORE, which includes commercial lawn and garden equipment, *with the possible inclusion of* ***incentives*** *for manufacturers to produce zero-emission equipment*. (Draft SIP EA, p.32.) (Emphasis added.) The EA also noted that the intent was to "use **incentives** and natural turnover *to replace* ***25 percent*** *of all spark-ignited small off-road engines and equipment with zero-emission equipment* ***by 2030***." (Id.) (521-Docket)

The Proposed SORE Amendments at issue are markedly different and more expansive than the SORE "regulatory concept" measure generically considered in the 2016 SIP-related EA. The SORE amendments at issue are not simply a tightening of emissions standards along with efforts to *incentivize* a 25 percent turnover to ZEE by 2030. To the contrary, the Proposed SORE Amendments mandate *only and all ZEE* – 100% ZEE – starting in 2024, not 2030. That is a fundamentally different program with fundamentally different ramifications, including with respect to the manufacture, storage, use, refurbishment and disposal of significantly increased volumes of lithium iodide batteries. Moreover, CARB is now assuming (albeit incorrectly) that the Proposed SORE Amendments will yield nearly twice the amount of emission reduction than were postulated under the 2016 SIP Strategy (i.e., 55 tpd of ROG v. 36 tpd, and 7.5 tpd of $NO_x$ v. 4 tpd). This too shows that the scope and impact of the actual SORE Amendments at issue are, in fact, substantially different from the generic "regulatory concept" that was given cursory review (along with 26 other mitigation concepts) in the EA for the 2016 SIP Strategy. (521-Docket)

Notwithstanding CARB's prior commitment to stakeholders, CARB now claims in the ISOR for this rulemaking that "no subsequent or supplemental environmental analysis is required for the Proposed Amendments." (ISOR, p. 83.) The alleged basis for CARB's claim is that "the Proposed Amendments are substantially similar to the regulatory concept measure previously included within the 2016 State SIP Strategy." (ISOR, p. 84.) But CARB's claim falls flat. First, as noted above, the Proposed Amendments are *not* sufficiently similar to the incremental incentive program envisioned in the SIP. And second, CARB previously conceded and committed in that SIP that regulation-specific EAs would be necessary and so "*will be provided.*" (Draft SIP EA, p.3.) (521-Docket)

CARB's other statements only highlight – not refute – the clear need for a separate detailed EA for this rulemaking. For example, CARB acknowledges that its 2016 EA concluded that "there could be potentially significant and unavoidable adverse impacts" to a wide range of environmental issue, including "agriculture and forest resources, short-term air quality, biological resources, and short-term hazards and hazardous materials." (ISOR, p.85.) CARB also acknowledges that the 2016 EA did not do any sort of deep-dive into any of those anticipated adverse effects because "the potential impacts from development activities cannot be quantified to inform mitigation measures." (ISOR, p. 86.) Thus, the 2016 EA really amounted to no actual EA at all. CARB's ISOR for this rulemaking goes on to admit as much:

> The indirect adverse impacts from a regulation or plan, such as the 2016 SIP Strategy, are so ill-defined and relatively speculative that it would be nearly impossible to adequately quantify the exact impacts from a regulation for purposes of establishing mitigation. Given this, while the final EA indicated that there may be potential adverse environmental impacts from the 27 measures in the 2016 State SIP Strategy as a whole, it concluded that **the impacts are speculative and cannot be precisely quantified until the scope of the measure is defined by actual proposed regulations**.
> (ISOR, p.86.) (Emphasis added.) (521-Docket)

We are now at the point where we are dealing with an "actual proposed regulation." Accordingly, by CARB's own prior analysis, we are now at the point where an actual regulation- specific EA is required. In that regard, we have reached the rulemaking stage where CARB can and must fully evaluate all of the impacts from the dramatically expanded SORE Amendments, including through a detailed quantification of the amount of ZEE batteries that will be required to implement the Amendments, along with a careful quantification of the environmental impacts that will be associated with the increased production, import, use, refurbishment, re-use, recycling and disposal of those batteries. Other impacts requiring more precise quantification relate to the potential need for new facilities to recycle the significantly increased volume of batteries. Tellingly, CARB admits that the 2016 EA did not undertake any of those necessary analyses:

> For the SIP Strategy, compliance-response development that could potentially occur is related to battery development (lithium mining, new or expanded battery recycling/disposal facilities) and new or expanded facilities to accommodate new product lines. As explained above, the Final EA could not predict with any accuracy the level of development and associated impacts that could occur when CARB adopts more stringent standards, and creates incentives for adoption of zero-emission technology, eventual transition to ZEE and enhanced enforcement. (ISOR, p. 93.) (521-Docket)

The foregoing makes clear – as do CARB's own prior admissions and assurances – that a separate regulation-specific EA is required and that the EA prepared for the 2016 SIP Strategy is not a sufficient substitute. That EA was inherently generic and was not intended to satisfy CARB's EA-related obligations for this specific and different rulemaking. (521-Docket)

In sum, CARB's efforts to simply wave-off the need to conduct an actual EA are unavailing. CARB's own prior statements in the 2016 SIP clearly establish that conclusion, and further establish that a fulsome EA is needed before this rulemaking can be considered or voted on by the Board. Without that necessary regulation-specific EA, this rulemaking will be invalid. Consequently, and as expressly acknowledged in the SIP-related EA, "a project-specific environmental analysis" is required in this case. (521-Docket)

Comment: 9. CARB's Environmental Analysis Does Not Meet CARB's CEQA Obligations
As detailed previously, CARB's Environmental Analysis ("EA") (ISOR, Section VII) is fundamentally deficient and fails to satisfy CARB's obligations under the California Environmental Quality Act (CEQA). In submitting the Proposed SORE Amendments for adoption, CARB seeks to rely on the EA that was prepared several years ago in connection with CARB's 2016 State SIP Strategy document, which included, among 26 other potential mitigation strategies, a preliminary analysis of potential amendments to the SORE Regulations. (ISOR, p. VII-1.) That is wholly inadequate in this case and will result in an invalid rulemaking. (521-Docket)

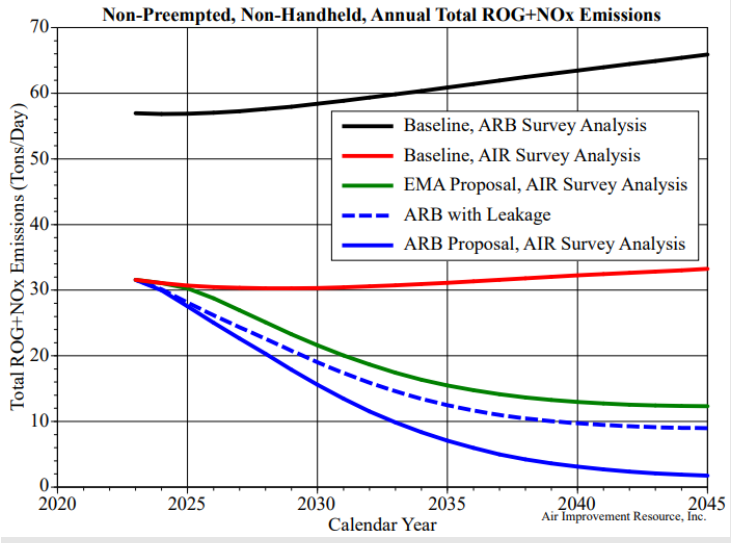
In support of not preparing an actual EA for this rulemaking, CARB states that, "while the Proposed Amendments fill in more detail with respect to specifying the more stringent emissions standards and eventual emission standards of zero, the addition detail does not change the potential compliance responses identified in the Final EA and associated impacts and mitigation measures from potential compliance-response development projects." (Staff Report, p. ES-8.) Staff's determination in that regard is plainly wrong. The full suite of the Proposed SORE Amendments has changed and expanded significantly since 2016. In addition, CARB staff have significantly changed the emission reduction goals for the SORE category from those stated in the 2016 SIP. Thus, and as detailed more thoroughly above, CARB's claim that nothing has really changed from the SIP concept that CARB referenced in 2016 is simply not correct. (521-Docket)

Comment: Moreover, CARB admits that it has done nothing to assess the significant reduction in SORE turnover rates or the increased "leakage" ramifications that will certainly result from the Proposed SORE Amendments as of the 2024 MY. Nor has CARB made any assessment of the high likelihood that CARB's regulations will result in an absence of new compliant ZEE SORE in California starting in MY2024, and that, instead, SORE product users will simply keep their older equipment longer and will buy their needed new products out-of-state, all of which will have potential adverse impacts on California's air quality and economy going forward. Thus, CARB's unilateral determination that it need not prepare any updated EA for this "Proposed Amendments to the SORE" rulemaking is without merit.[3] [Footnote 3: CARB confirms that the Proposed Amendments to the SORE Regulations will impact small businesses (Notice, p. 24), but also fails to conduct the necessary economic analyses of those impacts. That too is a violation of CARB's rulemaking obligations.] (521-Docket)

In that regard, the emission standards of the Proposed Amendments are substantially different from, and are phased-in differently than, the standards originally assumed and assessed in the 2016 SIP Strategy. Instead of incentivized pilot programs for ZEEs as envisioned under the 2016 SIP Strategy, the Proposed Amendments are calling for an across-the-board near-term conversion of almost all SORE to ZEE by 2024. In addition, the currently proposed test procedure changes are entirely different as well, since the proposed elimination of the component certification process – a major regulatory change – was not even contemplated let alone evaluated when the EA for the 2016 SIP strategy was prepared. And further, the SIP Strategy EA failed to assess in any way the likely significant pre-buy/no-buy and out-of-state-buy response from off- road engine and equipment purchasers that the adoption of the Proposed Amendments to the SORE Regulations will cause. CARB's failure to address the factors listed above renders its attempted use of the 2016 SIP-related EA for this rulemaking wholly inadequate under CEQA, as further detailed above. (521-Docket)

Comment: The cost implications, and the related pre-buy/no-buy response to the proposed requirements, will be highly disruptive to the users of SORE products – consumers, local government, and small businesses – and potentially to California's economy. The net result could be an absence of new SORE products in California starting in 2024. Consequently, CARB should pause and fundamentally rethink the Proposed SORE Amendments, and give strong consideration to the EMA proposed Tier IV alternative, which provides cleaner products and potentially greater emission reductions at a much lower cost to California consumers. (521-Docket)

Figure 9




(521-Docket)

Comment: Comment 3 – The Proposed Rule strategies and resulting reductions are inconsistent with the 2016 State Implementation Plan, which identified specific strategies and reductions needed to meet federal air quality standards. (524-Docket)

Comment: The 2016 SIP identifies specific SORE target reductions needed to meet federal air quality standards by 2031. Statewide the 2016 SIP seeks SORE emissions reductions of 4 tpd $NO_x$ and 36 tpd ROG as part of the overall strategy to achieve 2031 federal air quality standards. The SIP outlines methods to achieve this strategy, which include: (1) promote increased use of zero-emissions equipment; (2) propose tighter exhaust and evaporative emissions standards; and (3) enhance enforcement of current emissions standards for SORE.[4] [Footnote 4: Revised proposed 2016 State Strategy for the State Implementation Plan, March 7, 2017, pg., 115] This strategy does not suggest or require that CARB transition the SORE sector to zero emissions to meet federal air quality standards. (524-Docket)

Comment: CARB staff first presented the need for additional SORE emissions reductions to stakeholders at a SORE Workshop in November 2015. During the workshop CARB presented the October 2015 Mobile Source Strategy goals, which included: (1) tighten exhaust and evaporative emission standards; (2) increase penetration of zero emission technology; and (3) enhance enforcement of current emissions standards. Staff presented the need to incentivize production and deployment of zero emission technology, with a goal of 25% replacement of SORE equipment with ZEE by 2030.[5] [Footnote 5: Public Workshop to Discuss Proposed Changes to the Small Off-Road Engine Regulations. November 2015.] These strategies were developed in parallel with the 2016 SIP and determined to be the sector goals and reductions needed to achieve the federal air quality standards. (524-Docket)

Comment: The Proposed Rule is not reflective of the strategies originally presented to stakeholders, is not supported by established standards, data, or sufficient technical feasibility studies, and as a result is arbitrary. (524-Docket)

Comment: According to CARB modeling, the Proposed Rule would result in emissions reductions of 7.4 tpd $NO_x$ and 55 tpd ROG by 2031[6] [Footnote 6: Standardized Regulatory Impact Assessment (SRIA), September 20, 2021, pg 22], well in excess of what is needed or technologically feasible to

meet the SIP goals. CARB asserts the need for SORE reductions beyond those specifically detailed in the 2016 SIP as follows: "the increase in the SORE inventory (in the SORE2020 model) makes SORE a larger contributor to overall emissions and underscores the need to reduce $NO_x$ and ROG emissions from SORE to maximum extent feasible. Therefore, given SORE's larger share of the statewide $NO_x$ and ROG emissions, the potential proposed amendments to the SORE regulations seeks to exceed the emission reductions in the (SIP SORE measure) and to meet the further reductions needed from off-road sources."[7] [Footnote 7: SORE Workshop, Slide 7. March 24, 2021] This statement emphasizes the need for accurate modeling when determining what reductions are needed. In the absence of accurate modeling, as discussed in these comments, the underlying assumptions and the additional reductions "needed" are arbitrary. (524-Docket)

Comment: Furthermore, CARB asserts it is necessary to utilize SORE to capture SIP "Further Deployment of Cleaner Technologies" reductions, which seek 17 tpd $NO_x$ and 20 tpd ROG reductions across many off-road sectors. During the March 24, 2021 SORE Workshop CARB staff suggested "specific measures are not defined in the (SIP)".[8] [Footnote 8: SORE Workshop, Slide 7. March 24, 2021] OPEI disagrees with this assertion. As it relates to SORE, this SIP category focuses on expanding and enhancing incentive and other innovative funding programs to increase the emphasis and support for zero-emission capable equipment – not through immediate regulatory action and the imminent banning of SORE-powered equipment on an accelerated timeline. The SIP identifies an implementation schedule for the deployment of cleaner technologies in which CARB will develop separate regulatory strategies in 2022-2025 based on the execution of prior incentive programs and the evaluation of technology and prototype demonstrations which would be implemented in 2027-2031, what is referred to as "further" deployment of cleaner technologies[9]. [Footnote 9: Revised proposed 2016 State Strategy for the State Implementation Plan, March 7, 2017, pg., 122] The Proposed Rule highlights air district programs which generated "overwhelming response(s)".[10] [Footnote 10: ISoR, pg 27] These realized contributions must be addressed and accounted for in order to determine how these programs have already contributed to emission reductions to each this SIP goal. Finally, SORE is not the sole focus of the "Further Deployment of Cleaner Technologies" category. The SIP focuses significantly on other categories in this strategy, including fork lifts, TRU's, ground support equipment, and constructing mining and industry equipment. The Proposed Rule and its inclusion of SORE "Further Deployment of Cleaner Technologies" emission reductions is inconsistent with the SIP and is arbitrary with respect to the emission reductions needed from SORE to achieve federal air quality standards given the inaccurate sector modeling. (524-Docket)

Comment: CARB asserts that the DRAFT 2020 Mobile Source Strategy (MSS) "calls for SORE emission reductions of 7.9 tpd $NO_x$ and 64.5 tpd ROG in 2031" to support the Proposed Rule.[11] [Footnote 11: SRIA, pg 2] The characterization that the DRAFT MSS "calls for" these reductions is misleading. The DRAFT MSS summarizes CARB staff's Proposed Rule and recognizes that as the proposed strategy.[12] [Footnote 12: CARB Proposed 2020 Mobile Source Strategy, pg. 165. September 28, 2021.] The DRAFT MSS does not call for particular reductions. Furthermore, the document is not consistent with or based on the SIP or reductions needed to achieve federal air quality standards. The DRAFT MSS is arbitrary as it regards needed reductions to achieve federal air quality standards. (524-Docket)

Comment: The Proposed Rule is not based on the 2016 SIP, lacks evidence that such additional reductions are technically feasible for many use cases, does not account for ZEE incentive program reductions or evaporative emissions reductions achieved though recent amendments. Furthermore, by establishing goals well beyond those established by the SIP, the Proposed Rule lacks consideration of and potentially prohibits (by overly focusing on ZEE) other existing and/or future technologies that may offer HC+$NO_x$ emissions, greenhouse gas, and related climate change benefits beyond today's "zero emissions" technology. The Proposed Rule is inconsistent with the strategy identified in the

2016 SIP, based on reductions "needed" from overestimated models, is not necessary to meet compelling and extraordinary conditions, is technology forcing, and is arbitrary and capricious and without reasonable or rational basis. (524-Docket)

Comment: The equipment industry has led reduced and zero-emissions adoption by example, with large-scale development and adoption of reduced and zero-emissions equipment, when and where feasible. FWEDA members worked in good faith with CARB toward its initiatives to accomplish stated goals to reduce emissions (2016 SIP) and now the state is moving the goal posts. (2001-Docket)

Comment: The proposed SORE regulations will simply ban the sale of this equipment in California. Being ignored in the CARB staff proposal will cause the majority of these machines to be manufactured and sold in other states. They will then be imported along with less regulated emissions that they create back to California. (3015-Oral Testimony)

**Agency Response:**

These comments include expressions of commenters' opinions regarding the need to prepare an EA for the Proposed Amendments or update the SORE2020 emissions inventory model. CARB disagrees with the commenters' conclusions. The commenters also do not request changes to the Proposed Amendments, but rather contend that CARB misapplied CEQA for its environmental analysis. While CEQA does not require written responses to public comments regarding a lead agency's reliance on an addendum to satisfy CEQA (Title 14 CCR section 15164), CARB takes this opportunity to address the commenters' substantive claims. CARB made no change based on these comments.

Statements regarding "leakage," "scrappage," and "a growing used-equipment market" are conclusory, with the authors citing themselves as the authorities on these topics without supporting their claims. The commenters offer no evidence that SORE equipment owners will retain their SORE equipment longer than they would in the absence of the Proposed Amendments ("scrappage") or that some users will travel out of California to purchase SORE equipment ("leakage"). Commenters offer no evidence that equipment users will use motor vehicle engines to provide power to charge batteries, that increased statewide electricity demand due to the Proposed Amendments will cause adverse environmental impacts not discussed in the Final EA or affect state or local plans for renewable energy or energy efficiency in ways not discussed in the Final EA, or that the Proposed Amendments will adversely affect the occurrence of wildfires. Commenters do not provide evidence to support their claims that additional analysis is needed for impacts on mineral resources.

In response to the statement, "CARB's unilateral determination that it need not prepare any updated EA for this "Proposed Amendments to the SORE" rulemaking is without merit" and similar statements: Chapter V of the ISOR provides the basis for CARB's determination that no subsequent or supplemental environmental analysis is required for the Proposed Amendments. The Proposed Amendments are substantively similar to a regulatory concept measure previously included within the 2016 State SIP Strategy [CARB, 2017[124]] for SORE. In

[124] CARB. 2017. Revised Proposed 2016 State Strategy for the State Implementation Plan. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). March 7, 2017.

its approval of the 2016 State SIP Strategy, CARB certified an environmental analysis, entitled Final Environmental Analysis for the Revised Proposed 2016 State Strategy for the State Implementation Plan, [CARB, 2017[125]] or Final EA, that evaluated the impacts associated with the SORE SIP Measures and mitigated those impacts, to the extent feasible, evaluated overarching alternatives to the 2016 State SIP Strategy and adopted a statement of overriding circumstances for impacts deemed significant and unavoidable. While the Proposed Amendments fill in more detail with respect to specifying the more stringent emission standards and eventual emission standards of zero, the additional detail does not change the potential compliance responses identified in the Final EA. Rather, the only change triggered by the Proposed Amendments that warrants an addendum to the Final EA is the need to add the Proposed Amendments' detail to the project description of the SORE SIP Measures. Therefore, and for additional reasons discussed in Chapter V of the ISOR, since the Final EA adequately evaluated impacts, mitigation and alternatives associated with the SORE SIP Measures and because the Proposed Amendments are substantively similar to the SORE SIP Measures, the Proposed Amendments do not trigger the need to prepare a subsequent EA. CARB disagrees with the commenter's claim that its arguments regarding "leakage" and "scrappage" demonstrate CARB's determination is without merit or otherwise does not comply with California law. Commenters state their opinions but do not provide evidence to support their claims that the Final EA and the addendum in Chapter V of the ISOR are not adequate for this rulemaking.

In response to the statement, "The 2016 EA was explicit that additional CEQA review would occur when specific regulatory actions are taken to reduce criteria air pollutants" and similar statements: Chapter V of the ISOR provides the additional detail needed to meet applicable CEQA requirements for this rulemaking; previous statements made in CARB's CEQA documents related to future rulemakings do not preclude CARB from conducting CEQA review in a manner different from those previous statements and commenters have not provided any legal basis for establishing that previous statements have such a binding effect on a future rulemaking. CARB disagrees with commenters' assertions that the environmental analysis in the ISOR is not adequate.

In response to the statement, "The Proposed SORE Amendments at issue are markedly different and more expansive than the SORE "regulatory concept" measure generically considered in the 2016 SIP-related EA. The SORE amendments at issue are not simply a tightening of emissions standards along with efforts to incentivize a 25 percent turnover to ZEE by 2030. To the contrary, the Proposed SORE Amendments mandate only and all ZEE – 100% ZEE – starting in 2024, not 2030" and similar statements: The commenters mischaracterize language from the SORE SIP Measure and the Proposed Amendments. The commenters seem to refer to an earlier draft measure for SORE in the 2016 Mobile Source Strategy rather than the SORE SIP Measure in the 2016 State SIP Strategy. CARB disagrees with the commenter's conclusions. The Proposed Amendments do not require anyone to stop using SORE equipment and do not prohibit the sale of CARB-certified SORE. The Proposed Amendments tighten emission standards and provide incentives for manufacturers to develop and produce ZEE, as described in Chapter II of the ISOR. CARB disagrees with commenters' assertions that the Proposed Amendments' expected achievement of greater emission

[125] CARB. 2017. Revised Proposed 2016 State Strategy for the State Implementation Plan. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). March 7, 2017.

reductions than those described in the 2016 State SIP Strategy indicate a need for further environmental analysis.

CARB disagrees with commenters' assertions that the Proposed Amendments are inconsistent with the 2016 State SIP Strategy. The 2016 State SIP Strategy, California law, and federal law do not prohibit regulations from achieving more emission reductions than those expected in SIP measures. CARB also disagrees with commenters' assertions that the Proposed Amendments' achievement of some of the emission reductions from the measure for "Further Deployment of Cleaner Technologies: Off-Road Equipment" specific to the South Coast Air Basin in the 2016 State SIP Strategy, described on page 10 of the ISOR, is arbitrary or inconsistent with the 2016 State SIP Strategy. In the absence of tighter emission standards for SORE, emissions of the ozone precursors NOx and ROG are expected to increase as California's population continues to grow. Maximum emissions reductions must be achieved from SORE in order to avoid this increase in emissions and instead reduce SORE emissions to achieve 2016 State SIP Strategy commitments necessary to attain the ozone NAAQS and protect public health and welfare. Commenters seem to suggest that CARB may not update draft SIP measures once they are shared with stakeholders or seek to achieve maximum degree of technologically feasible, cost-effective emission reductions from SORE by the earliest practicable date. The commenters' suggestions contradict the requirements of California laws.

In response to the statement, "CARB confirms that the Proposed Amendments to the SORE Regulations will impact small businesses (Notice, p. 24), but also fails to conduct the necessary economic analyses of those impacts. That too is a violation of CARB's rulemaking obligations": CARB disagrees with the commenter's conclusion. The economic analysis for the Proposed Amendments is described in Chapter VII of the ISOR and in the SRIA, which includes a discussion of impacts to small businesses on pages 26 and 67-70. The commenter does not provide evidence that the economic analysis in the ISOR fails to adequately discuss impacts on small businesses. The commenter does not specify whether it believes CARB violated requirements in APA or nonregulatory obligations the commenter perceives.

In response to the statement, "the emission standards of the Proposed Amendments are substantially different from, and are phased-in differently than, the standards originally assumed and assessed in the 2016 SIP Strategy. Instead of incentivized pilot programs for ZEEs as envisioned under the 2016 SIP Strategy, the Proposed Amendments are calling for an across-the-board near-term conversion of almost all SORE to ZEE by 2024": CARB disagrees with the commenter's conclusions. The Proposed Amendments are substantively similar to a regulatory concept measure previously included within the 2016 State SIP Strategy for SORE, as described on page 84 of the ISOR. While the Proposed Amendments fill in more detail with respect to specifying the more stringent emission standards and eventual emission standards of zero, the additional detail does not change the potential compliance responses identified in the Final EA. Reasonably foreseeable compliance responses under this measure would include an increase in manufacturing, production and use of zero-emission technology in SORE. The ZEE Roadshow, discussed in Chapter X.E of the ISOR, is a pilot study that has demonstrated new technologies. CARB disagrees with the commenter's conclusion that the Proposed Amendments set more stringent emission standards instead of conducting pilot studies. As described on page 89 of the ISOR, the general scope of the SORE SIP Strategy includes: "Exhaust and evaporative emissions from SORE would be reduced through enhanced enforcement of the current emission standards, adoption of tighter exhaust and evaporative emission standards, and increased use of zero-emission equipment." The Proposed Amendments will implement this scope.

In response to the statement, "the currently proposed test procedure changes are entirely different as well, since the proposed elimination of the component certification process – a major regulatory change – was not even contemplated let alone evaluated when the EA for the 2016 SIP strategy was prepared": CARB disagrees with the commenter's conclusions. The commenter does not provide evidence that the elimination of design certification, which the commenter refers to as "the component certification process," will change the likely compliance responses to the Proposed Amendments or otherwise affect the environmental impacts of the Proposed Amendments.

In response to the statement, "a majority of California consumers use portable generators for the purpose of home backup power, and generator purchases spike in times of high fire danger. The lack of spark-ignited portable generators would hinder homeowners in fighting and withstanding wildfires. Further, with the widespread adoption of electric vehicles expected in the coming decades, the ability to charge cars without grid power in the case of emergencies will become even more paramount. Without access to spark- ignited portable generators, folks may be stranded if their electric vehicles do not have enough charge to safely get them away from a fire": the comment includes conclusory statements without support related to the use of zero emission equipment during power outages. CARB has no evidence to support the conclusion that people who own electric vehicles and suffer power outages rely on portable generators to charge their vehicles. Rather, available information suggests otherwise, that electric vehicles will become the power source to power homes during outages as championed by major automakers [PG&E, 2022[126]; Ford Motor Company, 2022[127]]. Additionally, throughout the record, CARB has provided technological feasibility assessment of the Proposed Amendments related to using zero emission equipment during power outages to charge essential items in the home. Please refer to the Agency Responses in sections IV.A.2.3.5, IV.A.2.4.2, IV.A.2.6.2, IV.A.2.6.3 and IV.A.35.2 for discussion of EMA's proposed alternative. Therefore, CARB has no evidence to suggest that the Proposed Amendments will expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

For discussion of comments about batteries, including recycling and disposal, charging infrastructure, California electricity sources, and statewide electricity demand for ZEE, please refer to the Agency Responses in section IV.A.6

## A.16. Equipment that is not powered by SORE

### *A.16.1. Diesel or compression-ignition engines*

Comment: **Subject: Public Workshop**
I recently started working in Emissions Compliance and I am currently reviewing the CARB and EPA

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[126] PG&E. 2022. PG&E and General Motors Collaborate on Pilot to Reimagine Use of Electric Vehicles as Backup Power Sources for Customers. Pacific Gas and Electric Company (PG&E) March 8, 2022, news release available at: https://www.pge.com/en_US/about-pge/media-newsroom/news-details.page?pageID=c77a4e23-f8fc-4774-9786-0dba87a203db&ts=1646754047003. Last accessed: May 13, 2022.

[127] Ford Motor Company. 2022. Ford Intelligent Backup Power. Available at: https://www.ford.com/trucks/f150/f150-lightning/features/intelligent-backup-power/. Last accessed: May 13, 2022.

compliance for High Pressure Washers in the company that I just joined. Today I was in the workshop (Public Workshop to Discuss Potential Amendments to the Off-Road Compression-Ignition Regulations for New Engines, Test Procedures, and Related Programs), and I have some doubts about the information that was shared with us. Now I am working with SORE Evaporative and Exhaust Certification (SSIEV = Off Road Certification - Small Spark-Ignited Engines, Evaporative Certification; and SSIEX = Off Road Certification - Small Spark-Ignited, Exhaust Certification) but I am not sure if my understanding is correct because I could not find the relationship between this topic with the today's presentation at the workshop. I have these questions:

- What are the next regulations for SORE, related to Tier 5?
- How do Tier 5 regulations affect SORE?

I am confused by this information and please let me know if I am wrong and if my understanding is not correct. (582-Email)

Comment: **Subject: Questions about golf maintenance equipment transition to electric**
Appendix A says on page 9 that it does not apply to compression-ignition engines, i.e., diesel engines. These are not included in the definition of small off road vehicles. That is consistent with what other ARB staff told me. Most golf course maintenance equipment uses diesel engines. Most are under 25 hp, some are over. My fundamental question remains: is there any proposed rule that would specifically apply to golf course maintenance equipment? (563-Email)

Comment: **Subject: diesel/propane**
Our company is a Honda small engine and equipment distributor located in Corona, CA and Nashville, TN. As our company endeavors to conform to CA requirements on small engines, we are looking at other power options for our equipment manufacturers. Current SORE regulations seem only apply to 'spark-ignited gas motors.' Diesel motors are not spark ignited. Propane motors are not gas fueled. Am I correct then in assuming that these are not regulated by SORE and the Air Resources Board. (589-Email)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

Commenters request clarification regarding the applicability of SORE regulations to compression-ignition engines or "Tier 5" emission standards. Per section 2401(a)(45) of the Proposed Amendments, "Small off-road engine" means any engine that produces a gross horsepower less than 25 horsepower (at or below 19 kilowatts for 2005 and later model year), or is designed (e.g., through fuel feed, valve timing, etc.) to produce less than 25 horsepower (at or below 19 kilowatts for 2005 and later model year), that is not used to propel a licensed on-road motor vehicle, an off-road motorcycle, an all-terrain vehicle, a marine vessel, a snowmobile, a model airplane, a model car, or a model boat. […] Any compression-ignition engine, as defined in Section 2421, produced during the 2000 and later model years shall not be defined as a small off-road engine.

As compression-ignition engines produced during the 2000 and later model years are explicitly excluded from the definition of SORE, the Proposed Amendments would not apply to any compression-ignition engine, regardless of rated power or application. However, other

CARB regulations may apply to these engines. Tier 5 emission standards for compression-ignition engines are not applicable to SORE.

Any engine that meets the definition of "small off-road engine" in section 2401(a)(45) would be subject to the Proposed Amendments. This includes, but is not limited to, small off-road engines fueled by propane and small off-road engines used in golf course maintenance equipment.

Questions regarding proposed rules specific to golf course maintenance equipment are beyond the scope of this rulemaking.

### *A.16.2. Gas- or powder-actuated fasteners*

Comment: For the purposes of the Proposed Amendments and the SORE Regulations, our comments reflect the perspective and product scope of ITW Construction Products which manufactures, among other items, certain construction equipment, such as fastening tools, some of which use combustion processes as a means of operation. ITW Construction Products is a wholly-owned segment of Illinois Tools Works Inc. ("ITW"), a U.S. manufacturer of value-added commercial and industrial-use products, components, and systems. ITW is a Fortune 200 company operating a diverse global portfolio of 84 manufacturing divisions. (502-Docket)

**Compressor Equipment Preemption to SORE Regulations – Statutory Bases**
After review of the Proposed Amendments to the SORE Regulations, and being mindful of federal statute and applicable regulations, we conclude that the fastening tools referenced herein are clearly preempt from the SORE regulations pursuant to Section 209(e)(1) of the federal Clean Air Act ("CAA"). (502-Docket)

Comment: **Sections 2401(a)(29) – Cordless Tools Not in Scope**
In addition, in our review of the SORE Regulations definition of "gas-powered engines," we explored the definition to consider how it would apply to products that may rely on combustion activity as part of their performance. Some of ITW Construction Products' fastening tools are "cordless" and incorporate cartridges of non-gasoline fuel to produce an on-demand combustion event which is harnessed to drive fasteners into building materials The power and portability of this "cordless" equipment provides unique benefits over its air compressor driven counterparts because of the mobility needs of end-users on construction sites. This heightens the integrity, strength and versatility of cordless products that our customers rely on, especially in large-scale construction settings. (502-Docket)

So, while we recognize the combustion function that characterizes our products, our examination of CARB's intended product scope as defined under the SORE Regulations leads us to conclude that CARB does not intend for construction equipment such as ours to be considered in scope to the extent our products do not use, contain or are powered by gasoline and the cartridges within the fasteners are not engines as defined the SORE Regulations. We recognize that it may be reasonably foreseeable for other stakeholders to be concerned whether similar products could fall inside of the SORE Regulation scope, so we would, again, respectfully suggest that the CARB consider amending the proposed regulation to avoid any unintended stakeholder confusion. (502-Docket)

Comment: **Subject: Question on Proposed CARB amendments to SORE regulations**
I represent a client that manufactures nailer equipment used primarily by commercial contractors. Among other pieces of equipment, they manufacture (1) gas (and battery) powered nailer equipment

that is cordless (note, this gas equipment contains a fuel cartridge which is likely not an "engine" under the regulations) and used to renovate homes by commercial contractors and (2) gas powered nailer equipment that come with compressors used to build new homes. Our view is that these pieces of equipment would fall under the preemption for regulation pursuant to the Clean Air Act section 209 and 40 CFR 1074.5 because they would be construction equipment primarily used by commercial contractors at construction sites (i.e. the homes being renovated or built would be construction sites). As you may know, CARB has published a list of equipment that is subject to preemption at the following website. https://www.arb.ca.gov/msprog/offroad/preempt.htm Although nailer equipment isn't specifically referenced in these lists, the compressors appear to be specifically identified as preempted. I'd like to understand whether CARB has specifically considered nailer equipment vis a vis the preemption? Also, if CARB has not specifically considered this equipment, with the background information provided, does the agency agree that this equipment would be preempted? (579-Email)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. Please refer to the Agency Response in section IV.A.29.1.1 for discussion of the comment regarding air compressors used with nailers.

With regards to fasteners actuated by combustion of gas or other fuel provided by a fuel cartridge, CARB agrees that these are not "engines" for the purposes of the existing or proposed SORE regulations. Questions regarding the preempt status of fastening tools are beyond the scope of this rulemaking.

### *A.16.3. Go-karts and off-road motorcycles*

Comment: I am a chemical regulatory consultant in Maine, currently engaged by a supplier of specialty fuels and lubricants for various small off-road engine end uses, including in California. My client has asked for a briefing on the proposed amendments as would relate to its business in California. After reviewing the proposed amendments and related CARB documents, my question is whether go-karts (recreational and/or sanctioned racing) would be excluded as are off-road motorcycles, ATVs, etc., or included as "specialty vehicles" in the definition of SORE:

§ 2401. Definitions

Paragraph (old 39) new 44: "Small off-road engine". (570-Email)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. CARB made no changes based on the comment. The following response provides clarification and context for several points within the above comment.

Off-road motorcycles and all-terrain vehicles (ATV) are excluded from the definition of "small off-road engine" and separately regulated by CARB under Title 13, Code of California Regulations, Sections 2410-2419. SORE used in go-karts are subject to the SORE regulations unless they are used solely for competition and not operated on public highways. Any vehicles, including go-karts, which are used exclusively in closed-course racing or other competition events, and never operated on public highways, are exempt from California emission standards by the provisions of California Health and Safety Code sections 39048 and 43001.

### *A.16.4. Watercraft engines*

Comment: I understand there may be new rules for the emissions for my boat. I have a 1975 Sea Ray that I have restored during this COVID time. I do not use it every day. Maybe a dozen times a year. The boat is well maintained and I am hoping to use this boat to time with my family. I feel that some day I would like to upgrade to a newer boat but for now I would like to use it and enjoy it. I also feel that it contributes so little to our air that when in the ocean it is it would be hard to measure the effects. (125.078-Docket)

Comment: Electric boat motors are inefficient and not compatible with the needs of emergency response, they will also leave people stranded in lakes, rivers, and oceans when the batteries expire. (489-Docket)

**Agency Response:**

These comments state or imply concern regarding the potential effect of the proposed regulations on the availability, or continued use, of watercraft engines. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

Per section 2401, SORE are defined as follows:

"Small off-road engine" means any engine that produces a gross horsepower less than 25 horsepower (at or below 19 kilowatts for 2005 and later model year), or is designed (e.g., through fuel feed, valve timing, etc.) to produce less than 25 horsepower (at or below 19 kilowatts for 2005 and later model year), that is not used to propel a licensed on-road motor vehicle, an off-road motorcycle, an all-terrain vehicle, a marine vessel, a snowmobile, a model airplane, a model car, or a model boat. […] Any compression-ignition engine, as defined in Section 2421, produced during the 2000 and later model years shall not be defined as a small off-road engine.

As engines used to propel marine vessels are explicitly excluded from the definition of SORE, the Proposed Amendments would not apply to any watercraft engine, regardless of rated power. However, other CARB regulations may apply to these engines.

Additionally, the proposed emission standards apply only to new engines of MY 2024 or later, and do not include any proposed restrictions on the continued possession or use of any existing engine or equipment.

## A.17. Evaporative emission regulations

Comment: **Comment 1: Design-based certification is effective, and CARB should not change the EVAP emissions testing procedures for SORE ≤80 cc.**
CARB's Proposed Amendment sets the evaporative emission standards for all SORE except generator engines to zero beginning in MY 2024 by simultaneously changing the certification requirements from CP-901 towards CP-902 and test procedure TP-901 towards TP902 specific for engines with displacement of less than or equal to 80cc. These new EVAP testing requirements effectively prevent sustainably minded companies, like STIHL, that have spent significant resources and time developing ZEE certified products and environmentally-friendly technologies, from using their ABT exhaust emission credits earned over the previous 5 model years. There is no apparent benefit to this change (as reflected by the exhaust testing procedures all remaining the same), and the resulting testing

requirements appear inconsistent with other CARB testing requirements and regularly accepted EPA testing procedures. These changes to performance-based certification (hot soak plus 24-hr diurnal) are not necessary, as design-based certification is effective. (509-Docket)

Comment: The U.S. Consumer Product Safety Commission (CPSC) study, published in September 2015 titled "Study of Fuel Leaks Associated with Outdoor Ground-Supported Gasoline-Powered Equipment", does not mention any gasoline fuel leakages, anomalies and fire hazards from small spark ignited handheld engines (SSIE ≤ 80cc). (see https://www.cpsc.gov/s3 fs-public/pdfs/FuelLeakutdoorGasolineEguipmentSept20l5.pdf). As there is no leakage issue with handheld outdoor power equipment (that operate multi-positionally and are therefore designed to prevent such leakage), there is no need for hot soak plus 24-hr diurnal testing for these products, or any change for the existing testing method. (509-Docket)

Evaporative emission factors accepted by and applied in the CARB SORE2020 model prove that evaporative emissions from small off-road equipment with displacement of less than or equal to 80 cc, which are based on a design-based certification, are already at the same level as those projected for generators for MY 2024 to 2027 in the "Proposed Amendments to the Small Off-Road Engine Evaporative Emission Regulations, California Code of Regulations, Title 13, Division 3, Chapter 15. Additional Off-Road Vehicles and Engines Pollution Control Requirements, Article l. Evaporative Emission Requirements for Off-Road Equipment", Table 3. STIHL evaporative emission measurements on chainsaws, backpack blowers and trimmers (see enclosure Figure 4) likewise confirm the CARB results from the validation and compliance testing's published in the SORE2020 model final report from September 2020, tables 20 and 25. The STIHL physical test results for hot soak plus 24-hr diurnal physical testing had excellent correlation with the design based testing currently used by CARB.[3] [Footnote 3: See Figure 1 and Figure 4 for a comparison of CARB and STIHL physical testing results.] (509-Docket)

Therefore, STIHL believes the current design-based certification is effective and necessary for all types of handheld equipment, as there does not appear to be any tangible benefit to changing the test procedure as proposed in the Proposed Amendment. The enforcement of the 2017 evaporative amendments have addressed noncompliance with ground-supported products. CARB has not conducted further testing or provided further data to show that the 2017 evaporative amendments are not effective for handheld product with displacement of less than or equal to 80cc. (509-Docket)

Furthermore, the adopted evaporative emission amendments from 2017 are not in alignment with the section 209 of the Federal Clean Air Act (CAA). There is no clear explanation as to why the evaporative certification/testing requirements would change in contradiction to the CAA, while the emissions certification/testing requirements all remain the same. STIHL believes that these new and inconsistent evaporative standards and accompanying enforcement procedures are arbitrary, capricious, and therefore inconsistent with section 209 of the CAA. (509-Docket)

CARBs SORE2020 final report and STIHL's validation study show that handheld products are significantly below the current diurnal emission standard for engines with displacement categories greater than 80cc based on design-based certification. This confirms that handheld equipment complies with the regulations without the need for alternative testing, like hot soak plus 24-hr diurnal testing requirements. (509-Docket)

Comment: Therefore, current design-based standards (CP-901 and TP-901) need to be retained to allow manufacturers to use currently earned and banked exhaust emission credits. Ultimately, the

exhaust emission credits will be limiting the number of sales for new products beyond 2024 to a very short period of time, hence evaporative limits do not need to change. (509-Docket)

Comment: Figure 1: CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020 final report

**Table 20. Average Evaporative Emission Results (grams and g/day)**

| Technology | Equipment (Model Year > 2010) | HP Bin | Number of Tests | Evaporative Emissions Test Data* | |
|---|---|---|---|---|---|
| | | | | Hot Soak (g) | 24-hour Diurnal (g/day) |
| Gasoline 4-stroke | Blower | | 9 | 0.126 | 0.529 |
| | Generator | 2 | 3 | 0.847 | 12.366 |
| | Trimmer | | 18 | 0.078 | 0.593 |
| | Generator | 5 | 15 | 1.387 | 2.747 |
| | Lawn Mower | | 65 | 0.157 | 0.823 |
| | Pressure Washer | | 10 | 0.136 | 0.608 |
| | Trimmer | | 6 | 0.082 | 0.545 |
| | Generator (49-state) | | 1 | 0.537 | 1.881 |
| | Chipper/Stump Grinder | | 3 | 0.160 | 1.488 |
| | Compressor | 15 | 10 | 0.411 | 8.178 |
| | Generator | | 36 | 0.831 | 2.922 |
| | Lawn Mower | | 10 | 0.195 | 0.796 |
| | Pressure Washer | | 10 | 0.164 | 1.171 |
| | Riding Mower | | 6 | 0.135 | 0.965 |
| | Tiller | | 14 | 0.107 | 0.839 |
| | Chipper (49-state) | | 1 | 0.319 | 2.476 |
| | Chipper/Stump Grinder | | 5 | 0.177 | 0.896 |
| | Riding Mower | 25 | 21 | 0.379 | 2.122 |
| | Tractor | | 9 | 0.582 | 1.769 |
| Gasoline 2-stroke | Blower | | 3 | 0.138 | 0.460 |
| | Chainsaw | | 3 | 0.129 | 0.390 |
| | Generator | All | 1 | 1.031 | 1.931 |
| | Tiller | | 1 | 0.724 | 2.624 |
| | Trimmer | | 4 | 0.086 | 0.431 |

* Emissions test data for tests with E10 fuel are converted to E0 for use in the model

(509-Docket)

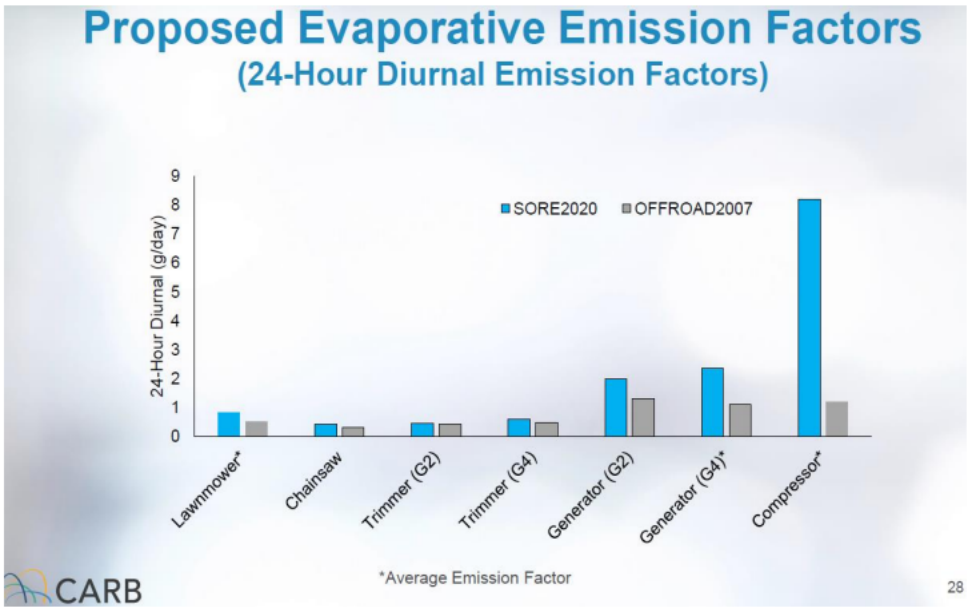
Comment: Figure 2: CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020 final report

**Table 25. Hot Soak and Diurnal Emission Factors (SORE2020)**

| Category | Equipment | Tech Type | HP | Evap Emission Factors | |
|---|---|---|---|---|---|
| | | | | Hot Soak (g/start) | 24-hr Diurnal (g/day) |
| Lawn & Garden | Chainsaws | G2-Carb | 2 | 0.129 | 0.390 |
| | | | 5 | 0.129 | 0.390 |
| | Chainsaws Preempt | G2-Carb | 2 | 0.129 | 0.390 |
| | | | 5 | 0.129 | 0.390 |
| | Chippers/Stump Grinders/Shredders | G4-Carb | 2 | 0.160 | 1.488 |
| | | | 5 | 0.160 | 1.488 |
| | | | 15 | 0.177 | 0.896 |
| | Lawn Mowers | G4-Carb | 2 | 0.157 | 0.823 |
| | | | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | | | 25 | 0.195 | 0.796 |
| | Leaf Blowers/Vacuums | G2-Carb | 2 | 0.138 | 0.460 |
| | | | 5 | 0.138 | 0.460 |
| | | G4-Carb | 2 | 0.126 | 0.529 |
| | | | 5 | 0.126 | 0.529 |
| | | | 15 | 0.378 | 3.278 |
| | | | 25 | 0.378 | 3.278 |
| | | G4-FI | 25 | 0.378 | 3.278 |
| | Other Lawn & Garden Equipment | G4-Carb | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | | | 25 | 0.195 | 0.796 |
| | Riding Mowers/Tractors | G4-Carb | 5 | 0.135 | 0.965 |
| | | | 15 | 0.135 | 0.965 |
| | | | 25 | 0.480 | 1.945 |
| | | G4-FI | 25 | 0.480 | 1.945 |
| | Snow Blowers | G4-Carb | 5 | 0.126 | 0.529 |
| | | | 15 | 0.378 | 3.278 |
| | | | 25 | 0.378 | 3.278 |
| | Tillers | G2-Carb | 2 | 0.724 | 2.624 |
| | | G4-Carb | 2 | 0.157 | 0.823 |
| | | | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | Trimmers/Edgers/Brush Cutters | G2-Carb | 2 | 0.086 | 0.431 |
| | | | 5 | 0.086 | 0.431 |
| | | G4-Carb | 2 | 0.078 | 0.593 |
| | | | 5 | 0.082 | 0.545 |
| | | | 15 | 0.378 | 3.278 |
| | Wood Splitters | G4-Carb | 2 | 0.160 | 1.488 |
| | | | 5 | 0.160 | 1.488 |
| | | | 15 | 0.177 | 0.896 |
| | | | 25 | 0.177 | 0.896 |

(509-Docket)

Comment: Figure 3: CARB workshop presentation from March 25, 2020




(509-Docket)

Comment: Figure 4: STIHL hot soak plus 24-hr diurnal evaporative emission test results

| Technology | Equipment (Model Year > 2010) | HP Bin | Number of Test Data | Evaporative Emissions Test Data | |
|---|---|---|---|---|---|
| | | | | Hot Soak (g) | 24-hour Diurnal (g/day) |
| Gasoline 4-stroke | Blower | 5 | 5 | 0,147 | 0,548 |
| | Trimmer | 2 | 5 | 0,037 | 0,480 |
| Gasoline 2-stroke | Chainsaw | 5 | 3 | 0,087 | 0,349 |
| | Chainsaw | 2 | 2 | 0,092 | 0,224 |

(509-Docket)

Comment: Nor does CARB provide any rationale whatsoever to support the proposed modifications to the test procedures, including the proposed removal of the design certification pathway, which has been used since the adoption of the initial evaporative regulation for non-handheld products, a largely non- integrated market. Rather CARB describes the modifications as being more for "clarification" of the certification and test procedures (SRIA p. 2). But the true purpose of the modifications is revealed later in the SRIA – the modifications are "intended to reduce CARB's compliance testing burden." (SRIA p. 9.) CARB staff try to dismiss the impact on manufacturers, stating that the change in compliance testing is not expected to change manufacturer costs. That is a false claim that does not account for the impacts that will be placed on the manufacturing process if single compliance tests are no longer permitted. In addition, the change in certification pathways (i.e., the elimination of design certification) is not feasible and will have a negative downstream effect on the national SORE market, since EPA currently relies on the CARB certification for running-loss control (if a carbon canister is not used or the gas tank not sealed). CARB's stated rationale for modifying the evaporative standards is insufficient and amounts to unreasonably motivated public policy. (521-Docket)

Comment: EMA is recommending additional revisions to the proposed ABT program to improve clarity and to facilitate the use of credits generated from zero-emission products. CARB's proposed regulatory changes would eliminate the ability of manufacturers to utilize component-based certification, a critical certification pathway in a non-integrated industry where engine manufacturers sell engines to hundreds of original equipment manufacturers, distributors and dealers, that in turn

may utilize different components for their fuel systems based on the performance requirements and design limitations of specific SORE applications and platforms. A shed test, as CARB proposes, will require duplicative testing and significantly lengthen the certification timeline and ultimately result in manufacturers leaving the California market due to the added cost and complexity. (521-Docket)

Comment: CARB proposes to revise the coupon sealing procedures for gas tanks as part of the elimination of the component-based certification process. As discussed above, the non-integrated nature of the industry makes the continuing availability of this certification process both critically important and absolutely necessary. (521-Docket)

Comment: On behalf of Andreas Stihl, I'd like to thank you for the opportunity to share with you our observations on the proposed amendment. Stihl supports a transition to ZEE. Over the last year, Stihl has been certifying many professional ZEE products with CARB. The proposed amendment, however, suggests a change to a performance-based evap certification. We are firmly convinced that the current design base evap certification for SORE under 80 cc is effective and should remain valid. It's effective, because already today handheld products have the lowest evaporative emissions in the SORE sector, in some cases even better than the proposed standard for generators. It should remain valid because the testing requirements would be inconsistent with federal EPA requirements, and it would effectively prevent sustainably-minded companies like Stihl from using the existing exhaust emission credits. (3038-Oral Testimony)

Comment: Therefore, we would ask CARB to consider also these two issues during the 15-days comment period. But first and foremost, the design-based evap certification for SORE under 80 cc. (3038-Oral Testimony)

**Agency Response:**

These comments state beliefs regarding the effectiveness of design certification, claim a lack of justification for removing design certification, and recommend to reinstate design certification. Chapter XI of the ISOR describes the purpose and rationale for all Proposed Amendments to the test procedures and regulations, including removal of design certification. As described on pages 27-40 of the ISOR, the Proposed Amendments establish new and more stringent emission standards and test procedures and require all SORE to use performance certification beginning with MY 2024. As described on pages 212-213 of the ISOR, performance certification is necessary to ensure engines meet the more stringent emission standards and support the effective inclusion of hot soak emissions in the emission standards. The Proposed Amendments' hot soak plus diurnal emission standards for MY 2024 and later are zero for engines other than pressure washer engines with displacement greater than or equal to 225 cc and generator engines. Design certification cannot be used to determine the amount of credits needed to offset hot soak plus diurnal emissions from engines because hot soak plus diurnal emissions are not determined when using design certification.

In response to the statement, "As there is no leakage issue with handheld outdoor power equipment (that operate multi-positionally and are therefore designed to prevent such leakage), there is no need for hot soak plus 24-hr diurnal testing for these products, or any change for the existing testing method,": CARB disagrees with the commenter's assertion that "there is no leakage issue with handheld outdoor power equipment" and the commenter's conclusion that more stringent evaporative emission standards are not needed. The term "leakage" as used in these comments refers to fuel leaking from engines. This usage differs from discussion of out-of-state sales of SORE, which some commenters term "leakage." Fuel

leaks from handheld do occur and did occur in CARB's testing, as described in the pre-rulemaking workshop held in September 2019, which is discussed in Chapter X of the ISOR. The title of the CPSC report mentioned by the commenter is "Study of Fuel Leaks Associated with Outdoor Ground-Supported Gasoline-Powered Equipment." The scope of the report did not include handheld equipment. The commenter's assertion that the report did not mention handheld equipment is therefore irrelevant.

The comments claim additional costs associated with compliance with the Proposed Amendments would exist for handheld products and are not accounted for in the Proposed Amendments. The comment does not provide an estimate of any such costs or make any statement regarding whether any such costs would be expected to be passed through to equipment purchasers or would be absorbed by manufacturers. CARB assumed that all available emission reduction credits would be used by manufacturers for generators in MYs 2024 through 2027, as discussed on pages 55-57 of the ISOR. The economic analysis in the ISOR does not assume sales of SORE equipment using engines with displacement less than or equal to 80 cc other than generators would occur after MY 2023. As a result, the analysis does not assume an increase in purchase price for equipment purchasers due to any certification testing of equipment using engines with displacement less than or equal to 80 cc other than generators after MY 2023. The Proposed Amendments do not preclude the use of emission reduction credits to certify engines used in equipment other than generators. The commenter does not provide evidence to suggest that the use of emission reduction credits to certify engines used in equipment other than generators would result in significantly different costs than those in CARB's analysis. Please refer to Agency Response 24 in Attachment A to this FSOR for discussion of similar comments.

CARB disagrees with the assertions that compliance of current engines with the proposed evaporative emission standards indicates the emission standards are not necessary. Some evaporative families have emissions below the proposed emission standards. The emissions of other evaporative families can be offset with emission reduction credits if they do not meet the proposed emission standards and manufacturers choose to certify them. Emission reductions would not be maximized if more stringent emission standards were not adopted. Failing to maximize emission reductions and health benefits would be inconsistent with California law. Please refer to the Agency Response in section IV.A.2.4 for discussion of requests to exempt or delay implementation of all or some SORE.

CARB disagrees with the assertion that removing design certification would prevent manufacturers from using exhaust emission credits. Amendments to § 2754.1, certification averaging, banking, and trading for evaporative emission credits, are discussed on pages 229-236 of the ISOR. All engines certified to the diurnal or hot soak plus diurnal emission standards specified in § 2754(a) may participate in the ABT program for evaporative emissions.

CARB made modifications to §§ 2753(c), 2754(a), and 2755 to allow an applicant to certify an evaporative emission control system for engines with displacement less than or equal to 80 cc to the diurnal emission standards in § 2754 in lieu of the permeation emission standards in § 2755 and follow the certification procedures outlined in CP-902, adopted July 26, 2004, and amended September 18, 2017. This modification is described in the March 2022 15-Day Notice and in section II.A of this FSOR. This modification is intended to allow manufacturers of engines with displacement less than or equal to 80 cc, which are often used in handheld equipment, to earn evaporative emission credits through MY 2023. Engines with displacement less than or equal to 80 cc are not currently subject to the diurnal emission standards. This

modification allows manufacturers to earn more evaporative emission credits than could occur under the Proposed Amendments in the ISOR.

For these reasons, CARB made no changes to reinstate design certification based on these comments.

Regarding the comment, "EMA is recommending additional revisions to the proposed ABT program to improve clarity and to facilitate the use of credits generated from zero-emission products": EMA wrote this introductory comment in its letter and then provided its proposed revisions in the Exhibit F Microsoft Excel spreadsheet attached to the letter. Attachment B to this FSOR provides a transcription of EMA's Exhibit F, along with Agency Responses. Please refer to rows B-17, B-22, B-23(a), B-25, B-37, B-43, B-44, and B-45 in Attachment B for Agency Responses to EMA comments related to its introductory comment.

In response to comments that claim the Proposed Amendments are inconsistent with federal requirements: It is true that the SORE regulations require compliance with diurnal emission standards, whereas the corresponding federal regulations do not. CARB disagrees that such differences are inconsistent with Clean Air Act requirements. Please refer to the Agency Responses in sections IV.A.10 and IV.A.11 for discussion of similar comments.

Please refer to Agency Response 15 in Attachment A to this FSOR for discussion of comments regarding exhaust emission compliance testing.

In response to the statement, "CARB proposes to revise the coupon sealing procedures for gas tanks as part of the elimination of the component-based certification process. As discussed above, the non-integrated nature of the industry makes the continuing availability of this certification process both critically important and absolutely necessary": This comment states the commenter's opinions regarding fuel tank testing according to TP-901. CARB made no changes based on this comment. Please refer to Agency Response 55 in Attachment A to this FSOR for additional discussion of comments related to sealing fuel tanks for testing.

## A.18. Existing Retail Inventory

Comment: Once the new laws are in effect, will a vendor/distributor/retailer be able to retail existing/remaining inventory that was manufactured prior to the enactment date? (104-Docket)

Comment: How will the state's policy address SORE dealer inventory over the next two years as it attempts to eliminate gas-powered equipment during the transition? What does a dealer with inventory of thousands of pieces of gas-powered equipment and parts do if they can't sell it by 2024? (2001-Docket)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. These comments seem to reflect a misunderstanding of CARB's SORE regulations. CARB made no changes based on the comments. The following provides responses to and clarification for the questions.

In response to the question, "will a vendor/distributor/retailer be able to retail existing/remaining inventory that was manufactured prior to the enactment date?": the Proposed Amendments are applicable to new engines and would not prohibit the sale of

CARB-compliant engines. The SORE regulations do not require engines to be sold before the end of the year in which they are produced.

## A.19. Feasibility of emissions durability periods

Comment: In addition, PGMA proposes revising Table II-3 of the ISOR so that the emissions durability period for model years 2026 and later should be 500 hours, regardless of the engine displacement. There are two reasons for this:

A durability period of 500 hours for a portable generator is reasonable, since a 1000 hour lifetime is not typical for a portable generator.

It will be difficult to achieve a 1000-hour durability period in combination with meeting the proposed exhaust emission standards. (515-Docket)

**Agency Response:**

This comment is similar to some of those addressed in the Agency Response in section IV.A.2.3. As discussed on page 165 of the ISOR, the proposed emission standards for generator engines for MYs 2024 through 2027 are based on engines already certified for sale or lease for use in California. "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[128]] lists ten MY 2020 engine families with HC + $NO_x$ certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-2 of the ISOR. Seven of those engine families have displacement greater than or equal to 225 cc and have emissions durability periods of 1,000 hours. As shown in Table II-3 on page 43 of the ISOR, the proposed emissions durability period for MY 2024 and later generator engines with displacement less than 225 cc is 500 hours, as suggested by the commenter. CARB made no changes in response to this comment.

## A.20. Feasibility of ZEE for specific applications

### *A.20.1. Fire prevention and related safety issues*

Comment: Potential wild fires. Potential damage to private property. Potential harm to citizens. (61-Docket)

Comment: A premature transition to zero-emission SORE equipment may impede residential and commercial efforts to create and maintain fuel breaks and defensible space in forested communities, as well as impede timber operations. (548-Docket)

[128] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

**Agency Response:**

These comments assert or imply that the Proposed Amendments, which one commenter characterizes in context as a "ban on all gas-powered equipment," may result in suitable equipment not being available for fuel reduction, maintenance of defensible space, and other fire preparedness and safety tasks. CARB made no changes based on this comment.

The Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce, and will not affect existing equipment. Manufacturers will be allowed to produce equipment using existing exhaust and evaporative credits, and ZEE generator credits, until those credits are used. As described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law.

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of equipment used primarily for harvesting wood or management of land in an agricultural or agroforestry context, such as chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters and clearing saws powered by engines with displacement 40 cc and above, will be considered preempt and therefore will not be affected by this rulemaking. As noted on pages 12 and 16 of the ISOR, chainsaws powered by engines with displacement 45 cc and above have generally been found to be preempt. With regards to fire safety applications, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision. CARB disagrees that the availability of equipment to address the described need would be affected by the proposed regulations.

### *A.20.2. Firefighting*

Comment: Secondly, how are firefighters supposed to fight fire with battery operated chain saws? Or will the state be exempt from their own law? Leave us alone!! (30-Docket)

**Agency Response:**

This comment expresses concern regarding the feasibility of firefighting using ZEE and appears to suggest that CARB consider a "no action" alternative to the proposed regulation. For an explanation of the necessity for the current rulemaking and why CARB cannot discontinue the rulemaking in progress, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV.

As discussed in sections IV.A.2.5.1 and IV.A.33.1, CARB does not anticipate that the availability of suitable chainsaws for firefighting applications will be adversely affected by this rulemaking. In addition to the preemption of large chainsaws primarily used in firefighting and fire prevention efforts as discussed in the aforementioned agency responses, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision. CARB does not otherwise propose to exempt state agencies from the proposed regulation.

### *A.20.3. Timber harvesting*

Comment: California Forestry Association appreciates the close consideration of these comments, with a specific focus on worker safety and wildfire preparedness. While the Proposed Rule may be applicable to metropolitan settings, or in areas with reliable and accessible electric power sources, the conduct of Timber Operations and other forest management activities for wildfire prevention simply do not align well with the proposed regulatory text. (121-Docket)

Comment: The total weight of timber falling equipment is a legitimate and serious safety consideration. When falling timber, my chainsaw (including bar and chain) weighed more than 23 pounds. My container of gasoline and bar oil weighed more than 20 pounds. 40+ pounds is the equivalent weight CARB should be using when comparing the weight of gasoline powered to electric chainsaws and battery packs. This is assuming that electric chainsaws are capable of performing this occupation and are of a weight that is safe to use, which is currently not the case. Ancillary falling equipment such as axes, falling wedges, fire extinguishers, falling jacks and safety apparel would be the same regardless of chainsaw type. (517-Docket)

**Agency Response:**

These comments do not directly request a change to the Proposed Amendments, but express concern regarding the feasibility of conducting timber harvesting and fuel reduction operations with ZEE. CARB made no changes in response to these comments. As described in section IV.A.2.5.1 and IV.A.20.4, chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters and clearing saws powered by engines with displacement 40 cc and above, are preempt and not subject to California emission standards. As described on pages 13-21 of the ISOR, ZEE equivalents generally give similar performance to SORE that are not preempt.

### *A.20.4. Trail maintenance*

Comment: I am writing to you on behalf of San Diego Ultra Running Friends, Inc.("SURF"), a California nonprofit corporation that is tax-exempt under Section 501(c)(3) of the Internal Revenue Code (and the equivalent California statute). For more than 15 years, SURF has conducted a trail maintenance program in the mountains of San Diego County. For more about the history of our program, known as TrailFit, please visit www.sdtrailfit.org or SDTrailFit on Facebook. The trails we maintain are located 30-50 miles from central San Diego in a sparsely populated area. These trails include about 40 miles of the Pacific Crest Trail, a National Scenic Trail. Each year, we clear brush, remove downed trees and do tread repair on approximately 25 miles of trail. We also do other projects, as requested by the agencies we work with, such as trail building/reroutes, graffiti removal and installation of trail signage. We work primarily in partnership with the California State Park system and the Descanso District of the Cleveland National Forest. I personally have led the TrailFit program from its inception and in a typical year I spend over 100 days out on the trail leading crews, scouting trail, etc. At this time, there are no employees within the Descanso District of Cleveland National Forest who are tasked with trail maintenance within the district. Nearly 100% of such work is being performed by volunteers working with SURF and the San Diego Mountain Bike Association. Anza Borrego State Park and Cuyamaca Rancho State Park (with hundreds of miles of trails) have only two employees assigned for trail work and thus both parks rely heavily on volunteers from SURF and other nonprofits. (1-Docket)

Virtually all of our volunteers are current or former ultra runners (runners who run in races for distances longer than a marathon) and thus they have a high level of fitness far beyond that of a typical volunteer. This enables our group to maintain trails that are farther removed from trailheads and other access points. Because ultra running races tend to use many of our local mountain trails, our members are motivated to work on these more remote trails (whereas most other volunteers in the San Diego area are unwilling to drive an hour each way to a trail work location let alone hike several miles each way to the work area). It would not be unusual for our crews to hike 3 or 4 miles to the work location, clear trails for half a day and then hike back out. We note that State Park employees, who also use SORE, are usually working on the trail for a full 10 hour workday. (1-Docket)

Generally speaking, we have no fundamental objection to replacing SORE with ZEE in an urban setting. Heck, who doesn't hate a noisy leaf blower? But, making such a replacement in the context of trail maintenance raises many insurmountable problems. (1-Docket)

In our work we make considerable use of SORE, primarily chainsaws, brush cutters (aka brush saws), hedgers and pole saws. The agencies we work with require that when operating any of these types of power equipment, we must wear safety items including Kevlar chaps, a sawyer helmet, ear protection, and eye protection (which requirements would also apply to ZEE). We also carry a first aid kit and during certain fire conditions, a small fire extinguisher. This is all in addition to one's personal gear: backpack, lunch, water, hat, sunblock, cell phone, jacket, work gloves, etc. So, before we even set one foot on the trail, our crews are already carrying substantial amounts of weight. (1-Docket)

A typical crew would consist of 4-8 individuals, with one or two persons operating a brush cutter, another running a hedger, and the rest of the crew doing either tread repair/improvement or stashing the brush cuttings. The crew members not operating power equipment will be carrying various hand tools, such as loppers, Pulaskis, McLeods and pitchforks. During a typical half day of trail work (excluding driving time), we will clear between .5 and .75 miles of trail. Even our volunteers are pretty much wiped out after 4-5 hours of lifting, digging, hauling, loppering, etc. (1-Docket)

In general, the battery life ZEE such as chainsaws, brush cutters and hedgers, when running at full power is in the range of 15-30 minutes. With SORE, we are normally running our equipment at full power on a more or less continuous basis and we would need dozens of backup batteries to get thru a typical project. (1-Docket)

Comment: It simply is not realistic to expect trail workers, unpaid volunteers or paid agency employees, to lug in heavy amounts of back up batteries needed for ZEE operations on top of everything else that is required to do a project. (1-Docket)

Comment: Based on my experience, I believe that for trail maintenance, the use of ZZE in replacement of SORE is only feasible where (1) the parking area/trailhead is very close to the trail, (2) the total distance for the project itself, including hiking from the trailhead, is under one mile, and (3) the work to be accomplished involves relatively small brush and trees. Unfortunately, almost none of our projects fall within these criteria. Indeed, a project that fit these criteria could probably be best handled by a crew of typical non-ultra runner volunteers using only hand tools. (1-Docket)

Comment: On behalf of the 14,300-member Pacific Crest Trail Association (PCTA), we are writing in general support of the proposed SORE regulations. AB 1346 (Berman) requires CARB to adopt cost-effective and technologically feasible regulations to prohibit engine exhaust and evaporative emissions from new small off-road engines by July 1, 2022. We laud the goal of CARB's efforts to reach zero emissions and agree that battery-operated equipment is most appropriate in urban areas

for lawnmowers and leaf blowers, where recharging is easily accessible and battery weight is not an issue. (508-Docket)

Comment: While we favor the new law's goals, we must point out that it will affect some aspects of the trail building and maintenance that the PCTA performs on the Pacific Crest National Scenic Trail (PCT) and associated side and connecting trails. Therefore, we want to point out the unintended consequence of this proposal regarding its effect on trail maintenance. (508-Docket)

The PCTA is the primary private partner with the U.S. Forest Service, the Bureau of Land Management, the National Park Service, and California State Parks in the management and maintenance of the PCT. The PCT is one of eleven Congressionally designated National Scenic Trails and the only one in California. The PCTA has 30 full-time employees and coordinates with more than 2,000 volunteers contributing over 100,000 hours of work annually to maintain the PCT. The PCTA also acts as a technical advisor for the agencies and provides the necessary training and certification standards to the volunteers who build and maintain the trail. Our staff and volunteers who handle chain saws are trained and certified to meet the U.S. Forest Service standards. (508-Docket)

This private-public partnership is rooted in the 1968 National Trails System Act, which authorizes land management agencies "… to encourage volunteers and volunteer organizations to plan, develop, maintain, and manage, where appropriate, trails throughout the Nation." The purpose of the National Trails System Act is to:

> "…provide for maximum outdoor recreation potential and for the conservation and enjoyment of the nationally significant scenic, historic, natural, or cultural qualities of the areas through which such trails may pass." (508-Docket)

The PCT travels through:

- 2,650 miles in California, Oregon, and Washington, of which 1,692 are in California
- 48 Congressionally-designated Wilderness Areas
- 25 National Forest Units
- 22 California Counties
- 7 BLM Field Offices
- 6 National Parks
- 5 California State Park Units
- 5 National Monuments
- 3 California State Wilderness Areas
- 2 Native American Sovereignties
- Private Lands (508-Docket)

The PCT connects a variety of ecosystems along the way, including desert, old-growth forests, alpine tundra, grasslands, and rainforest. In addition, the PCT is the sole natural connection between many of our state parks, national forests, national parks, and other protected lands in California and along the west coast. This connectivity is crucial for the survival of many wildlife species as they grapple with the rapid onset of climate change. The PCTA has actively engaged in the Governor's efforts on the 30X30 Initiative and is extremely supportive of protecting and preserving the lands and waters of California. More than 25 million people live within an hour's drive from the PCT. In addition, the ongoing pandemic has laid bare the importance of trails and outdoor recreation. During the last year, the use of trails and public lands by Californians and visitors to the state has hit record numbers. The

PCT must be accessible, useable, and safe for the public as a resource, and the maintenance of the trail remains a high priority. (508-Docket)

To maintain the PCT as a footpath for hikers and horseback riders, the PCTA uses a variety of approaches. Trail maintenance may include cutting back overgrown brush, removing dead and downed trees from the trail, removing dangerous and low branches, creating water bars to assist with appropriate water drainage, widening the tread, and appropriately sloping the tread to prohibit trail creep or trail collapse. In wilderness areas, where motorized and mechanized tools are prohibited, our volunteers use crosscut saws and other hand tools to cut brush and trees and maintain the tread, often with the help of the Back Country Horsemen of California. This work is painstakingly slow. In non- wilderness areas, many of which are several miles from a trailhead, chain saws and power brushers are vital for our maintenance duties. (508-Docket)

Comment: Under the new rules, we would need to replace or phase out seven models of chain saws, pruning saws, and brush cutters. We are concerned about the higher cost of the new tools and the batteries, and the limitations of the batteries. With a battery having an expected run time of 45 minutes under ideal conditions, we estimate that we'd need five to seven batteries per tool for one full day of work. Another concern is that the battery tool owner's manuals have explicit warnings and limitations that make their use in the backcountry challenging. We would be unable to recharge batteries in the backcountry without access to power. Solar charging is not always an option as we work in cloudy conditions, rain, snow, and dense smoke. Additionally, owner's manuals state to "operate the charger only indoors, in dry rooms and within an ambient temperate range of 41F to 104F." The owner's manual also warns of exposing the tools or batteries to rain or wet conditions. If exposed to rain during work, remove the battery and allow it to dry indoors. This is not viable for our work in the backcountry over a weekend or a two-week-long project. These weather limitations make the use of battery tools difficult, if not impractical. (508-Docket)

The manual describes the proper battery storage and use, namely, only use and store within 14F to 122F and never in direct sunlight or a vehicle in hot weather. Again, we use our tools in all types of weather and will often have a basecamp set up where we store our tools in trucks or trailers, hike out for the day to work, and then return to camp. We would not be able to safely or adequately recharge or store the batteries based on the owner's manual instructions and our real- world working conditions. We currently store all our equipment in tool caches and outdoor sheds throughout California that are not temperature-controlled and often get below 14F and above 122F, depending on the season. Since we are working with volunteers to perform often dangerous work, safety is always our top priority. We must abide by the manufacturer's rules as a matter of principle. (508-Docket)

Comment: Erin Gilbert on behalf of the Pacific Crest Trail Association. We greatly appreciate the time that staff and Board members have spent with us to discuss the proposed regulation and how it may impact the trail maintenance on the PCT. The PCT is a national scenic trail designated by Congress and travels 2,650 miles from Mexico to Canada, of which 1,700 miles are in California. The trail traverses 22 California counties, five California State Parks, three wilderness areas, and a variety of federal lands. The PCTA operates under an MOU as the primary partner with Federal agencies and California State Parks on the management and maintenance of the trail. The PCTA has over 2,000 volunteers that contribute over a hundred thousand hours of work annually on the trail. All volunteers who handle saws are trained and certified to the National Forest Service standard. While we support the direction of the proposed SORE regulation and agree that ZEE is appropriate in urban areas, we do want to point out the unintended consequence of this proposal and the effect on trail maintenance in the back country. (3041-Oral Testimony)

At this time, ZEE tools are unable to tackle most of the work we encounter in the back country. Our trail crews often hike four to five miles out for a weekend or up to two weeks to do trail maintenance in all types of weather. We estimate we would need five to seven batteries per tool for one day of work. We would not be able to recharge batteries in the back country, as owner manuals state to charge only indoors in dry rooms in specific temperatures. The tools and batteries should not be exposed to rain or wet conditions. (3041-Oral Testimony)

Comment: I'm part of the California Mountain Biking Coalition. And our members are the local trail groups who do maintenance on trails throughout the state of California. It's done by thousands of volunteers, staff, hand tools, electrical tools, and gas tools. And we're big supporters of the environmental advantages of zero-emissions equipment and are generally supportive of this regulation. However, we're also concerned that the zero-emissions equipment is not ready for all users today and in the timeline specified. Our particular concern is remote use, similar to a concern exposed -- expressed by the PCTA earlier. Some of our members work in urban areas where you can plug things in easily, but many work in remote areas, where you actually have to hike for hours to get to equipment. So understand that the current gas is about ten times as dense as batteries. So imagine today you have to pack in 20 pounds of gas to work for a day, instead you'd have to pack in 200 pounds of batteries. (3065-Oral Testimony)

Comment: So while these tools are small in number, they're an essential importance for keeping these opportunities open for recreation in remote areas and also for trail -- for firefighting and prevention needs. (3065-Oral Testimony)

**Agency Response:**

These comments do not directly request a change to the Proposed Amendments, but raise concerns regarding the feasibility of conducting trail maintenance with ZEE. The commenters provide background on the Pacific Crest Trail, trail maintenance equipment and typical practices, the commenters' organizations, and the commenters' perspectives. CARB acknowledges the requirements of AB 1346. CARB made no change based on the comments.

Several of these comments express general support for the goals of the rulemaking. CARB appreciates this support. The comments otherwise describe several concerns regarding the suitability of ZEE for trail maintenance operations, particularly with regard to remote worksites and the perception that carrying adequate ZEE batteries will be burdensome. The commenters' statements are expressions of opinions and do not include evidence to support the commenters' conclusions. The commenters' claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenters' assessments of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[129]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. The Proposed Amendments do not require anyone to stop using SORE equipment, nor do they require anyone to use ZEE. As described on pages 13-21 of the ISOR, ZEE are generally comparable to SORE equipment in most respects, particularly for

[129] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

smaller equipment, and for most SORE the weight and inconvenience associated with extra batteries is comparable to that associated with gasoline-powered SORE's need for refueling. Please refer to the Agency Responses in section IV.A.35 for a discussion of comments on technological feasibility and cost-effectiveness of ZEE, including a comparison of the energy density of batteries and liquid fuel in section IV.A.35.2. With regard to chainsaws and brush cutters in particular, which are cited by commenters as being specifically needed for trail maintenance, chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters and clearing saws powered by engines with displacement 40 cc and above are preempt, as described in the Agency Response in section IV.A.29.1.2. As discussed in the Agency Responses in sections IV.A.2.5.1, IV.A.20.2, and IV.A.33.1, CARB does not anticipate that the availability of suitable chainsaws for firefighting applications will be adversely affected by this rulemaking.

## A.21. General opposition to the rulemaking

### *A.21.1. Living landscapes*

Comment: And if people in the cities can't grow lawns economically due to the high cost of mowing, converting to rock gardens and wood decks mean that the grass won't be there to cleanse the air and absorb heat. (6-Docket)

Comment: Further, the living landscapes our equipment is used to install and maintain contribute to tangible environmental benefits, including reductions in the heat island effect, carbon sequestration, trapping dust and particulate matter, providing habitat for pollinators, and producing oxygen. (34-Docket) (Form Letter A-Email) (Form Letter B-Email) (Form Letter F-Email) (Form Letter H-Email)

Comment: While I appreciate the efforts of legislators and CARB to address California's air quality needs, the small engine-powered equipment category is a comparatively minimal contributor to the state's emissions. Further, the living landscapes our equipment is used to install and maintain contribute to tangible environmental benefits, including reductions in the heat island effect, carbon sequestration, trapping dust and particulate matter, providing habitat for pollinators, and producing oxygen. Our gasoline powered products are also needed to combat the catastrophic toll that fires and other natural disasters have taken on our environment and communities in California. (Form Letter G-Email)

**Agency Response:**

These comments do not request changes to the Proposed Amendments. The commenters claim or suggest that the Proposed Amendments would cause people to convert their lawns and other living landscapes to rock gardens, wood decks, or other nonliving landscapes for economic or other reasons not provided in the comments. However, the commenters did not provide evidence to support their claims, and CARB does not have evidence to support their claims. While ZEE can have higher upfront purchasing costs than SORE equipment, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. For additional explanation of the benefits of the current rulemaking, please refer to ISOR sections I.D and IV. Please refer to sections II.A.7 and II.D in this document, and ISOR Appendix I SRIA sections B and C, for additional discussion and analyses of potential economic impacts and benefits for California residents and businesses under the Proposed Amendments.

As described in ISOR sections I.A and III, SORE emissions are still expected to grow as California's population continues to grow. Emissions of smog forming pollutants from SORE already exceed those from light-duty passenger vehicles and are forecast to be nearly twice those from light-duty passenger vehicles in 2031 under current regulations. Maximum emission reductions must be achieved from SORE in order to avoid this increase in emissions and instead reduce SORE emissions to achieve 2016 State SIP Strategy commitments necessary to attain the ozone NAAQS and protect public health and welfare. Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards for ozone and other criteria air pollutants at the earliest practicable date. Consequently, CARB made no changes based on these comments. For additional explanation of the necessity for the current rulemaking specific to SORE, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, and IV.

The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. Gardeners and other people can continue to use and repair their current SORE equipment until the end of its life. A landscaping business would not need to purchase a full suite of ZEE at once, thereby avoiding a significant one-time cost to transition to ZEE. Rather, landscaping businesses can gradually purchase ZEE to replace SORE equipment as it breaks or for other business reasons, such as upgrading equipment.

Please refer to the Agency Response in section IV.A.20.1 and IV.A.20.2 for discussion of comments related to the use of SORE equipment to fight or prevent fires.

### *A.21.2. Relative importance of SORE*

Comment: **Subject: Don't ban gas equipment**
The factories make far more noise than a chainsaw, you are hurting more people than helping anything so stop the crap and focus on the people of America and making their lives better for once instead of continuing to hurt everyone but yourselves. (87-Docket)

Comment: No need to eliminate gas powered equipment when there are much bigger issues in this country. (118-Docket)

**Agency Response:**

The Proposed Amendments are specifically designed to protect the health and welfare of all California residents by reducing emissions of pollutants that have multiple known adverse health effects. Reducing noise caused by the use of SORE equipment is one of many benefits of the Proposed Amendments, but it is not the primary goal of the Proposed Amendments. Emissions of $NO_x$ and ROG from SORE contribute to three criteria air pollutants—ozone, PM, and $NO_2$. As described in Chapter I of the ISOR, all of these criteria air pollutants have adverse health effects. Health benefits of the Proposed Amendments for California residents include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease. Further, Health and Safety Code (HSC) section 43018 requires that CARB endeavor to achieve the maximum degree of

technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards for ozone and other criteria air pollutants at the earliest practicable date. Consequently, CARB made no changes based on these comments. For additional explanation of the necessity for the current rulemaking, its benefits for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, and IV.

### *A.21.3. Request to work with stakeholders to develop an alternative rulemaking*

Comment: STIHL would be grateful if CARB would consider the above-mentioned comments. STIHL is prepared to jointly develop a regulatory plan for a transition towards ZEE that effectively reduces emissions, responds to the needs and expectations of customers and small businesses, and allows innovative solutions to be developed and businesses to implement and adapt accordingly. (509-Docket)

Comment: In light of the foregoing, the Board should not adopt the Proposed SORE Amendments, but instead should direct CARB staff to work in good faith with all stakeholders to develop a cost-effective SORE emission reduction program to be phased-in over a reasonable period of time, taking into account technical feasibility and cost-effectiveness, and beginning no earlier than model year ("MY") 2025. EMA has detailed that sort of reasonable alternative program in these comments. (521-Docket)

Comment: Given these concerns and the following comments, OPEI opposes the Proposed Rule in its current form. OPEI requests the Board postpone the decision to adopt the Proposed Rule and direct staff to work with industry and stakeholders to develop a data-supported and fact-based rule, focused on the goals outlined in the 2016 State Implementation Plan – which are required to meet federal air quality standards. (524-Docket)

Comment: Based on the recent conversations with CARB staff at this point we believe that the staff is unwilling to amend their proposal prior to December 9th despite industry input and public comments. This is disappointing and not reflective of CARB's statutory duty pursuant to the California Administrative Procedures Act. (533-Docket)

Comment: While we shared our Alternate Proposal with the staff last month, they have not carefully reviewed or assessed its efficacy. We ask that the Board direct Staff to work with us and other stakeholders to develop an implementable alternative program that can and will provide the benefits that CARB is seeking, but at a lower cost and without undue market disruption. We look forward to working with you and your Staff on such a program. (2011-Docket)

Comment: The Outdoor Power Equipment Institute supports ZEE as part of an emissions reduction strategy. However, there is currently no one-size-fits-all ZEE approach to satisfy the full range of SORE-powered equipment in-use cases. OPEI asks the Board to postpone today's decision to adopt the proposed rule and request staff to address rulemaking concerns and work with industry to develop a technologically feasible strategy. (3039-Oral Testimony)

**Agency Response:**

These comments suggest that CARB discontinue this rulemaking or initiate an alternative rulemaking with a different scope. These comments refer to the commenters' other

comments, which are addressed throughout this FSOR. CARB made no changes based on these comments. The Proposed Amendments will result in emission reductions that meet the expected emission reductions from SORE in the 2016 State SIP Strategy (ISOR Chapter IV), take into consideration impacts on small businesses (ISOR Chapter VII), and are technologically feasible and cost-effective (ISOR Chapters I.E and VII).

In response to the statement, "Based on the recent conversations with CARB staff at this point we believe that the staff is unwilling to amend their proposal prior to December 9th despite industry input and public comments. This is disappointing and not reflective of CARB's statutory duty pursuant to the California Administrative Procedures Act": APA does not require agencies to modify proposals between publication of the notice of an ISOR and the date of a public hearing to consider the proposal in response to industry input or public comments. APA allows for 15-day modifications, which CARB made in response to industry input and other public comments, as described in the 15-Day Notices. CARB staff provided ample opportunities to the public and stakeholders to participate in development of the Proposed Amendments, as described more fully in Chapter X of the ISOR, in compliance with Government Code section 11346.45.

Regarding OPEI's comment "there is currently no one-size-fits-all ZEE approach to satisfy the full range of SORE-powered equipment in-use cases": Please refer to the Agency Response in sections IV.A.35 for discussion of the basis for CARB's determination that the proposed ZEE approach is technologically feasible and allows adequate time for the ZEE market to mature. Each of OPEI's concerns are addressed in other sections of this chapter IV.

### *A.21.4. Restrictions and mandates*

Comment: The state of California has restricted those of us that live here too much. So many restrictions and mandating that people are leaving the state in droves. Petroleum based vehicles and equipment are by far cheaper to run. (293-Docket)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. The following response provides clarification and context for several of the points within the above comments.

The commenter's expression of opinions regarding restrictions imposed by the State of California and people leaving the state are not responsive to the Proposed Amendments.

In response to the statement, "Petroleum based vehicles and equipment are by far cheaper to run,": Part E of the Executive Summary in the ISOR explains that ongoing costs for ZEE are typically lower than for SORE because of savings on gasoline and maintenance. Section C.1.d of Appendix I in the ISOR includes additional discussion of ongoing costs.

## A.22. Health Benefits

Comment: **Medical Costs**
Only two medical costs (cardiovascular premature mortality and ER visits for asthma attacks) were factored into your cost : benefit analysis for this rulemaking. You mentioned that there are many other medical costs. Some SORE-induced disorders follow. These should be factored into this SORE rulemaking if you have time. If not, please do so for future rulemaking. (523-Docket)

**Noise**
SORE noise pollution levels have been proven to elevate stress, exacerbate a wide range of chronic medical disorders (e.g. heart disease, diabetes, and immune disorders including cancer), increase antisocial behaviors (e.g. violence), decrease hearing ability, disturb napping (e.g., of young children, geriatrics, pets, and those working at home), repel wildlife (e.g. pollinators) and pets, disrupt concentration, increase accidents/injuries, decrease productivity, and interfere with the quiet enjoyment and utility of one's premises. Laborers using SORE are at elevated risk of hearing impairment. (523-Docket)

**Gases and Airborne Toxins**
Gas emissions from ICE have been proven to decrease longevity, induce shortness of breath, exacerbate chronic respiratory disorders, increase risk of cardiovascular disorders (e.g. heart attack), trigger allergic reactions, decrease lung function, increase upper respiratory infections, diminish cognitive function, decrease alertness, and lower endurance. The combination of ICE gases impairs heart, liver, and lung capacities to expel toxins.

*Heavy metals*, toxic and fatal in sufficient doses, increase oxidant damage, cancer, cardiovascular disease, organ damage, and neurodegenerative disorders (e.g., Parkinson's and Alzheimer's).

*Benzene* induces birth defects, leukemia, anemia, bone marrow damage, cancer, drowsiness, and immune impairment.

*Nitrogen oxides* cause chronic respiratory disorders (e.g., cancer), cardiovascular disease, and diabetes mellitus.

*Sulphur oxides* induce shortness of breath and decrease longevity.

*Carbon dioxide* exposure may temporarily cause headache, dizziness, shortness of breath, and fatigue; chronic impairment of visual acuity, cognitive function, and kidney function; cancer, and brain damage.

*Carbon monoxide*, fatal in high doses, causes confusion, shortness of breath, diminished endurance, impaired cognitive function, and brain damage.

*Formaldehyde* temporarily induces wheezing and fatigue; causes cancer, birth defects, and asthma.

*Aldehyde* causes cancer, liver damage, and cilia impairment.

*Volatile organic compounds* induce fatigue and shortness of breath; cause respiratory disorders, cancer, cardiovascular disorders, liver dysfunction, kidney dysfunction, cognitive impairment, and dementia.

*Methane* temporarily induces shortness of breath, weakness, and drowsiness; increases ground-level ozone (which kills 1 million people annually worldwide). (523-Docket)

<u>Particulate Matter</u>
Fine particulate matter (PM<2.5um) pollution is from engine emissions as well as debris that is dispersed from the ground into the air: This may be carried up to hundreds of miles by wind and remain airborne for weeks. Shorter durations and distances are probably more typical, but further

research is needed. Locations where PM emissions are higher have chronically elevated PM levels. PM from decomposing detached organic matter launched into the air commonly contains pathogenic microbes, pollen, pesticides, fertilizers, and herbicides. PM increases risk of preterm birth disorders and mortality, cancer, mutagenesis, cardiovascular disease, chronic kidney disease, exacerbation of respiratory disorders, and increases risk of Alzheimer's Disease. (523-Docket)

Comment: The CA Dept. of Public Health probably has data on each of the above disorders and annual costs of treating each. For future publications on any emissions issue, CARB should use more complete data on morbidity and mortality costs to estimate the benefit to cost ratio. A more comprehensive medical cost estimate is vital for the evaluation of any policy. If a more complete cost analysis reveals a benefit : cost ratio of 3.9 while a cursory analysis reveals a ratio of 1.3, the implication is that thrice as much funding is warranted. (523-Docket)

Comment: A more comprehensive analysis also avoids being misquoted, e.g., "CARB estimated the benefit to cost ratio to be 1.3." In haste, the important qualifications you made may be omitted. (523-Docket)

Comment: References on Medical Effects of Ice (523-Docket)

**Agency Response:**

The commenter provided a list of more than 60 citations for published papers about health effects from diesel and gasoline-powered equipment, particulate matter and noise pollution and requests that CARB perform a different health benefits analysis. CARB made no changes based on these comments. CARB thanks the commenter for his support and references on the health impacts of exposure to pollutants from internal combustion engines. The negative health outcomes included in the economic analysis are not the only ones associated with exposure to $NO_x$, ROG, and PM, as described in Chapter IV of the ISOR. The full list of citations can be found in Dr. Bezanson's comment letter that is included in the rulemaking record and is available at the CARB website for public comments submitted for the SORE rulemaking, here: https://ww2.arb.ca.gov/applications/public-comments?p=comm&s=bccommlog&l=sore2021.

## A.23. Hydrogen Generators

Comment: **Future RV Motorized Power Trains** [slide 26]

- The RV industry is studying the applicability of fuel cells in the context of the 5 attributes, e.g. where to get hydrogen, how/where to store it, capacity, safety, temperature, etc., and of course, cost.
- There will still be storage batteries to both store energy and balance the loads.
- While the unit is "dry camping" either the primary fuel cell or a secondary fuel cell will run continuously. (531-Docket)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. CARB made no changes based on the comment. The following response provides clarification and context for several of RVIA's points within the above comment. CARB recognizes that the fuel cell market,

as well as the commercial hydrogen/methanol market are still developing. The Proposed Amendments allow more time for generators to meet emission standards of zero and do not require anyone to stop using their SORE generator.

## A.24. Implementation Timing

Comment: Comment 19 – Comments to Regulatory Orders, Test Procedures and Certification Procedures
Setting aside the concerns outlined in the previous comments, OPEI provides the following comments to the rulemaking Regulatory Orders (RO), Test Procedures (TP) and Certification Procedures (CP). Additional details and comments are included in Annex A.

Comment 19-1: Effective dates for many proposed amendments are unclear
The effective dates for many proposed amendments are unclear. For example, it is proposed that "engine" definition in RO 2401 is updated. The updated definition may impact engine certification, ATB strategies, replacement engine strategies and service part strategies and will require transition times. Another example is several sections in RO's propose that the labels and warranty statements are reformatted. This will require manufactures to make changes to labels and warranty statements. A third example is the revised compliance testing in 2407. There many other sections in RO's, Part 1054 and Part 1060 for which the effective dates are unclear. OPEI is seeking clarification of the effective dates of these changes if the Proposed Rule is adopted. (524-Docket)

**Agency Response:**

OPEI's comment 19-1 is similar to other comments from OPEI. The comment requests clarification regarding the effective date of certain provisions in the Proposed Amendments. In response to the commenter's request: Provisions of the Proposed Amendments which do not specify a subsequent effective date would apply for any new certification application submitted on or after the effective date of the Proposed Amendments. Attachment A to this FSOR provides CARB responses to OPEI's comments presented in OPEI's Annex A, which accompanied OPEI's first November 29, 2021, letter submitted by Gregg Knott during the 45-day comment period. Please refer to Agency Response 1 in Attachment A for discussion of comments on the definition of "engine." Please refer to Agency Responses 6(b) and 7 in Attachment A for discussion of comments on labeling and warranty statements. Please refer to Agency Response 15 in Attachment A for discussion of comments on new engine compliance testing. Please refer also to Agency Response 100 in Attachment A to this FSOR for discussion of comments related to the effective date of provisions in the Proposed Amendments.

## A.25. Incentives

### *A.25.1. Air District Programs*

Comment: For example, we have been offering funding through an innovative grant program to exchange residential gas-powered lawn care equipment for zero-emission equipment since the early 2000s and added a commercial lawn care grant program in recent years. What we've learned through these efforts is that zero-emission equipment is more readily available, but significant challenges remain in widely deploying this equipment. (3046-Oral Testimony)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. CARB made no change based on the comment. CARB appreciates the commenter sharing their perspective.

### *A.25.2. Funding for other users*

Comment: Over the years, SURF has invested several thousand dollars in trail maintenance equipment, including SORE. Under AB 1346 we understand that the State of California is proposing some financial assistance for landscape companies to replace SORE with ZEE but we are not aware of any similar assistance for groups such as ours. We are a tiny non-profit with less than 300 members and it would be financially impossible for us to replace all of our SORE with ZEE. (1-Docket)

**Agency Response:**

This comment is beyond the scope of the rulemaking as described in the October 2021 45-Day Notice. The scope of the rulemaking does not include allocating funding for incentives to transition to ZEE, specifying details of the implementation of incentive programs to transition to ZEE, or making a determination regarding eligibility of an entity to participate in any program to transition to ZEE. This comment does not request a change to the Proposed Amendments. CARB made no changes based on the comment. The following response provides clarification for several points within the above comment. The Budget Act of 2021 provided $30 million in the FY21-22 California state budget "to create a program, or utilize an existing program, to provide incentives for professional landscaping services in California operated by small businesses or sole proprietors to purchase zero-emission small off-road equipment." The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. The Proposed Amendments do not require SURF to replace the SORE equipment that SURF currently owns. SURF can continue to use and repair their current SORE equipment until the end of its life (e.g., until the SORE equipment breaks or SURF decides to upgrade equipment).

### *A.25.3. Propane*

Comment: *[WPGA respectfully asks that CARB:]* Allow incentives funding for generators that utilize renewable propane. (539-Docket)

**Agency Response:**

This comment is beyond the scope of the rulemaking as described in the October 2021 45-Day Notice. The scope of the rulemaking does not include providing incentives for generators that utilize renewable propane. CARB made no change based on this comment.

### *A.25.4. Rooftop solar incentives*

Comment: Please encourage continuation of incentives for solar panels on every rooftop. (365-Docket)

**Agency Response:**

This comment suggests that CARB undertake action to provide continued incentives for installation of rooftop solar installations. The comment's suggestion is beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comment. The scope of the rulemaking described in the October 2021 45-Day Notice does not include making changes to rules regarding incentives for solar installation. The SORE regulations do not contain provisions related to incentives for solar panels on roofs. The current rulemaking focuses on reducing emissions from SORE.

### *A.25.5. Workforce development*

Comment: In addition to funding for the actual equipment there should be money allocated to properly educate the workforce to operate the equipment. (533-Docket)

Comment: There must also be training for the equipment dealers and maintenance of this equipment and also opportunities for mechanics within landscape companies to learn how to make both minor and major repairs to keep ZEE SORE in operation. (533-Docket)

Comment: The California Legislature has appropriated only $30 million for your agency to distribute to small proprietor landscapers and help them begin to acquire and transition to new, zero emission electric and manual equipment. More funding will be needed. Funding also must be provided to support training programs to help landscapers switch to clean tools. (556-Docket)

**Agency Response:**

These comments are beyond the scope of the rulemaking as described in the October 2021 45-Day Notice. The scope of the rulemaking does not include providing funding for workforce development. CARB agrees that workforce development training for dealers, mechanics, and landscapers would be beneficial. CARB made no change based on these comments.

## A.26. Internal consistency of SORE provisions

Comment: CARB's proposed revisions in Appendices F and G also create inconsistencies even within the CARB regulations by deleting the bonding requirements in the Appendices. (521-Docket)

**Agency Response:**

This comment appears to express the belief that the Proposed Amendments delete bonding requirements previously present in California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1054) and California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1065), and that this results in internal inconsistency of CARB regulations. CARB made no changes in response to this comment.

When CARB adopted California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1054) in October 2012, based on the text of Title 40, Code of Federal Regulations, Part 1054, certain federal text was not incorporated to reflect California-specific needs, such as maintaining consistency with existing California regulations. In particular, section 1054.690 ("What bond requirements apply for certified engines?") was not adopted. The entry in the table of contents for

section 1054.690 was incorporated into California's Part 1054 in the 2012 adoption, even though the section to which it referred was not adopted. The Proposed Amendments would remove this table of contents entry.

A provision in California Part 1054, paragraph 1054.255(c)(1), stipulating that failure to comply with bonding requirements that apply (e.g., those in Title 13, California Code of Regulations, section 2774) may be grounds to deny, suspend, or revoke a certification (clarified in the Proposed Amendments with the California-specific term "Executive Order") is retained. Similarly, provisions in California Part 1065 in section 1065.170(c)(1)(i), regarding "bonding" in the context of filter media construction, and in section 1065.255(b)(5)(i), regarding "bonding" in the context of gas chromatography construction, are retained under the Proposed Amendments; no other references to "bond" or "bonding" exist in the present text of California Part 1065.

CARB disagrees that the Proposed Amendments delete any bonding requirements in Appendices F or G, or introduce inconsistency related to bonding requirements.

## A.27. Portable generators for emergency backup power

Comment: And then there's my 80+year-old neighbor, who lives alone in the woods off the grid. She has solar panels for electricity, with a generator for when the sun doesn't shine due to prolonged bad weather, especially when the days are short. She needs a gas-powered backup generator to charge her storage batteries. No power, no light. And no water from her well pump. (6-Docket)

Comment: -inability to continuously generate electricity from a gas powered generator in an emergency

We have been involved with homeowners and business owners that suffer from power loss, fires, flooding and other losses and our gas powered small engine equipment has been a lifesaving resource to help them! This cannot be taken lightly. (102-Docket)

Comment: Will generators be exempt? There will be an on-going need to generate power to charge or run electrical equipment in the field. Public safety depends on it. (113-Docket)

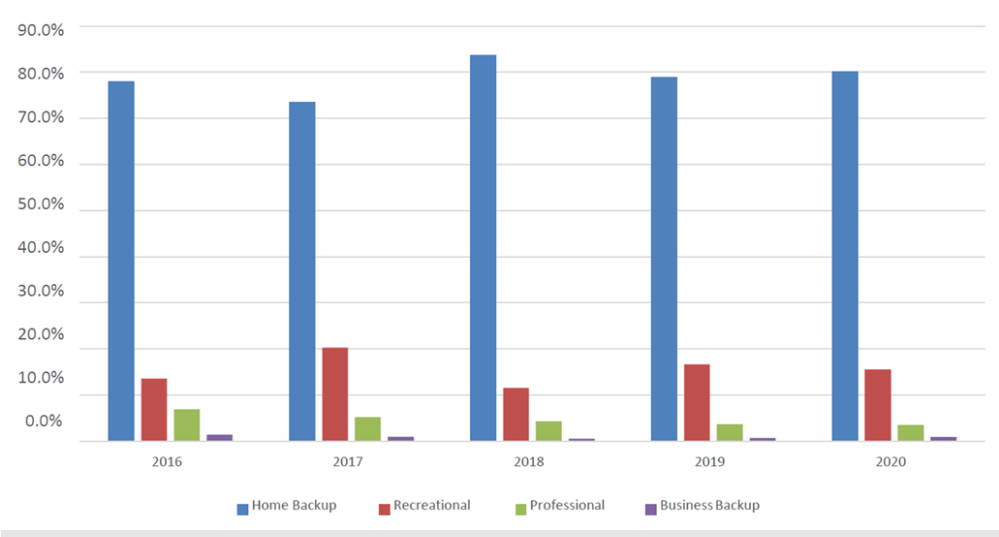
Comment: SORE 2021 will cause extreme hardships on people who depend upon generators during the power grid shutoffs. People need generators to refrigerate their medications, operate their medical equipment, and for heating and cooling during extreme temperatures. (489-Docket)

Comment: Our concerns with the Proposed Amendments, which are explained more fully in Attachment 1, are as follows.
First, the Proposed Amendments do not fully appreciate the fact that spark-ignited portable generators are a unique product, used primarily for emergency home backup power, unlike other SORE equipment and zero emission generators, which are used primarily for discretionary activities. (515-Docket)

Comment: Portable generators are a unique product (515-Docket)

Comment: **A Large Majority of Consumers Use Portable Generators for Emergency Back-up Power**
The ISOR states that "[s]ome small portable generators are purchased for home backup power."[4]

[Footnote 4: ISOR, at p. 125.] But this assertion is a considerable understatement. Based on a PGMA member's data, about 80% of Californians who purchase a portable generator do so for the purpose of home backup power.[5] [Footnote 5: A PGMA member's data based on a survey of California customers.]



(515-Docket)

Comment: The ISOR then states that "[s]ome people depend on generators for power backup during outages. The longer time for generators to meet emissions standards of zero will allow for these people to identify suitable power backup options."[6] [Footnote 6: ISOR, at p. 163.] But according to PGMA member data, more than 70% of portable generator owners stated that it took them less than three weeks to decide to purchase a portable generator. This evidences the fact that most consumers buy a portable generator in response to an expected, imminent emergency situation. (515-Docket)

Comment: California faces an unprecedented risk from wildfires and climate change is only expected to exacerbate this problem in the future. Consumers respond to potential Public Safety Power Shutoff ("PSPS") events by buying portable generators to provide power in these situations. As shown in the graph below of PGMA member shipments of portable generators into California in the period of 2018 to 2020, there has been a steady growth of portable generator shipments, with notable spikes during two quarters with high fire activity in the state. (515-Docket)

Comment: The spike in the fourth quarter of 2019 can be attributed to the wide-scale PSPS events during this period and the second spike in the third quarter of 2020 can be attributed to three of California's largest ever fires: the August Complex, the LNU Lighting Complex, and the SCU Lightning Complex fires. (515-Docket)

Comment: B. Lawn and Garden Equipment Are Discretionary Tools Whereas Portable Generators Are Not
As described above, the majority of California consumers who purchase portable generators do so for the purpose of home backup power. Aside from planned maintenance power outages, consumers use portable generators at unexpected times. This contrasts with lawn and garden equipment which is discretionary in the sense that an operator can freely choose when to use the equipment.
(515-Docket)

Similarly, there is flexibility on the timing of recharging the batteries of zero-emission equipment ("ZEE") lawn and garden equipment. This is not the case for portable generators in emergency

backup power applications. Users cannot easily recharge ZEE portable generators during a power outage.[7] [Footnote 7: This comment letter refers to battery power stations as "ZEE generators" but as discussed in Section I.C, that term is a misnomer for such battery power stations as they do not generate electricity like a spark-ignited portable generator does.] Strategies for extended usage of a ZEE portable generator during a power outage include buying multiple generators or a solar- or wind-powered charger. These strategies not only significantly increase the price of the ZEE portable generator to the consumer, but also are insufficient solutions as we will explain in more detail in our comments below. (515-Docket)

Comment: As described more fully in Section III, spark-ignited portable generators can serve a wide variety of potential consumer needs because of their ability to generate electricity. For example, spark-ignited portable generators are ideal for providing emergency power during power outages and power at construction sites—both uses that by their nature lack access to the grid. Spark-ignited portable generators can provide power continuously for many hours or many days if needed, as long as there is a supply of fuel such as gasoline. Having enough fuel on hand to run a spark-ignited portable generator continuously for a few days is very feasible. (515-Docket)

Comment: As described above in Section I.A, a majority of consumers use portable generators for emergency home backup power and generator sales spike during periods of high fire danger. Thus, a fundamental use of a portable generator is providing home backup power during PSPS events in California. (515-Docket)

Comment: Thus, the ISOR's conclusion that "manufacturers will be able to offer zero-emission generators at a price and capability comparable to existing SORE generators by MY 2028" is unfounded. As described above, spark-ignited generators are anywhere from seven to thirty times less expensive than comparably capable ZEE generators. (515-Docket)

Comment: An incorrect premise repeatedly voiced by CARB staff during the workshop was that portable generators primary use is to keep refrigerators running, phones charged and laptops running during power outages and perhaps for camping and tailgating. This excludes from consideration the most significant application for portable generators, which is to provide critical energy support during extended power outage emergencies - light, heating/cooling, water, medical devices, communications, and security are a few beyond those sited during the workshop. A second significant application of portable generators for consideration is the supply of power in professional/business settings such as commercial/residential construction sites and mobile businesses. In all these applications, spark-ignited portable generators fulfill power demands not realized by alternate technology designs, and therefore puts them in a category of product far removed from SORE regulated outdoor power equipment. (527-Docket)

Comment: The Portable Generator Manufacturers Association concluded that 2000W zero-emission generators, the size needed to power critical home appliances in the event of a power outage, would provide continuous power for just 35 minutes to 3 hours (depending on the unit), and cost between $1,300 and $6,000; meanwhile, popular gas-powered 2000W generators can run continuously, and range from $300 to $500. (533-Docket)

Comment: The Western Propane Gas Association (WPGA) appreciates the opportunity to comment on the proposed amendments to the Small Off-Road Engine (SORE) regulation. WPGA is respectfully opposed to any regulation that restricts Californian's access to affordable, clean, and reliable energy resiliency measures. In recent years, millions of Californians have suffered due to Public Safety Power Shut Offs, rolling blackouts, and other various de-energization events. These occurrences are a prime

example of why relying on a single power source is unacceptably risky and accentuate the need for both energy diversity and resiliency across the state, not only in terms of building and transportation energy, but also backup power generation. Portable generators, of all sizes, fueled with propane serve as critical life-saving power source for homes, businesses, firefighters and others during these far too frequent de-energization events. (539-Docket)

Comment: Generators often serve a much different role than the other applications, such as lawn and garden equipment that fall under the SORE regulation. For example, lawn and garden equipment are subject to discretionary use and charging, while generators are often needed in unplanned, emergency power situations. Furthermore, many of the aforementioned de-energization events last for extended periods of time, where zero-emission (ZE) generators would require the purchase of multiple spare batteries or a solar-powered charger, significantly increasing the price to both own and operate. (539-Docket)

Comment: We value our role as a partner for clean energy initiatives. California residents need the assurance that when they find themselves in an emergency situation, there will be affordable, clean energy products on the market. Generators fueled by propane and renewable propane facilitates both of these objectives. We thank you for your consideration and look forward to the opportunity of working with you to provide all Californians a clean and resilient energy future. (539-Docket)

Comment: **Subject: Gasoline Powered Electric Generators**
I live in the country and have to utilize a 15,000 Watt gasoline powered generator multiple times a year. With the recent passage of AB1346, when will I have to stop using my generator? Are propane generators allowed? And/or, if the wattage output is increased to 20,000, could I still use a gasoline powered generator? Where can I find more information? I just don't have the room for a small nuclear power plant. Darn. Thank you! (568-Email)

Comment: I think the staff has been giving you a little lip service as far as disadvantaged residents, because a lot of them use just the size generator for their home that they can afford. You know, some of them use a small just to keep their medical equipment running and any other type of equipment. (3047-Oral Testimony)

Comment: My name is Tammy Stafford. I'm Divisional Vice President of Harbor Freight Tools, a family-owned specialty tool retailer headquartered in Southern California with over 120 stores in California, 1,200 stores nationwide, and 24,000 employees. We are a leading seller of gas-powered portable generators that provide affordable back-up power to Californians during power outages. When electricity is not available due to wildfires, earthquakes, and Public Safety Power Shutoffs, gas-powered portable generators can provide life-saving back-up power to critical appliances in homes and be quickly refueled during an outage. From an environmental perspective, portable gas generators only comprise three percent of the small engines in California and are used episodically during power outages and do not present a daily source of emissions like automobiles or gas-powered lawn and garden equipment. (3057-Oral Testimony)

Comment: All small off-road engines are not the same. You owe it to your constituents to ensure that portable generators are not taken away from them during a time when they are still critically needed and that cost-effective alternatives do not yet exist. (3057-Oral Testimony)

Comment: This is Michael Carroll with Latham and Watkins, LLP on behalf of the Portable Generator Manufacturers Association, or PGMA. Portable generators are very different from the other types of equipment covered by the SORE regulations. They are emergency equipment. Californians rely on

portable generators to keep themselves and their families safe and secure when they lose access to grid power. This is not lawn and garden equipment. The increased wildfire risk in California is undeniable. To combat wildfire risks, the State has implemented Public Service Power Shutoffs. Since 2013, there have been almost 5,000 PSPS events, with an average duration of about 35 hours. Spark-ignited portable generators are an excellent solution for home back-up power during extended power outages, and importantly they are affordable. Zero-emissions portable generators are not capable of providing the output and runtime necessary for home back-up power and are prohibitively expensive. (3058-Oral Testimony)

**Agency Response:**

These comments include expressions of the commenters' opinions regarding the use of SORE generators for backup power, the occurrence of public safety power shutoff (PSPS) events, and questions commenters have about SORE generators. Some of the comments also state opinions regarding the amount of time SORE generators are used, the size of generators used by certain users, the relative contribution of SORE generators to overall SORE emissions, or the settings in which they are used, such as a professional setting. The comments do not request changes to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

The Proposed Amendments do not require anyone to stop using their SORE generator, including those fueled with gasoline and/or propane. Zero-emission generators can be used for backup power, as discussed in section I.E.3.b of the ISOR. As further described in section I.E.3.b, CARB recognizes that the zero-emission generator market is a developing market and that more time is needed to allow manufacturers to innovate and develop new products to meet the future demands of the zero-emission generator market. The Proposed Amendments allow more time for generators to meet emission standards of zero by implementing them starting in MY 2028 rather than MY 2024.

AB 1346 was passed by the California Legislature, not CARB, and directs CARB to adopt regulations. AB 1346 does not require anyone to stop using their SORE generator, including those fueled with gasoline and/or propane. The Proposed Amendments do not apply to stationary generators, including those fueled with propane. A portable generator with 20,000-watt electrical output is not likely to be powered by SORE since the engine power rating could not be greater than 19 kW in order to be subject to CARB's SORE regulations. The Proposed Amendments do apply to SORE generators fueled with propane. The Proposed Amendments allow more time for generators to meet emission standards of zero. As described on page 199 of the ISOR, generators accounted for approximately 14 percent of the total population of SORE equipment and 19 percent of all ROG and $NO_x$ emissions from SORE in 2020.

More information on the Proposed Amendments is on the SORE Rulemaking Page.

The technological feasibility of the Proposed Amendments is discussed in Chapter I.E of the ISOR and in the Agency Responses in section IV.A.35 of this FSOR. The cost-effectiveness of the Proposed Amendments is discussed in Chapter VII of the ISOR and in the Agency Responses in sections IV.A.13 and IV.A.35 of this FSOR.

## A.28. Potential unintended consequences and unforeseen circumstances

### *A.28.1. Moving to or purchasing SORE in other states*

Comment: First of all, we'll buy our small engine needs in another state. (30-Docket)

Comment: We have been in the business of landscape and gardening repair equipment for the last 20 years. We have been providing service to small companies and individuals in the gardening industry. They have been our main business structure and they have been concerned about this new law and most of them have been commenting about moving to another state to continue their business or moving to another country. (93-Docket)

Comment: These real-world impacts would limit our options when it comes to the use of battery-powered tools. For example, we could purchase larger equipment not subject to the SORE regulations, which undercuts the intent of reducing emissions and may impact the safety of our volunteers for using an inappropriately sized tool for the job at hand. Or we could purchase equipment out of state, which we feel sets the wrong example for our volunteers and the larger trails and conservation community. (508-Docket)

Comment: Also to allow emergency services to purchase equipment out of the state, not only is that a ridiculous comment, but just -- it just -- how can that be done for them to go out of state and purchase equipment. With that, there's going to be many people that will go out of state to purchase equipment considering the cost, the reliability and runtime of some of the battery equipment as well. (3033-Oral Testimony)

**Agency Response:**

These comments do not request changes to the Proposed Amendments. CARB made no changes based on these comments. These comments describe commenters' plans to purchase SORE equipment or concerns about businesses purchasing equipment outside of California, or potentially leaving the state entirely.

Manufacturing for sale, selling, or offering for sale in California, or introducing, delivering or importing into California for introduction into commerce new small off-road engines that are subject to the SORE regulations without an Executive Order, issued pursuant to the SORE regulations, is a violation of the requirements in the SORE regulations. The possibility of individuals violating the regulations does not indicate the Proposed Amendments will not be effective. The commenter does not provide, and CARB does not have, evidence that individuals purchase SORE equipment in other states extensively. The commenter does not provide, and CARB does not have, evidence that the Proposed Amendments would have an effect on businesses leaving California. Any such decision by a business would be beyond the scope of this rulemaking. In response to claims that businesses and residents will purchase SORE equipment outside of California: CARB cannot account for illegal activity in its rulemaking analysis.

In response to the statement, "Also to allow emergency services to purchase equipment out of the state, not only is that a ridiculous comment, but just -- it just -- how can that be done for them to go out of state and purchase equipment,": The commenter mischaracterizes the provision for fire and police departments, and other entities that specialize in emergency response to purchase emergency equipment powered by a non-California certified engine. Section 2403(f) of the exhaust emission regulations provides that "fire and police

departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available. For purposes of this section, a request to purchase emergency equipment powered by a non-California certified engine must be submitted for approval to the Executive Officer." The regulations do not require entities to travel to another state to purchase emergency equipment powered by a non-California certified engine.

In response to comments that suggest retention of existing equipment or out-of-state sales of SORE equipment will result in fewer emission reductions: The commenters do not provide evidence for these claims. Speculation by the commenters or their contractors does not demonstrate the likelihood of users retaining their existing equipment longer than they otherwise would or traveling out of state to purchase SORE equipment more frequently than they otherwise would in the absence of the Proposed Amendments. Comments regarding the addendum to the Final EA are addressed in section IV.A.15. Please refer to the Agency Response in section IV.A.14.1 for additional discussion of comments related to out-of-state sales of SORE.

### *A.28.2. Supply chain*

Comment: In addition to the impact on small businesses, the Proposed Rule fails to consider whether it is even possible for battery and equipment manufacturers to meet demand on an accelerated 2024 timeline to replace an entire industry with ZEE. According to CARB, approximately 4,000,000 new SORE are sold in California each year.[39] [Footnote 39: Notice of Public Hearing to Consider Proposed Mobile Source Certification and Compliance Fees, Table Appn D-2, pg 141] As discussed in Comments 7 and 8, multiple batteries will be needed for each product. It is not unreasonable to estimate replacement of 4,000,000 SORE-products will result in a demand of 10,000,000+ new batteries annually (plus replacement batteries as ZEE fleets age). The world is currently experiencing an unprecedented interruption in the supply chain, initiated by the global COVID-19 pandemic. Port back logs, cargo shipping delays, materials shortages, global trade disputes and staffing issues, combined with record demand for products have led to empty shelves, increased prices, and lingering back orders. Manufacturers of both battery and gas-powered outdoor power equipment are struggling to keep up with demand, and the supply chain disruptions are not showing any signs of waning. The Proposed Rule fails to consider whether sufficient ZEE will even be available in the quantities and quality needed to replace combustion SORE across the entire state. To the contrary, the Proposed Rule vaguely acknowledges the need for construction or modification of associated manufacturing facilities to increase the supply of zero-emission technology, including battery powered equipment, but fails to explain how such manufacturers will construct or modify their facilities, source additional materials and adequately staff such new or expanded facilities quickly enough to supply California's needs in time for 2024. (524-Docket)

The Proposed Rule likewise acknowledges that the increased demand for lithium-ion batteries could increase production, and increase lithium mining and exports from source countries, but fails to address the current international supply chain challenges or the specific challenges with sourcing the materials needed to manufacture lithium-ion batteries. The rapidly surging demand for lithium, especially battery-grade lithium hydroxide, is challenged by the limited number of qualified lithium producers in the battery supply chain. Indeed, the global lithium market is estimated to reach a deficit of 12,000 tons of lithium carbonate in 2022, compared with a surplus of 3,000 tons in 2021 and a surplus of 54,000 tons in 2020.[40] [Footnote 40: See

https://www.metalbulletin.com/Article/4002802/OUTLOOK-Securing-lithium-biggest-challenge-to-batterysupply-chain-in-H2-2021.html] (524-Docket)

Comment: CARB estimates there are 29.3 million pieces of lawn/garden and other outdoor power equipment across the state with 12.8 million of these using gasoline as their power source. It is estimated there are 55,000 landscape businesses in the state. Given that a single landscaper could require a minimum of 35 batteries per day to do their job, **the estimated minimum number of batteries landscapers would use daily is nearly 2 million. Once the transition to ZEE is complete, it would total upwards of 12 million batteries (single use) at a minimum for each piece of equipment.** The reality is significantly more. (2001-Docket)

Comment: FWEDA Reference **1) ARB – SORE – 16MLD011 Full Report Final 11-26-19**, pg 552, Table 440. Populations and upper and lower bounds of SORE equipment types from all sources in California, pg 553 Table 441. Populations and upper and lower bounds of gasoline powered SORE equipment from all sources in California (2001-Docket)

FWEDA Reference **2) OPEI comments to CARB**, : "For the average landscaper operating walk-behind mowers, string trimmers, leaf blowers and hedge trimmers, based on the CSU-F survey equipment distribution and SORE2020 suggested use factors, using conservative estimates of battery size, the average landscaper would require 36.68 batteries per day. If chain saws are included with the average landscaper equipment, they would require 48.17 batteries per day. Walk-behind lawn mowers would require 8 batteries per day, string trimmers would require 5.05 batteries per day, leaf blowers would require 18.34 batteries per day, hedge trimmers would require 5.28 batteries per day, and chain saws would require 12.5 batteries per day." (2001-Docket)

" … conservatively, the average landscaper would require 36.68 batteries to 48.17 batteries per day. Considering replacement batteries, which are not considered in the Proposed Rule, an average landscaper could conservatively use 84.32 to 103.37 batteries over the useful life (6 years) of the equipment. The total cost of batteries and chargers for the average landscaper set-up could cost $18,000 to $22,000 over a six-year product useful life. It is important to note that these calculations do not account for equipment costs nor do they account for battery or motor efficiency losses. Battery and motor efficiency losses would likely result in additional batteries and costs. It does not appear the Proposed Rule accounted for efficiency when estimating battery needs." (2001-Docket)

Comment: Demand for ZEE products is at an all-time high, while raw materials are gobbled up by the large industries like car -- cars and electronics. Electronic modules and lithium are in short supply causing backorders throughout industry. In fact, the Center for Automotive Research anticipates significant shortages of lithium-ion battery sales and will not resolve until 2029. (3032-Oral Testimony)

Comment: So it seems like some of it is working to reduce emissions, but again, the technology is just not quite there. And to ask some of these companies to try to come out with new battery products when there's such a supply chain issue that we've all been affected in one way or another, I think is also unreasonable as well. So again, it's not quite there, technology, and the cost is just not cost effective as well. (3033-Oral Testimony)

Comment: Another big issue is, as has been mentioned, is the supply chain is virtually impossible at this moment, as we sit and stare at the cargo ships out in the harbor on a daily basis. (3035-Oral Testimony)

Comment: My name is Joani Woelfel with Far West Equipment Dealers Association representing agricultural, industrial, material handling, outdoor power, and rental equipment dealers across

California. Thank you for the chance to speak on proposed amendments to SORE regulations banning new sales of gas-powered SORE by 2024. Please refer to our written comments submitted as we cannot cover all of our concerns here. The equipment industry is plagued with supply chain disruptions that have pushed out new orders as much as two years and increased costs for users. Combining equipment sales of gas-powered equipment and new commercial ZEE with insufficient performance that is not widely available compounds this problem, as does stocking and managing equipment and parts for both over the next several years. Dealers are burdened with the added expense of charging infrastructure and stocking a large volume of batteries required to power ZEE. Estimates show a single landscaped would need 35 batteries per day to perform as they do now. This would incur a minimum of two million batteries stocked at any given time to supply an estimated 55,000 landscape businesses. A full transition is conservatively estimated to be a minimum of more than 12 million batteries based on CARB's inventory. The volume of batteries a dealer would need to keep in inventory poses significant logistical, safety, and environmental concerns. These demands are compounded for dealers who offer rental or loaner equipment. (3045-Oral Testimony)

Comment: I'm Dan Mabe, President of the American Green Zone Alliance, otherwise known as AGZA. AGZA was formed by gas operators for gas operators and others who wish to explore lower impact operations and business models for landscape maintenance. AGZA has been on the front lines for over a decade introducing low-impact maintenance strategies for the grounds maintenance industry. Today, we refer to the science of the CARB staff to make what we see are sometimes difficult decisions of needing to reach out -- reach attainment goals and clean up our air, while taking into consideration the impact on small business owners and operators. We appreciate that CARB has made an effort to understand the complexities and needs of the outdoor power and grounds maintenance industries and encourage CARB to continue to expand on those efforts.
(3050-Oral Testimony)

Comment: AGZA recognizes CARB's feasibility determination on when to regulate SORE in the state of California and trust there would be considerations and contingencies for any supply chain issues and further address much more needed resources to buy down the cost for operators.
(3050-Oral Testimony)

Comment: Equipment choices and supply are already limited due to worldwide supply chain disruptions caused by COVID-19, and we do not yet see any indications of recovery and return to normal supply and demand. (Form Letter A-Email) (Form Letter G-Email)

**Agency Response:**

These comments provide commenters' estimates of the numbers of batteries that might be needed for new ZEE and suggest that there are supply chain issues that could affect industry's ability to comply with the Proposed Amendments. One of the commenters states that supply chain issues are one reason for extending the date for required emission reductions from 2024 to 2026 for portable generators. Other commenters discuss expectations that demand for lithium or other materials used for batteries or ZEE may exceed supply. However, the commenters didn't provide evidence to support their supply chain-related claims, and CARB does not have evidence to support their claims. The Proposed Amendments do not require anyone to stop using SORE equipment. Some commenters describe supply chain issues affecting SORE equipment. The commenters do not provide evidence that supply chain issues would affect ZEE more than SORE equipment or that manufacturers would not be able to supply a sufficient number of batteries to meet demand. The commenters' claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or

equipment power output to support these claims; thus, CARB cannot evaluate the commenters' assessments of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[130]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. Consequently, CARB made no changes based on the comments.

In response to the comment about dealers and stocking of both SORE and ZEE parts, the commenter provides no evidence for why this would create a burden or whether it would represent a change from the current situation. For dealers who may not have previously sold ZEE, selling and servicing ZEE would be a new source of revenue. Dealers could utilize smart charging switches specifically designed to allow for the charging of multiple batteries at once on one circuit. One such smart charging switch retails for $1,595 and can handle up to 8 chargers [Towa Industries, 2022[131]]. Please refer to the Agency Response in section IV.A.6.1 for additional discussion of charging infrastructure.

Regarding the comment "...further address much more needed resources to buy down the cost for operators": Please refer to the Agency Response in section IV.A.1.2 for discussion of incentives.

Please refer to the Agency Response in section IV.A.2.3.5 for discussion of the portion of the comments regarding PGMA's proposed alternative to delay the implementation date for portable generators.

Please refer to the Agency Response in section IV.A.35.1 for discussion of the portion of comments regarding ZEE performance and the number of batteries landscapers might need to complete their work.

Please refer to the Agency Responses in section IV.A.14 for discussion of comments related to the SORE emissions inventory and the CSUF survey.

### *A.28.3. Gasoline tax loss*

Comment: I am against the banning of small off road engines. I have been a California Licensed Landscape Contractor for 40+ years. Here are my objections;

1. The thousands of small gardeners & tree trimmers will eventually have thousands and thousands of battery equipment. All Lithium charged. And when those pieces of equipment go bad where do you think those defunct Lithium batteries will go?? Answer straight into our landfills. That is a disaster!!!
2. This will cause work productivity to plummet. Thus landscape maintenance costs will sky rocket. Adding to added cost to Homeowners & HOA's = added inflation.

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[130] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[131] Towa Industries. 2022. TOWA PDM 20-8 SmartCharger. Available at: www.towatools.com/towa-pdm-smart-charger/. Last accessed: February 10, 2022.

3. Hugh gas tax loss with no gas being purchased for thousands of equipment pieces. Where will this lost tax revenue for our highway repairs come from??? (428-Docket)

**Agency Response:**

Allocating funding for highway repairs is beyond the scope of the Proposed Amendments and outside of CARB's authority. CARB estimates the Proposed Amendments will result in annual decreases in gasoline excise and sales tax funds to the State and local governments that range from $1.75 million in FY2023-2024 to $135.41 million in FY2042-2043, as described in section II.D and Attachment D (Tables D-8 and D-9) of this FSOR. For comparison, California's transportation budget, which includes funding for State and local road and highway repairs, is $22.5 billion, $26.5 billion, and $31.7 billion for FY2019-2020, FY2020-2021, and FY2021-2022, respectively [LAO, 2021[132]]. The transportation budget has increased by approximately 20 percent each year from FY2019-2020 through FY2021-2022. Funding sources include fuel taxes, vehicle-related fees, bond funds, and other State and federal funds [LAO, 2021[133]]. The estimated impact of $135.41 million in FY2042-2043 represents 0.44 percent of the FY2021-2022 transportation budget. However, the FY2042-2043 transportation budget is likely to be significantly greater than the FY2021-2022 transportation budget, and the gasoline tax revenue decrease of the Proposed Amendments is not likely to have an adverse impact on transportation funding. The comment regarding disposal of batteries is discussed in the Agency Response in section IV.A.6.2. The comment, "This will cause work productivity to plummet … added inflation," is discussed in the Agency Response in section IV.A.2.4.2.

## A.29. Preempt equipment

### *A.29.1. Need for or availability of preempt equipment*

#### A.29.1.1. Air compressors

Comment: Portable off-road gas-powered air compressor (about 8-12 horsepower)- Compressors are necessary during the conduct of Timber Operations and other fuel hazard reduction projects to service forestry equipment, inclusive of heavy machinery. Servicing includes repair of machinery with pneumatic tools, but also, as important, is relied upon to remove buildup of fine material from machinery that can ignite if not properly maintained. As with other previously identified equipment, projects that rely upon these air compressors are dozens of miles from an available electrical source. Below is one of dozens of examples of a typical gas-powered air compressor that is relied upon for the conduct of forest management activities: (121-Docket)

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[132] LAO. 2021. The 2021-22 California Spending Plan: Transportation. California Legislative Analyst's Office (LAO) Budget and Policy Post. October 1, 2021. Available at: https://lao.ca.gov/Publications/Report/4458. Last accessed: March 14, 2022.

[133] LAO. 2021. The 2021-22 California Spending Plan: Transportation. California Legislative Analyst's Office (LAO) Budget and Policy Post. October 1, 2021. Available at: https://lao.ca.gov/Publications/Report/4458. Last accessed: March 14, 2022.


(121-Docket)

Comment: The dive harvest commercial fishing industry utilizes small engines to power "Air Breathing compressors" in salty, humid, wet often very rough weather marine environments. (493-Docket)

**Agency Response:**

These comments do not directly request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

These comments express a need for certain equipment for fishery and forestry applications, specifically air compressors, and express or imply concern regarding the continued availability of suitable equipment under the regulatory proposal. However, certain new small off-road engines are not subject to CARB's SORE regulations. Section 209, subsection (e)(1), of the Clean Air Act provides that new engines less than 175 horsepower which are used in farm or construction equipment or vehicles are preempt from CARB's emission standards and only subject to emission standards from U.S. EPA. CARB generally refers to engines that are not subject to California's emission standards in this fashion as "preempt."

U.S. EPA regulations implementing Section 209(e)(1) define "farm equipment or vehicle" as "any internal combustion engine-powered machine primarily used in the commercial production and/or commercial harvesting of food, fiber, wood, or commercial organic products or for the processing of such products for further use on the farm" and define "construction equipment or vehicle" as "any internal combustion engine-powered machine primarily used in construction and located on commercial construction sites." [134] "Commercial," in turn, is defined to mean "an activity engaged in as a vocation," and "primarily used" is defined to mean "used 51 percent or more." [135] U.S. EPA regulations also state that "[f]or equipment that is used in applications in addition to farming or construction

[134] 40 CFR § 1074.5

[135] 40 CFR § 1074.5

activities, if the equipment is primarily used as farm and/or construction equipment or vehicles (as defined in this part), it is considered farm or construction equipment or vehicles." [136]

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of air compressor used primarily for agricultural, harvesting, or construction applications, including forest management, will be considered preempt and therefore will not be affected by this rulemaking.

### A.29.1.2. Clearing saws and large chainsaws

Comment: In our work we make considerable use of SORE, primarily chainsaws, brush cutters (aka brush saws), hedgers and pole saws. (1-Docket)

Comment: For some projects, such as sawing up a big downed oak tree that has a 4 foot diameter, or brushing out a 15 foot high wall of ceanothus brush, I am not aware of any ZEE that would have the capability of doing that. (1-Docket)

Comment: Cal Fire needs large gas chainsaws to fight wildfires. The logging industry needs chainsaws to operate far from electricity. Second-and third-growth forests need thinning to be healthy. If a battery goes dead cutting down a tree, the tree can start splitting up the middle threatening the safety of the faller. (6-Docket)

Comment: First: In the rural areas of our state, fire prevention/mitigation is a year round job that requires the use of many tools. Mostly clearing brush, grasses, dead trees and dead or low-hanging limbs is imperative and also required by county ordinances). ZEE equipment is appropriate on a small lot. I personally have adopted use of ZEE equipment in my yard, unless a large tree falls unexpectedly. As a business we encourage consumers to switch to ZEE equipment when feasible. However, managing fire prevention on large parcels usually requires SORE equipment. Sometimes you can only work for 30 minutes at a time and it is very expensive, and cumbersome (if not impossible) to buy multiple extra batteries and have them charged, and carried out with you. Also, the overall life of these batteries makes this equipment not cost-effective. In addition, there are many instances where a ZEE equipment cannot even complete the task. Imagine a large oak tree falling and needing to be removed so there is not dead, dry fuel. This is mandated by most counties and Cal-Fire. (12-Docket)

Comment: Banning gas powered engines before there are adequate replacements will place a tremendous hardship all business of all sizes. Just in the tree care industry, we will not have adequate replacement for equipment. For example, we will not have saws large enough to cut large fallen trees and large dead trees. Currently there are not comparable electric alternatives in this broad small engine ban. Banning critical resources to maintain properties, the forest and infrastructure before replacement tools are available is very poor planning. (51-Docket)

Comment: It would be completely irresponsible to ban all gas powered equipment. I understand limiting some pieces of equipment but there are so many aspects of tree work that require bigger

[136] 40 CFR § 1074.10

and more powerful equipment. There would be so many dangerous trees that couldn't be removed without a large gas powered saw which would cause so much damage when it fails. (61-Docket)

Comment: We use husqvarna battery chainsaws almost exclusively for tree pruning. That said, we still rely on the use of gas powered chainsaws greater than 45cc as the technology is not offered. We also lean on our gas equipment when working in remote locations, for fire abatement, and recharging batteries is not an option. (63-Docket)

Comment: I am in the tree and landscaping business, there is no way to drop a 200 foot tree with a battery chainsaw, it's just ignorant to think so. (87-Docket)

Comment: Large chainsaws used by timber fallers and other Licensed Timber Operators easily requires packing a ¼ mile daily throughout forested terrain. Chainsaws with 8 horsepower or more and up to a 36-inch bar and chain are common. The primary reason that battery-operated large chainsaws are not in commercial production is due to weight and the number of battery packs that would have to be made available daily, let alone carried by fellers to locations where saw operations are occurring. An equivalent electric motor that would produce over 8 horsepower would require a 40-volt to 80-volt battery producing 6-9 amps. A single battery of this capacity weighs at least 10 pounds. It would create a chainsaw prohibitively heavy to pack and operate safely in the forest. In addition, the battery pack would only provide a run time of 45-60 minutes at best. Hence, each timber faller would have to carry up to 8 always charged spare battery packs on-site. As a result, each timber faller would have to personally transport an additionally 80-pound backpack daily, resulting in tremendous fatigue and exhaustion that would certainly result in injury. (121-Docket)

Further, each battery would cost up to $439/each, and have unknown life expectancies. At a minimum, the economic impact to each timber faller or Licensed Timber Operators would be at least $3,500 dollars for batteries alone, notwithstanding the costs associated with the purchase of replacement chainsaws. Clearly, compliance with the draft regulatory proposal would be cost prohibitive. (121-Docket)

Comment: To limit the use to only battery-operated chainsaws to do this needed and regulated work is irrespirable by ARB. The industry does not have the necessary battery-operated chainsaws to do this work. The technology needed for large-scale tree operations does not exist. (477-Docket)

Comment: I am not completely opposed to this idea, but I disagree with it. The equipment for a lot of the tasks aren't well equipped, for example: Stump removal, or most Tree services in general, it isn't quite ready yet. They lack power and reliability on a variety of equipment and not to mention there is still not any options that I am aware of for a variety of chainsaws and pole saws. I also know that in many isolated situations where there is no access to alternative energy, gas is the only real reliable source to power this kind of equipment. (479-Docket)

Comment: Electric chainsaws will not work for tree clearance during and after wildfires--they are underpowered and have short battery life. Cutting trees down before and during wildfires saves lives in preventing fire spread. (489-Docket)

Comment: While we have not thoroughly tested the battery-operated tools available on the market in backcountry conditions, based on the knowledge we have, today's battery-operated tools are unable to tackle most of the work we encounter. At this time, it's not practical nor feasible to use only battery-operated, zero-emission tools for trail maintenance. (508-Docket)

Comment: The pandemic, record heat, drought, and fire have limited our volunteers' time to safely work on the PCT for the last few years. Catastrophic wildfires have burned across the PCT to a degree rarely seen. Our volunteers and staff are already stretched thin trying to keep up with the job of reopening the trail where high severity fire has destroyed the surrounding environment. Until the technology of battery-operated tools can be safely used and charged in the backcountry, while meeting the standards of speed, efficiency, and weight that gas-powered tools provide, we ask that trail crews be allowed to continue using gas-powered tools to maintain trails, for the safety and accessibility of the public. As stewards of the land, we look forward to the day when battery technology will meet the needs of trail maintainers. (508-Docket)

Comment: At best, the current available Battery Powered Equipment is suited for residential user. Only for a limited number of applications does a battery powered tool make sense for commercial applications. For example, a tree arborist will employ the small battery powered chainsaw whilst high in a tree for safety reasons. The largest battery powered chainsaw can power a small 18" bar whereas the forestry and fire response requires bars twice size in length. In terms of equivalent chainsaw power, the largest battery powered chainsaw is roughly equivalent to a 30cc gas powered chainsaw. A gas powered chainsaw designed for a 36" bar requires at least an 80cc gas powered engine. Hence there is no suitable battery powered equipment for forestry or fire fighting gas powered equipment, and the list goes on. (514-Docket)

Comment: The current available Battery Powered Equipment is best suited for the residential user. Only for a limited number of applications does a battery powered tool make sense for commercial applications. For example, a tree arborist will employ the small battery powered chainsaw whilst high in a tree for safety reasons. The largest battery powered chainsaw can power a small 18" bar whereas the forestry and fire response requires bars twice the size in length. In terms of equivalent chainsaw power, the largest battery powered chainsaw is roughly equivalent to a 30cc gas powered chainsaw. A gas powered chainsaw designed for a 36" bar requires at least an 80cc gas powered engine. Hence there is no suitable battery powered equipment for forestry or fire fighting gas powered equipment, and the list goes on for most all commercial applications. (514-Docket)

Comment: Chainsaws used to fell average second-growth coastal redwoods and Douglas fir here in the Santa Cruz Mountains require saw bars (sometimes referred to as blades) from a minimum of 32 inches in length to 50 inches whenever larger trees are felled. I typically ran a chainsaw with a 36 inch bar. In order to properly and safely back-cut a tree, the bar must be capable of reaching through half the diameter of a tree and quickly cut through that much mass. Gasoline powered professional chainsaws capable of safely and effectively running bars of that length and cutting trees of such size have approximately eight horsepower and revolutions per minute (RPM's) between 11,000 and 13,000 RPM's. (517-Docket)

Comment: Zero-emission chainsaws are not practical for licensed timber operators to use in the course of their work. While CARB quantified the benefits from the anticipated regulatory action to include (for example) occupational exposure to sounds, it did not account for other occupational trade-offs including how to safely carry—and use—prohibitively heavy zero-emission chainsaws with enough battery packs (at an added expense, no less) in remote, densely forested areas. Not only could the Proposed Amendments impede the pace and scale of this work, but it will also come at an extra cost in equipment and worker fatigue. (548-Docket)

Comment: **Subject: AB 1346 Questions**
Email sent 11/01/2021: I have 2 questions regarding AB 1346. Specifically I use chainsaws. First question is since there is no professional grade battery powered equivalent to chainsaws over 35 cc,

will there be allowances for purchase and operation of the larger 40 to 120 cc 2 stroke power-saws until appropriate battery technology is available? Second question is will the repair and refurbishment of existing SORE engines be allowed to continue after 2024? Email sent 11/04/2021: ...to clarify Chainsaws 45cc and up, which are on the preempt list, can be legally acquired and used in CA after 2024. I need layman's terms. At this point, I and many other people, vendors, etc. are thinking that it is a complete moratorium across the board on small gasoline engines starting in 2024. (580-Email)

Comment: Small engine powered products are also needed to combat the catastrophic toll that fires and other natural disasters have taken on our environment and communities in California. (Form Letter A-Email)

Comment: And, battery powered equipment is simply not a viable option for many critical services, like fuel mitigation, infrastructure/utilities maintenance and tree care and clearing services that depend on small engine-powered equipment to keep our citizens and infrastructure safe. (Form Letter G-Email)

Comment: Our gasoline powered products are also needed to combat the catastrophic toll that fires and other natural disasters have taken on our environment and communities in California. (Form Letter G-Email)

**Agency Response:**

These comments do not directly request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

These comments express or imply a need for certain equipment for agricultural or forestry applications, specifically the larger, higher-power range of chainsaw models, and in some cases, brush cutters or clearing saws. These comments also express or imply concern regarding the continued availability of suitable equipment under the regulatory proposal. As described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law.

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of equipment used primarily for harvesting wood or management of land in an agricultural or agroforestry context, such as stump cutters, grinders, stumpbeaters, chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters and clearing saws powered by engines with displacement 40 cc and above, will be considered preempt and therefore will not be affected by this rulemaking. As noted on pages 12 and 16 of the ISOR, chainsaws powered by engines with displacement 45 cc and above have generally been found to be preempt.

Regarding the comments "It would be completely irresponsible to ban all gas powered equipment" and "At a minimum, the economic impact to each timber faller or Licensed Timber Operators would be at least $3,500 dollars for batteries alone, notwithstanding the costs associated with the purchase of replacement chainsaws. Clearly, compliance with the draft regulatory proposal would be cost prohibitive,": To clarify, the Proposed Amendments would not require people to stop using SORE equipment. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into

commerce. Also, as noted above, the Proposed Amendments do not apply to certain large chainsaws or blade-capable brush cutters and clearing saws. As discussed on pages 104-106 of the ISOR, zero-emission chainsaws can have higher upfront costs and lower ongoing costs. A typical professional user could see net cost-savings 2 years after purchasing a zero-emission chainsaw.

In response to the statement, "I have 2 questions regarding AB 1346. Specifically I use chainsaws…": The Proposed Amendments are not AB 1346 and are not a bill to be considered by the Legislature. The Legislature passed AB 1346, and the Governor signed it. The Proposed Amendments meet the requirements of AB 1346. The Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce and do not prohibit the repair or refurbishment of existing engines. The Proposed Amendments will not affect the availability of chainsaws powered by engines with displacement 45 cc and above.

For a discussion of comments related to the availability of equipment necessary for wildfire mitigation and emergency responders, please refer to the Agency Response in section A.33.

### A.29.1.3. Water pumps for agriculture, construction, or safety applications

Comment: And water pumps drawing a source of water from on irrigation source, holding pond, lake, stream or a swimming pool also require an energy source other than a battery due to a remote location. A property owner or fire agency also relies on water pumps to defend structures or land when faced with fire protection issues (8-Docket)

Comment: Also, the fire agencies utilize gas-powered water pumps. The city and county agencies utilize gas-powered water pumps manage heavy water flows and construction projects. (12-Docket)

Comment: **Portable gas-powered water pumps in fire boxes for fire preparedness required for the conduct of Timber Operations and other fuel hazard reduction projects** (10 horsepower). Portable water pumps are relied upon to provide water under pressure for hose lays to suppress fire. Given the extraordinary remote locations of forest management projects, these pumps are not in proximity to reliable energy sources to support electric equivalent pumps. (121-Docket)

(121-Docket)

**Drafting with a water pump** (5 to 20 horsepower) into a water truck at remote locations in the forest commonly relies upon gas-powered pumps. (121-Docket)

 (121-Docket)

Though an all-electric pump may work in some settings, the applicability of such equipment is not compatible in remote settings that are often 25-50 miles or more from a reliable electric source. (121-Docket)

**Agency Response:**

These comments do not directly request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

These comments express or imply a need for certain equipment for agricultural or forestry applications, specifically water pumps for agricultural, construction, and safety purposes. These comments also express or imply concern regarding the continued availability of suitable equipment under the regulatory proposal. However, as described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law.

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of water pump used primarily for agricultural or construction applications, including forest management, will be considered preempt and therefore will not be affected by this rulemaking. In particular, as noted on page 12 of the ISOR, pumps powered by engines with displacement 40 cc and above have generally been found to be preempt. Furthermore, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision.

### A.29.1.4. Water pumps integrated with non-SORE equipment

Comment: Off-road forestry equipment with water tank and pump – An example of this piece of equipment is a forestry off-road vehicle called a "skidgine." (121-Docket)

"Skidgine"

Rubber-tired skidder with a Bolt-on 400-gallon water tank with gas-powered pump for off-road fire preparedness (121-Docket)

**Agency Response:**

This comment does not directly request a change to the Proposed Amendments. CARB made no changes based on this comment. The following response provides clarification and context for several points within the above comment.

This comment describes, and implies a need for, certain equipment for forestry and firefighting applications, specifically equipment consisting of a water pump integrated into an off-road vehicle described as a "skidgine." This comment also implies concern regarding the continued availability of suitable equipment under the regulatory proposal. The vehicle itself would not fall within the SORE category as defined in section 2401, and so the proposed rulemaking would not apply to it. As described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law.

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of water pump used primarily for agricultural or construction applications, including forest management, will be considered preempt and therefore will not be affected by this rulemaking. In particular, as noted on page 12 of the ISOR, pumps powered by engines with displacement 40 cc and above have generally been found to be preempt. Furthermore, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision.

## *A.29.2. Clarification regarding preempt equipment*

### A.29.2.1. Compressors

Comment: Compressor equipment is overwhelmingly used by commercial contractors at construction sites in California and throughout the United States to power pneumatic fastening tools. As you know, the federal Environmental Protection Agency ("EPA") defines "construction equipment or vehicle" at 40 CFR 1074.5, to mean "any internal combustion engine-powered machine primarily [51% or more] used in construction and located on commercial construction sites." Brackets added. Moreover, when discussing these provisions, the EPA indicated that the preemption to construction

equipment applies by category or type of equipment (e.g., general use of the equipment) rather than to each individual engine or piece of equipment. See Air Pollution Control; Preemption of State Regulation for Nonroad Engine and Vehicle Standards, 59 Fed. Reg. 36969, 36979. Consequently, the CARB developed a list of specific new construction equipment that is preempted (e.g., "List to Determine Preempt Off-Road Applications"—referred to herein as the "Federally Preempt List") from regulation under the agency's nonroad regulations, including the California flexibility provisions at 13 CCR 2423. (502-Docket)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. CARB made no changes based on the comment. The following provides a response to and clarification for the comment and its implied request.

The comment conveys the commenter's conclusion, and implies a request for CARB to confirm, that certain equipment for which the commenter is a manufacturer, specifically SORE-powered air compressors, are preempt and not affected by the Proposed Amendments. As described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law.

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB indeed expects that models of air compressor used primarily for construction applications will be considered preempt and therefore will not be affected by this rulemaking.

## A.29.2.2. Construction saws

Comment: Recently one of our team members has forwarded us about new California law banning on types of gas-powered equipment under 25 horse power as below. We are distributing the gas powered cut off saws or any other related equipment in US construction market. So would you tell me if new California law might affect our own equipment?
https://www.diamondvantage.com/equipment.html (564-Email)

**FS200-13G**
flat saw

Diamond Vantage Walk Behind Saws, FS200-13G, are built from the ground up to provide years of reliable cutting. These saws will cut concrete and asphalt with little to no vibration because of their heavygauge steel frames, rugged shafts and bearing assemblies.

- Precision machined arbor shafts
- Multiple-belt power transfer system
- Superior rigidity for smooth, clean, straight cuts
- Heavy-Duty 7-gauge steel construction
- Large screw-type depth control locks for consistent cutting depth
- Part #: FS200-13G

+ specifications >

| | |
|---|---|
| BLADE CAPACITY | 18" |
| WEIGHT | 254 lbs. |
| HORSE POWER | 13 HP |
| DIMENSIONS | 49"L x 27"W x 40"H |
| MAX CUT DEPTH | 6-3/4" |
| MOTOR | Honda |

(564-Email)


## DV-GCT-8EE
early entry saw

- Early Entry Saw with skid plate assembly
- Optional dust box with excellent dust control
- 7 position control handle
- Up cut blade rotation
- Heavy duty bearings
- 1/4" thick welded steel construction
- Wide wheels for stability
- Durable powder coated finish
- Front and rear blade pointers
- Quick blade depth adjustment
- Preset blade depth stop
- Integrated wrench holders
- Made in USA
- Part #: DV-GCT-8EE

**specifications >**

| | |
|---|---|
| BLADE CAPACITY | 8" |
| WEIGHT | 125 lbs. |
| HORSE POWER | 125 lbs. |
| ARBOR SIZE | 5.5HP |
| RPM | 3,600 |
| DRIVE BELTS | 2 |
| CUTTING DEPTH | 2" maximum |
| FRAME CONSTRUCTION | 1/4" welded steel |
| VACUUM REQUIREMENTS | 250 c.f.m. minimum |
| DUST PORT | 2" |
| MOTOR | Honda GX200 |

(564-Email)

https://www.danseusa.com/solo-881-14


SOLO

**Solo 881-14 Cut-Off Saw, 2-Stroke 81CC Engine With Patented ILube System - For 14" Blade**

Danse #: 881-14 Mfr #: 881-14

Write a Review

Parts Book / Manual

QUANTITY

1

IN STOCK

$1,195.95

(564-Email)

25HP and under gasoline engines will no longer be sold in California starting in 2024. This could have huge ramifications for our industry. https://abc7chicago.com/leaf-blower-california-bans-small-engines-engine-ban-lawn- mower/11112309/ (564-Email)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. The following provides responses to and clarification for the question and comments.

The commenter requests that CARB confirm whether certain equipment for which the commenter is a distributor, specifically several types of engine-powered saws for which the commenter supplies example images, might be affected by the Proposed Amendments. As described in detail in section IV.A.29.1.1, new engines which are used in construction equipment or vehicles or used in farm equipment or vehicles and which are smaller than 175 horsepower, are preempt from state emission standards under federal law.

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of concrete, masonry, and cutoff saw used primarily for construction applications will be considered preempt and therefore will not be affected by this rulemaking. As noted on page 12 of the ISOR, cutoff saws in particular have generally been found to be preempt.

In response to the comment that claims that the Proposed Amendments could have huge ramifications on the commenter's industry: The comment references a news article that results in a "Page not Found" link, but does not otherwise provide any explanation for how the Proposed Amendments will affect the commenter's industry. ISOR chapter VII discusses the economic impacts of the Proposed Amendments.

In response to the statement, “This is how California defines small off road engines or SORE,”: CARB notes that "small off-road engine" is defined for California purposes in Title 13, California Code of Regulations, Section 2401(a), and that the webpage referenced presents a simplified description of SORE for informational purposes.

### A.29.2.3. Welders

Comment: For the purposes of the Proposed Amendments and the SORE Regulations, our comments reflect the perspective and product scope of the Miller Electric Manufacturing, LLC, ("Miller Electric'') which manufactures, among other Items, certain welding equipment that contains small gas-powered engines of less than 25 horsepower. Miller Electric is a wholly owned subsidiary of Illinois Tools Works Inc. (''ITW''), a U.S. manufacturer of value-added commercial and industrial-use products, components, and systems. ITW is a Fortune 200 company operating a diverse global portfolio of 84 manufacturing divisions. (378-Docket)

Welding Equipment Preemption to SORE Regulations - Statutory Bases
After review of the Proposed Amendments to the SORE Regulations, and being mindful of federal statute and applicable regulations, we conclude that the welders manufactured by Miller Electric are clearly preempt from the SORE regulations pursuant to Section 209 of the federal Clean Air Act (“CAA''). The welders manufactured by Miller Electric are generally sold through commercial distributors and equipment dealers. As such, our equipment is overwhelmingly used by commercial contractors at construction sites in California and throughout the United states. As you know, the federal Environmental Protection Agency (EPA) defines "construction equipment or vehicle" at 40 CFR 1074.5, to mean “any internal combustion engine-powered machine primarily [51 % or more] used in construction and located on commercial construction sites." *Brackets added*. Moreover, when discussing these provisions, the EPA indicated that the preemption to construction equipment applies by category or type of equipment (e.g., general use of the equipment) rather than to each Individual engine or piece of equipment. *See Air Pollution Control: Preemption of State Regulation for Nonroad Engine and Vehicle Standards.* 59 Fed. Reg. 36969, 36979. Consequently, the CARB developed a list of specific new construction equipment that is preempted (e.g., "List to Determine Preempt Off-Road Applications"- referred to herein as the "Federally Preempt List") from regulation under the agency's

nonroad regulations, including the California flexibility provisions at 13 CCR 2423. The Federally Preempt List specifically identifies welders as preempted from CARB regulation. As such, we would conclude that our equipment should be specifically out of scope of the SORE Regulations, and we would suggest the CARB consider clarifying amendments to the Proposed Amendments as explained below. (378-Docket)

Comment: Sections 2401(a)(29) – Definitions
Similarly, under the SORE Regulations, the term "generator" at section 2401(a)(29) is defined as "off-road equipment that exclusively produces electric power." First, we would, again, respectfully suggest that the CARB consider amending the "generator" definition to ensure federally preempt equipment, such as welders, are clearly outlined. And, in the case of welders, we would also explain an applicable product distinction to prevent otherwise federally preempt welding equipment from being inadvertently considered as within the scope of the Proposed Amendments. Certain Miller Electric equipment contains a generator as part of a welding power source that the CARB recognizes as federally preempt from regulation. These welding power sources provide support for welding operations, making electricity generation merely another capability of what is manufactured and used as a welder. This equipment is unlike, for example, an emergency generator that has been exclusively manufactured for providing back-up electricity for various applications. Our view is that making these key definitional clarifications to the term "generator" at section 2401(a)(29) of the SORE Regulations will also provide greater certainty and clarity to manufacturers and allow them to easily determine if they are subject to regulation. (378-Docket)

**Agency Response:**

These comments convey the commenter's conclusion, and imply a request for CARB to confirm, that certain equipment for which the commenter is a manufacturer, specifically SORE-powered welders and equipment that "contains a generator as part of a welding power source," are preempt and not affected by the Proposed Amendments. As described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law. In addition, the comment requests CARB to amend the "generator" definition to "ensure federally preempt equipment, such as welders, are clearly outlined" and, "in the case of welders, … explain an applicable product distinction to prevent otherwise federally preempt welding equipment from being inadvertently considered as within the scope of the Proposed Amendments."

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB indeed expects that models of welder used primarily for construction applications will be considered preempt and therefore will not be affected by this rulemaking. A determination regarding whether equipment that "contains a generator as part of a welding power source" is preempt is beyond the scope of the rulemaking described in the October 2021 45-Day Notice, and therefore amending the definition of generator to include such a determination also is beyond the scope of this rulemaking. In addition, existing California regulatory text, in CCR section 2401, subsection (a), includes the following language in the definition of "Small off-road engine": "All engines and equipment that fall within the scope of the preemption of Section 209(e)(1)(A) of the Federal Clean Air Act, as amended, and as defined by regulation of the Environmental Protection Agency, are specifically not included within this category." The Proposed Amendments do not change this provision. As such, the amendment text the comment requests already exists in the SORE regulations, and no change would be necessary to address the issue raised by the commenter. Furthermore, incorporating such an

amendment would potentially create regulatory conflict or inconsistency with other California or federal provisions, and could be construed as asserting authority to unilaterally determine the scope of the federal preemption that CARB does not have. As such, explicitly listing preempt equipment types within the SORE regulations is inappropriate. Consequently, CARB made no changes based on the comments.

### A.29.2.4. Is cleaning equipment (carpet, flooring, hard surface, tile and concrete) considered construction or farm equipment?

Comment: We are a manufacturer of cleaning equipment (carpet, flooring, hard surface, tile and concrete) in trying to determine how new regulations may impact the manufacturing of our equipment. We are unsure if we would be considered construction or farm equipment on any of our equipment under 25 HP would be effected by these regulations? Any clarification of the SORE or CARB regulations as they would pertain to our industry, would be appreciated. (2016-Email)

**Agency Response:**

The commenter did not request a change and so no changes were made to the Proposed Amendments. The commenter asks whether their cleaning equipment would be considered construction or farm equipment. Questions about preempt equipment can be addressed outside of the rulemaking process.

Certain new small off-road engines are not subject to CARB's SORE regulations. Section 209, subsection (e)(1), of the Clean Air Act provides that new engines less than 175 horsepower which are used in farm or construction equipment or vehicles are preempt from CARB's emission standards and only subject to emission standards from the U.S. Environmental Protection Agency (U.S. EPA). CARB generally refers to engines which are not subject to California's emission standards in this fashion as "preempt."

U.S. EPA regulations implementing Section 209(e)(1) define "farm equipment or vehicle" as "any internal combustion engine-powered machine primarily used in the commercial production and/or commercial harvesting of food, fiber, wood, or commercial organic products or for the processing of such products for further use on the farm." [137] "Commercial," in turn, is defined to mean "an activity engaged in as a vocation," and "primarily used" is defined to mean "used 51 percent or more." [138] EPA regulations also state that "[f]or equipment that is used in applications in addition to farming or construction activities, if the equipment is primarily used as farm and/or construction equipment or vehicles (as defined in this part), it is considered farm or construction equipment or vehicles." [139]

A full listing of preempt equipment types is beyond the scope of this rulemaking.

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[137] 40 CFR § 1074.5

[138] 40 CFR § 1074.5

[139] 40 CFR § 1074.10

### A.29.2.5. Request to acknowledge CAA preemption in the SORE regulations

Comment: **c. CARB must acknowledge that the Proposed SORE Amendments cannot and do not apply to smaller engines "primarily used" in farm and construction equipment**
CAA section 209(e)(A) has established absolute non-waivable federal preemption for "new engines which are used in construction equipment or vehicles or used in farm equipment or vehicles and which are smaller than 175 horsepower." (See 42 U.S.C. §7543(e)(A). The controlling federal regulations implementing that statutory provision make it clear that this absolute preemption applies to nonroad engines that are "primarily used" in commercial farming operations or "primarily used" in construction equipment at commercial construction sites. See 40 CFR §1074.5. In addition, EPA has specified that an engine that is used "51 percent" or more in farm- or construction- related activities meets the "primary use" test. (See Id. 59 FR 36969, 36978- 79.) (521-Docket)

To ensure consistency with controlling federal law, CARB will need to include a provision in the final SORE Amendments confirming that the Amendments do not and will not apply to engines less than 175 horsepower that are primarily used – 51% or more of the time -- in commercial farming and construction equipment. (See 40 CFR §1074.10.) Otherwise, the SORE Amendments will unlawfully encroach into areas that are exclusively reserved, without exception, for federal jurisdiction. (521-Docket)

**Agency Response:**

This comment requests that CARB make a change to the Proposed Amendments, by adding a statement that the Proposed Amendments do not apply to small engines "primarily used" in farm and construction equipment. CARB made no changes in response to this comment.

As described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with engines less than 175 horsepower, are preempt from state emission standards under federal law, under the Clean Air Act, section 209(e)(1). CARB acknowledges this provision, and the Proposed Amendments do not infringe upon it. Existing California regulatory text, in CCR section 2401, subsection (a), includes the following language in the definition of "Small off-road engine": "All engines and equipment that fall within the scope of the preemption of Section 209(e)(1)(A) of the Federal Clean Air Act, as amended, and as defined by regulation of the Environmental Protection Agency, are specifically not included within this category." The Proposed Amendments do not change this provision. As such, the statement the comment requests already exists, and no change would be necessary to address the issue raised by the commenter.

### A.29.2.6. Request to list preempt equipment types

Comment: Sections 2400 and 2751(c) – Applicability
As part of our review of the Proposed Amendments, we note that CARB specifically referenced the CAA preemption in a note within the Proposed Amendment's "Applicability" section at 13 CCR 2400 and in the Proposed Amendment's Notice of Public Hearing. To add further clarity to the regulatory status of the equipment listed on the Federally Preempt List, we respectfully request that the CARB amend Sections 2400 and 2751(c) to state that the SORE Regulations do not apply to equipment on the Federally Preempt List, such as welders, drills, jackhammers, etc. In the alternative to referencing the Federally Preempt List, we request that the CARB amend Sections 2400 and 2751(c) to include an enumerated list of preempt equipment that includes welders. Miller Electric believes that doing so will provide greater clarity and certainty to welding equipment manufacturers, sellers and end users

by allowing manufacturers to easily determine how the regulation applies to their products. (378-Docket)

Comment: The Federally Preempt List specifically identifies compressors as preempted from CARB regulation. As such, we would conclude that compressor equipment should be specifically out of scope of the SORE Regulations, and we would suggest the CARB consider clarifying amendments to the Proposed Amendments as explained below. (502-Docket)

Comment: **Sections 2400 and 2751(c) – Applicability**
As part of our review of the Proposed Amendments, we note that CARB specifically referenced the CAA preemption in a note within the Proposed Amendment's "Applicability" section at 13 CCR 2400 and in the Proposed Amendment's Notice of Public Hearing. To add further clarity to the regulatory status of the equipment listed on the Federally Preempt List, we respectfully request that the CARB amend Sections 2400 and 2751(c) to state that the SORE Regulations do not apply to equipment on the Federally Preempt List, such as commercial nailers, drills, jackhammers, etc. In the alternative to referencing the Federally Preempt List, we request that the CARB amend Sections 2400 and 2751(c) to include an enumerated list of preempt equipment. ITW Construction Products believes that doing so will provide greater clarity and certainty to equipment manufacturers, sellers and end users by allowing manufacturers to easily determine how the regulation applies to their products and practices. (502-Docket)

**Agency Response:**

These comments request that CARB add regulatory language that lists specific equipment types identified by the commenter as preempt from state emission standards under the federal Clean Air Act (CAA). The requests in these comments are beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice, and therefore CARB made no changes based on these comments. The scope of the rulemaking described in the October 2021 45-Day Notice does not include making CAA preemption determinations for specific equipment.

As described in detail in section IV.A.29.1.1, equipment and vehicles used primarily for farming or construction, with new engines less than 175 horsepower, are preempt from state emission standards under federal law. These comments request that CARB explicitly list, in the Proposed Amendments, certain equipment types which are considered to be preempt. However, although CARB expects that models and types of equipment used primarily for agricultural or construction applications will be considered preempt, a full listing of preempt equipment types is beyond the scope of this rulemaking. Furthermore, incorporating such a listing would potentially create regulatory conflict or inconsistency with other California or federal provisions, and could be construed as asserting authority to unilaterally determine the scope of the federal preemption that CARB does not have. As such, explicitly listing preempt equipment types within the SORE regulations is inappropriate.

## A.30. Rental equipment

Comment: ARA's concerns with moving to zero-emission SORE equipment center around two basic issues: 1) requiring all new SORE equipment in MY 2024 and after to be zero- emission equipment, and 2) the battery disposal issue that will be facing equipment rental companies as more SORE equipment enters rental inventories. Rental companies are unlike other typical owners of SORE equipment. Rental companies put a high premium on quality in the equipment they buy and maintain

in their rental inventories. Equipment in rental fleet inventories is often newer than that owned by other end users, and it is almost always professional grade equipment because many customers are using the equipment in a professional setting and because professional grade equipment is more durable. Even so, rental equipment takes many hours of hard use and abuse requiring rental companies to frequently refresh their inventories. When rental companies replace old equipment, they replace it with new equipment with the latest emissions control technology. Just as with non-road diesel, rental companies are leading the way in the adoption of low-emission and zero-emission technologies. (513-Docket)

A specific concern we have with all SORE equipment purchased in MY 2024 and after being zero-emission equipment is the number of batteries that will be required to power this equipment. According to data developed by the outdoor power equipment industry, battery use for a typical rental of SORE equipment is significant. For example, leaf blowers need about 18 batteries over an 8-hour period. This means that the rental business must supply 8 fully charged batteries to the customer with the rental, and/or provide charging devices so that the customer can charge the batteries during the day and overnight if it is a multi-day rental. Similarly, a walk- behind mower requires 8 batteries per day, string trimmers and hedge trimmers require about 5 batteries each, and chainsaws require at least 12 batteries to work a full 8-hour day. Multiply these daily requirements by the hundreds or even thousands of SORE equipment units in California rental company inventories and it is clear that the demand for batteries by rental business could easily be in the tens-of-thousands. Further multiply that by the 900 rental business locations operating in California leads to the conclusion that the number of batteries needed in future years could be in the millions. (513-Docket)

In addition to the significant increase in battery demand, there will be logistical issues for rental companies and their customers. While there is some penetration of SORE equipment in rental company inventories now, transitioning to a fleet that is 100 percent SORE equipment will require many more batteries and charging facilities than are currently required. Because rental companies replace equipment on a more rapid replacement schedule that other businesses, the transition to 100 percent SORE equipment will require significant near-term modifications to operating facilities to accommodate battery storage and recharging. (513-Docket)

Moreover, the equipment and event rental industry is concerned about the disposal and replacement costs of batteries. Industry data on the lifecycle battery and charger costs for a leaf blower is $10,776. These figures for walk-behind mowers, string trimmers, hedge trimmers and chainsaws are $4,428, $2,198, $1,137, and $3,971 respectively. These costs will be significant and ongoing for rental companies. ARA members in California have also expressed concerns about battery disposal and the environmental effects of millions of batteries that will have to be disposed of in coming years. Rental customers will also face hurdles if the transition to 100 percent SORE inventories happens too quickly. Batteries are clearly an issue with significant numbers of batteries needed for each equipment unit on a particular job. In addition, some of this equipment will be used in places where electricity is not readily available for recharging. Thus, multi-day rentals will either require additional batteries or charging will have to be done using portable power generation. All of these issues will increase costs to rental companies and their customers. (513-Docket)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. The following response provides clarification and context for several of the points within the above comments.

The commenter describes the type and amount of SORE equipment purchased by rental companies and expresses concerns regarding rental companies transitioning to ZEE that focus on the number of batteries and charging devices and amount of infrastructure that will be needed to power rental equipment and on battery disposal. ISOR Chapter V.B.1.b. discusses the environmental impact of ZEE battery disposal. Disposal of batteries to landfills is prohibited. They can be refurbished or re-used. To meet an increased demand of refurbishing or reusing batteries, new facilities, or modifications to existing facilities, are anticipated to accommodate battery recycling activities.

ISOR chapter I.E.2.a.iii. describes operational differences between SORE and ZEE. The timing of battery charging does need to be considered. Users would need sufficient electrical service and outlets for charging overnight. The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report [CARB, 2020[140]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. CARB also disagrees with the commenter's assessment of the total costs for equipment, batteries, and chargers. The commenter does not provide evidence to support its assertions regarding the costs of replacement batteries. The commenter's assessment seems to refer to OPEI's Annex B comments, which are discussed in the Agency Response in section IV.A.35.1 of this FSOR.

Regarding the comment, "the transition to 100 percent SORE equipment will require significant near-term modifications to operating facilities to accommodate battery storage and recharging," please refer to the Agency Response in section IV.A.6.1 for discussion of comments related to charging infrastructure.

## A.31. Requests for harmonization with specific federal provisions

### *A.31.1. Compliance testing provisions*

Comment: CARB also is proposing to convert the current SORE regulations into a strict liability program by revising the test procedures to require the testing of only a single engine/piece of equipment to determine compliance, rather than the 5 under the current regulations, all under theguise of "clarification." Under CARB's Proposed Amendments, a single engine or equipment failure would be sufficient to support a finding of "nonconformity" or "noncompliance," and thus sufficient for CARB to compel an engine or equipment family recall. That is substantially different from the federal regulations and directly contradicts CARB's rationale for other amendments, which is to harmonize with the federal regulations. (521-Docket)

Comment: CARB's unilateral move to create a strict liability SORE program — with recall liability for any "failed" testing — is contrary to the foundational principals of the SORE audit and recall programs, and will result in an unfair and unlawful divergence between the federal program and the

[140] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

revised program that CARB seeks to implement. CARB's unilateral imposition of new and unwarranted compliance risks and liabilities is yet another aspect of CARB's Proposed Amendments that likely will fracture the market for SORE products, with several manufacturers being forced to exit California. Accordingly, CARB needs to modify the Proposed Amendments as discussed above. (521-Docket)

Comment: Finally, the Proposed Rule includes a new exhaust emissions compliance testing strategy based on just one engine test. EPA's Selective Enforcement Audit for exhaust testing is significantly different, based on multiple engine tests, and OPEI is certain EPA would not accept compliance test results as specified in the Proposed Rule based on just one test. (524-Docket)

**Agency Response:**

This comment discusses the commenter's opinions and conclusions regarding the Proposed Amendments to § 2407(a), and seems to recommend retention of the current requirements for compliance testing pursuant to § 2407(a). CARB made no changes in response to this comment. In response to the statement, "CARB also is proposing to convert the current SORE regulations into a strict liability program by revising the test procedures to require the testing of only a single engine/piece of equipment to determine compliance, rather than the 5 under the current regulations, all under theguise [sic] of "clarification,"": CARB disagrees with the commenter's assertion that the Proposed Amendments to § 2407(a) were made under the guise of clarification. The rationale for the Proposed Amendments to § 2407(a) does not discuss clarification. Rather, as stated on pages 50-51 and 176-182 of the ISOR, the Proposed Amendments to § 2407(a) will improve compliance testing methods and could increase the pace of compliance testing, which would reduce the number of engines sold in California that exceed the emission standards. CARB's stated rationale on pages 50-51 of the ISOR was based on the burdensome nature of the current requirements and the limitations they impose on CARB's ability to perform compliance testing in practice. As described on pages 50-51 of the ISOR, the current requirement that anywhere from 5 to 30 engines be tested – not simply a requirement for 5 engines as characterized in the comment – to make a compliance determination is overly burdensome.

In response to the statements:

> "Under CARB's Proposed Amendments, a single engine or equipment failure would be sufficient to support a finding of "nonconformity" or "noncompliance," and thus sufficient for CARB to compel an engine or equipment family recall," and
>
> "EPA's Selective Enforcement Audit for exhaust testing is significantly different, based on multiple engine tests, and OPEI is certain EPA would not accept compliance test results as specified in the Proposed Rule based on just one test;"

The failure of an engine family in compliance testing does not automatically result in an ordered recall. The provisions for ordered recalls are in § 2405.3. The ordered recall process begins with a notification to the manufacturer if the Executive Officer determines that a substantial number of any class or category of engines, although properly maintained and used, do not conform to the regulations. The manufacturer may present its views and evidence at a public hearing if it disagrees with the Executive Officer's determination of nonconformity. Section 2407(a)(9)(A) states, in part, "Prior to revoking or suspending the Executive Order, or seeking to enjoin an engine manufacturer, the Executive Officer will consider production line test results, if any, and any additional test data or other information

provided by the engine manufacturers and other interested parties, including the availability of emission reductions credits to remedy the failure." CARB disagrees with the commenters' implications that the Executive Officer would make a decision to order a recall, suspend or revoke an Executive Order, or enjoin an engine manufacturer from further sales or distribution upon the failure of an engine to meet an emission standard without considering any additional information provided by the engine manufacturer and other interested parties.

In response to the statement, "That is substantially different from the federal regulations and directly contradicts CARB's rationale for other amendments, which is to harmonize with the federal regulations.": CARB acknowledges the differences between the proposed exhaust compliance testing provisions and the corresponding federal requirements and discusses these differences directly on page 147 of the ISOR, but these differences are not inconsistent with CAA requirements for authorization approvals from the U.S. EPA because the same engine models can meet both CARB's and the U.S. EPA's compliance testing procedures. CARB disagrees with the commenter's statement that these changes are in conflict with CARB's stated intention of harmonizing certain test procedures with corresponding federal test procedures except where changes are needed for consistency with other California regulations or to address California's unique air quality challenges; the Agency Response in section IV.A.11 provides more detail regarding "harmonization."

### *A.31.2. Definitions*

Comment: **Comment 2: Revised Engine Definition §2401.**
CARB's definition of an "engine" in section §2401. (a)(19) should be revised for the following reasons:

1. A crankshaft constitutes an essential component of an engine.
2. Only an entity with fully integrated parts should be considered an engine. A mere kit of components could be considered a replacement engine for regulatory purposes under the current Proposed Amendment, and thus banned, preventing customers from being able to repair their equipment.

For regulatory purposes, the definition should be fully harmonized with EPA Part 1054.801 and Part 1068.30. (509-Docket)

The Proposed Amendment definition itself is inconsistent. First, it defines an engine as a "complete, operational engine", but also suggests, "any engine block or kit with the parts necessary to assemble an engine block with or without an installed crankshaft is also considered an engine." STIHL is also concerned how or why an engine block would be assembled without a crankshaft. In addition the definition and rational will prevent users from servicing and maintaining their products, even with "authorized" parts. Furthermore, the Proposed Amendment ignores the manufacturer's need to apply the emissions label. Emissions labels may not be able to be affixed to components due to durability (temperature above 392°F) and legibility requirements as well as material compatibility (rough and fluorinated surfaces, exposure with oil and liquid sealant) of the parts that are by the proposed definition considered an engine. To avoid inconsistency with EPA requirements, and to prevent an unintended restriction on end users' ability to repair their own equipment, the "engine" definition must be harmonized with current EPA Part 1054.801 and Part 1068.30. (509-Docket)

Comment: The Proposed SORE Amendments are also invalid because they include provisions that diverge from the corollary federal regulations without any supporting rationale or data. For example, the proposed modification to the definition of "engine" diverges from the federal definition, and will

have significant negative implications for the servicing of existing engines and products already in-use, contrary to CARB staff's assertion. (ISOR, ES p. 1.) CARB offers no coherent rationale for that difference. That is preempted and prohibited under the federal Clean Air Act. (521-Docket)

Comment: Among the revisions that are needed to ensure that CARB's Proposed Amendments are aligned with the relevant EPA regulations, including EPA's recent Technical Amendments, are the following:

> CARB's proposed modification of the definition of "engine" is no longer harmonized with the corollary federal regulation. The proposed amendment is internally inconsistent, overly broad and vague, such that it will be difficult, if not impossible, for manufacturers to be able to determine when an emissions label needs to be applied, and in some cases it may be physically impossible to permanently apply a label (e.g. to an aluminum block if no plastic components are included). In addition, the proposed definition blurs the distinction between new engines and service parts, potentially making it impossible for manufacturers to provide service and replacement parts for existing products, contrary to federal law. (521-Docket)

Comment: **Comment 19-2: "Engine" Definition**
The proposed definition of an engine is too vague. An engine block without a crankshaft should not be considered an engine. Furthermore, a kit that contains engine components may be considered a replacement engine for regulatory purposes. Additionally, unassembled parts could not be assigned an assembly date. Additionally, the definition itself is inconsistent and confusing. First it defines an engine as a "complete, operational engine", but also suggests "any engine block or kit with the parts necessary to assemble an engine block with or without an installed crankshaft is also considered an engine." OPEI is also concerned how or why and engine block would be assembled without an crankshaft. OPEI is concerned that definition and rational will prevent users from servicing and maintaining their products, even with "authorized" parts, which is inconsistent with Right to Repair movements. OPEI recommends the definition is harmonized with EPA. (524-Docket)

Comment: **Comment 19-3: "Handheld" Definition**
OPEI is concerned the definition is inconsistent with EPA and may result in different certification and compliance requirements for identical engines and/or equipment for CARB and EPA, which would be inconsistent with Section 202(a) of the Clean Air Act. OPEI recommends the definition is harmonized with EPA. (524-Docket)

Comment: (32) "Handheld" means relating to off-road equipment using an engine with displacement less than or equal to 80 cc that meets either of the following criteria: (A) It is carried by the operator throughout the performance of the manufacturer's intended function. (524-Docket)

Comment: Stihl has also concerns with the proposed engine and handheld definition and other changes outlined in the proposal. (3038-Oral Testimony)

> **Agency Response:**
>
> In response to comments regarding the definition of "handheld," CARB made a modification to § 2401(a)(32), which now reads, ""Handheld" means relating to off-road equipment using an engine with displacement less than or equal to 80 cc," as described in the March 2022 15-Day Notice and in section II.A.1.c of this FSOR. The current California definition in Part 1054 similarly reads "Handheld means equipment that contains an engine with a displacement of less than 80cc." The modification removes criteria included in the ISOR Proposed Amendments beyond engine displacement for equipment to be considered

handheld. The modification effectively harmonizes the definition of "handheld" in the SORE regulations with the definition of "handheld" in federal regulations since federal 40 CFR Part 1054 also specifies in section 1054.101(e), in part, "For purposes of the requirements of this part, engines at or below 80 cc are considered handheld engines, but may be installed in either handheld or nonhandheld equipment."

In response to comments regarding the definition of "engine," CARB made a modification to § 2401(a)(19), which now reads, "Engine means an engine block with an installed crankshaft. Gas turbine engines are excluded from this definition. The term engine does not include engine blocks without an installed crankshaft, nor does it include any assembly of reciprocating engine components that does not include the engine block. (Note: For purposes of this definition, any component that is the primary means of converting an engine's energy into usable work is considered a crankshaft, whether or not it is known commercially as a crankshaft.)," as described in the March 2022 15-Day Notice and in section II.A.1.b of this FSOR. The modification largely harmonizes the definition of "engine" in the SORE regulations with the definition of "engine" in federal regulations. Please refer to the Agency Response in section IV.A.10 for discussion of comments related to the Proposed Amendments' compliance with Clean Air Act requirements.

### *A.31.3. Production line testing*

Comment: OPEI recommends CARB retain the original test and process or align with EPA CFR 40 Part 1680 Subpart E - Selective Enforcement Auditing. (524-Docket)

**Agency Response:**

This comment recommends retention of the current requirements for compliance testing pursuant to § 2407(a) or alignment with federal requirements for selective enforcement auditing. CARB made no changes in response to this comment.

Amendments to § 2407(a) do not impact production line testing requirements in §§ 2407(b)-(d). New engine compliance testing is initiated by CARB, not manufacturers, and is a distinct process that is not part of the production line testing process. The SORE regulations do not draw a connection between CARB's new engine compliance testing and federal selective enforcement auditing. The purpose and rationale for the changes to § 2407(a) are described on pages 176-182 of the ISOR. The Proposed Amendments to § 2407(a) are necessary to ensure expected emission reductions are achieved. Please refer to Agency Response 15 in Attachment A to this FSOR for further discussion.

## A.32. Requests for information

### *A.32.1. Emissions data*

Comment: **Subject: AB 1346**
During the discussion, passage, and subsequent signing into law by Governor Newsom of AB 1346. it was referenced in news sources that "An hour's use of a gas-powered leaf blower produces the same amount of emissions as driving from Los Angeles to Denver, according to the Air Resources Board". As the intent and form of this legislation could be proposed in other states, please provide any links or references to studies or research that verifies this assertion. (583-Email)

Comment: A very popular daily newspaper published in high volume here in Vienna, Austria was using in one recent article the following statement, which is based on a statement of a California Air Resources Board Fact Sheet attached. The relevant text is highlighted in yellow color. Quote of text published in the Vienna newspaper: *The devices, which are often powered by an internal combustion engine, emit a surprising large amount of CO2. A U.S. study found that a leaf blower produces as much exhaust gas per hour as a Toyota Camry driving about 1,800 kilometers.* Please review this matter! This statement for sure is not correct. I made the following calculation based on fuel consumption data I did get (fuel consumption is linear proportional to CO2 emission quantity): (588-Email)

The facts

A Toyota Camry consumes 5.4 l/100 km according to a recent test by the ADAC - Quote:

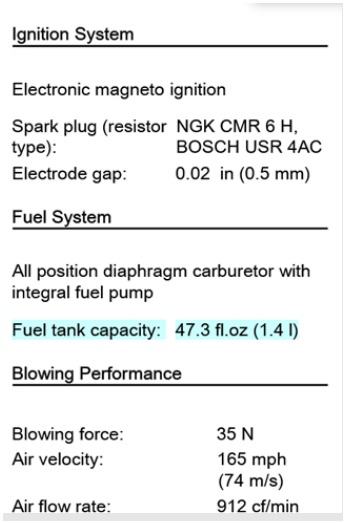
ADAC (German automobile club) test consumption: only 5.4 l/100 km

With the real consumption it does not look bad. The reality-based ADAC Ecotest even undercut the factory- specified WLTP average consumption of 5.5 liters: 5.4 liters of premium per 100 kilometers of test consumption is a top value for such a large sedan.

This means that the Toyota Camry uses 97.2 liters of gasoline for 1,800 kilometers.

A typical professional gasoline-powered leaf blower is the Stihl BR 700 with 2800W drive power.

The tank capacity is 1.4 liters - see bright blue highlighted text from the BR 700 manual below. (588-Email)



**Ignition System**

Electronic magneto ignition

| | |
|---|---|
| Spark plug (resistor type): | NGK CMR 6 H, BOSCH USR 4AC |
| Electrode gap: | 0.02 in (0.5 mm) |

**Fuel System**

All position diaphragm carburetor with integral fuel pump

Fuel tank capacity: 47.3 fl.oz (1.4 l)

**Blowing Performance**

| | |
|---|---|
| Blowing force: | 35 N |
| Air velocity: | 165 mph (74 m/s) |
| Air flow rate: | 912 cf/min |

(588-Email)

Quote from a dealer information:

Features Stihl BR 700 Petrol Leaf Blower 2800W
For professional use in landscaping, gardening and municipalities
Low-fatigue work with back padding and waist belt
Extremely powerful petrol leaf blower for professionals

Excellent pulling power and high torque thanks to 4-MIX® engine
Efficiently removes leaves, hedge trimmings or debris from large areas (588-Email)

Technical specifications

Displacement - 64.8 $cm^3$
Weight - 10.8 kg
Sound pressure level - 101 dB
Sound power level - 109 dB
Vibration value right - 2.5 $m/s^2$ CO2 - 775 g/kWh
blowing force - 35 N Air velocity - 74 m/s
Air flow rate with R-nozzle brochure - 1550 $m^3/h$
Max. Air flow rate - 1860 $m^3/h$
Max. Air speed - 88 m/s
Running time per tank filling - 69 min (588-Email)

This means that the blower uses 60/69 x 1,4 = 1,22 liters in one hour. 97,2 / 1,22 = 79,7 (588-Email)

The fact is that a Toyota Camry emits almost 80 times more CO2 over a distance of 1,800 kilometers than a Stihl BR 700 gasoline leaf blower 2800W in one hour of operation. Since the amount of CO2 is linearly proportional to the amount of fuel burned, the values given in your fact sheet are never correct. Even if a 2017 Toyota Camry is said to have consumed more gasoline than a 2021, the ratio is still not correct! I am looking forward to your comments. I do see it as my citizen's obligation to act when such mismatches are found. (588-Email)

Comment: **Subject: Data and Studies**
I am looking at this fact sheet (https://ww3.arb.ca.gov/msprog/offroad/sm_en_fs.pdf?_ga=2.57772970.1807115685.1562651154-1700486834.1557971923) and I am wondering if the data and studies that this fact sheet refers to is available online. Mainly I am wondering how these claims were modeled and what models were used that predict the decline in vehicular smog-forming emissions. I think the results are very interesting and worth examining. (591-Email)

Comment: I would also like some of the information that CARB is using to be published publicly, such as what kind of backpack blower would put out enough emissions to cause -- to be equivalent to a vehicle driving over a thousand miles, what kind of infor -- what kind of data that that is being used? Because also some of the data that was put out in the presentation earlier is that 50 percent of emissions have been reduced since some of these implications. (3033-Oral Testimony)

**Agency Response:**

These comments discuss or inquire about comparisons between smog-forming emissions from SORE equipment and light-duty passenger cars. One comment mentions the possibility that the intent and form of AB 1346 could be proposed in other states. Such possible actions are beyond the scope of the Proposed Amendments, and, therefore, CARB made no changes based on the comment. The scope of the rulemaking described in the October 2021 45-Day Notice does not include actions that may be taken in other states. Other comments inquire about studies that led to the comparison of smog-forming emissions or about a comparison of greenhouse gas emissions between SORE equipment and a light-duty passenger car. The following response provides clarification and context for the above comments.

Page 2 of the ISOR includes the following paragraph: "Operating a typical professional lawn mower for one hour emits as much ozone-forming pollution as driving a new light-duty passenger car about 300 miles – approximately the distance from Los Angeles to Las Vegas, more than 4 hours of drive time. Operating a typical professional backpack leaf blower for one hour emits ozone-forming pollution comparable to driving the same light-duty passenger car

about 1,100 miles – approximately the distance from Los Angeles to Denver, more than 15 hours of drive time. These comparisons are based on the lawn mower, the leaf blower, and the light-duty passenger car having emissions equal to their respective emission standards." The comparisons in the ISOR and in fact sheets published on CARB's website are not based on studies per se, since they are based on each source having emissions equal to its respective emission standards. The comparisons are not based on greenhouse gas emissions as one commenter seemed to assume.

It is true that emissions from SORE have generally been reduced since emission standards were first implemented in 1995, and it is true that emissions from SORE are still relatively high when compared to other sources, such as light-duty passenger cars. Emissions from a professional backpack leaf blower that meets its emission standards will depend on the power of the engine. Some professional backpack leaf blowers that meet their emission standards would have emissions lower than what might be considered typical, as represented in the comparison in the ISOR, while others could have significantly higher emissions.

Emissions from light-duty passenger cars are modeled in EMFAC available here: https://arb.ca.gov/emfac/

CARB staff sent emails to the stakeholders who emailed their questions.

### *A.32.2. Rebates*

Comment: I would like to turn in my gas leaf blower for electric, since they are being made "illegal" (which I feel is appropriate based on the data). I am trying to find out how to get the reported offered rebate for doing so. I live in Amador County. (577-Email)

Comment: **Subject: rebates**
I'm inquiring if the program to eliminate small engine carbon emissions will have a tun-in or rebates attached to help in the purchasing of battery powered equipment? What scheduled date of elimination? (587-Email)

**Agency Response:**

These comments do not request a change to the Proposed Amendments. CARB made no changes based on the comments. The following response provides answers to the commenters' questions and clarification about the rulemaking and SORE regulations.

Regarding the comments about SORE "being made "illegal" and the "scheduled date of elimination": The current SORE regulations and the Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. People can continue to use and repair their current SORE equipment until the end of its life (e.g., until the SORE equipment breaks or people decide to upgrade equipment). There is no scheduled date of elimination for SORE equipment that California residents and businesses currently own. The SORE regulations require new engines to be certified and labeled to meet emission standards and other requirements. New emission standards in the Proposed Amendments could go into effect as early as MY 2024, with the goal of transitioning all new equipment sales to zero-emission equipment shortly thereafter, primarily between 2024 and 2028. Note, CARB regulates the engines, but does not regulate the use of SORE equipment.

Regarding the questions about rebates and turn-in programs: The scope of the rulemaking described in the October 2021 45-Day Notice does not include any SORE rebate or turn-in program because it focuses exclusively on SORE regulations related to exhaust and evaporative emissions. However, associated with this rulemaking, AB 1346 requires CARB to identify, and, to the extent feasible, make available, funding for commercial rebates or similar incentive funding as part of any updates to existing, applicable funding program guidelines for districts to implement to support the transition to zero-emission small off-road equipment operations. The Budget Act of 2021 authorized $30 million in incentive funding for the FY21-22 California state budget for the transition to ZEE. The Board approved including this funding in CORE at their November 2021 hearing. Details of how the SORE funding will be distributed will be determined through a public process. ISOR section I.F provides additional discussion of sources of incentive funding.

CARB staff provided responses via emails to the stakeholders who emailed these questions. In response to the email from the commenter who lives in Amador County, CARB staff sent a response suggesting the commenter reach out to the local air district, Amador County Air Pollution Control District, for information on current incentives and rebates: Amador APCD, 810 Court Street, Jackson, CA 95642, (209) 257-0112.

### *A.32.3. Request for additional certification test data*

Comment: There are currently no identified methods where evaporative emissions can be reduced to the proposed levels. Therefore, the proposed reduction in evaporative emissions is challenging and manufacturers will need more time to comply. Although page 33 of the ISOR claims "Currently-certified engines meet these emission standards, including the hot soak. Several evaporative families in each displacement category meet the proposed emission standards", no data was provided to support this claim. It would be helpful if CARB would identify which engines and evaporative families in each displacement category meet the proposed evaporative emission standards. (515-Docket)

**Agency Response:**

This comment asserts that manufacturers will need more time to comply with the proposed evaporative emission standards and refers to text on page 33 of the ISOR. In response to the statement, "Although page 33 of the ISOR claims "Currently-certified engines meet these emission standards, including the hot soak. Several evaporative families in each displacement category meet the proposed emission standards", no data was provided to support this claim,": a Technical Support Document cited in the ISOR provides data for evaporative families with hot soak plus diurnal certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR [CARB, 2021[141]]. In response to the statement, "It would be helpful if CARB would identify which

[141] This document was cited in the ISOR and included in the rulemaking record that was made available for public review by the October 2021 45-Day Notice:

CARB. 2021. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021.

engines and evaporative families in each displacement category meet the proposed evaporative emission standards,": CARB amended the Technical Support Document to include data for additional evaporative families with hot soak plus diurnal certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR [CARB, 2022[142]]. Because there are substantial data included in the rulemaking record that support the finding that there are engines and evaporative families in each displacement category that meet the proposed evaporative emission standards, CARB determined that more time is not needed for manufacturers to comply with the implementation timeline in the Proposed Amendments; consequently, CARB made no changes to the Proposed Amendments in response to this comment.

### *A.32.4. Requests for information about the Proposed Amendments*

Comment: **Subject: Request for Proposed Amendments to the Small Off-Road Engine Regulations**
I am in charge of regulatory investigations at Kyoeisha Co., Ltd, a Japanese lawnmower manufacturer. I was introduced to you on this matter by David Pino, Air Resources Engineer, Emissions Certification and Compliance Division. We have a request related to the following notification. Could you provide us with Proposed Amendments to the Small Off-Road Engine Regulations? If it is published on the CARB homepage, please let us know the URL. We would like to know the regulatory requirements as it is a regulation that affects the lawnmowers we manufacture. (571-Email)

Comment: **Subject: Small gas engine restrictions**
I'm a gardener in San Jose and would like more information about the proposed restrictions on small gas engine use in California. Initially, this looks ridiculous, but, before passing judgement, I'd like to understand what is going on better. A phone call would be outstanding, but if an Email is all that's available, then I do appreciate your time and effort. (572-Email)

Comment: **Subject: SORE Regulation Question**
Can you please send some information regarding the small off-road engine regulations; I need help understanding the ARB timeline and how best to begin participating in the work to develop regulations and rebates/financial incentives related to this new bill? (584-Email)

**Agency Response:**

These comments do not request changes to the Proposed Amendments, and, therefore, CARB made no changes based on the comments. CARB responded to the commenters' email messages and provided links to the rulemaking page.

### *A.32.5. Propane-fueled engines*

Comment: **Subject: Propane Small Engine**
Hi, my name is Jon and I work for a company that currently sells small horse power engines for log splitters. I understand there is a new law that bans the sale of small engines. My question is, will propane engines be acceptable? Currently engine companies make dual fuel engines, a small engine

[142] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

that can run on either gas or propane. I'm wondering if the engine is converted to only with propane if that would be acceptable to be sold in California. Is there a place I can read more about the requirements? (578-Email)

**Agency Response:**

This comment does not request changes to the Proposed Amendments, and, therefore, CARB made no changes based on the comment. The comment seems to request clarification regarding the applicability of the Proposed Amendments to engines fueled with propane. In response to that apparent request: engines meeting the definition of "small off-road engine" and fueled with propane are subject to the SORE regulations and the Proposed Amendments. In response to the question, "Is there a place I can read more about the requirements?": More information on the Proposed Amendments to the small off-road engine regulations can be found here: https://ww2.arb.ca.gov/rulemaking/2021/sore2021. CARB staff provided a response via email to the stakeholder who emailed these questions.

### *A.32.6. Technical advisory committee*

Comment: **Subject: SORE Advisory Committee**
Is there a technical advisory committee to establish the technology and feasibility criteria for AB 1346? How does someone join the committee? (581-Email)

**Agency Response:**

The comment's request is beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comment. The scope of the rulemaking described in the October 2021 45-Day Notice does not include providing more information about technical advisory committees.

In response to the questions, "Is there a technical advisory committee to establish the technology and feasibility criteria for AB 1346? How does someone join the committee?": CARB does not have a technical advisory committee for AB 1346. CARB staff provided a response via email to the stakeholder who emailed these questions.

## A.33. Safety concerns and emergency equipment

### *A.33.1. Chainsaws for logging and brush clearing*

Comment: I've always been a firm proponent of reasonable environmental laws, but the proposed SORE regulations are very impractical, at least in rural areas of the state. For forty years, I've lived on 20 acres of steep oak woodland and wild grassland in the hills of Mendocino County. After the seasonal rains stop every spring, due to the fire danger and Cal Fire mandates I have to cut several acres of wild grass around my home and along both sides of my 750-foot-long driveway with a string trimmer ("weed eater"). Since it's impossible to predict when the last seasonal rain falls, my neighbors and I sometimes have to cut three times. (6-Docket)

Comment: The grass isn't cut for landscaping purposes, but to enable Cal Fire to try and save my home, and maybe give us precious seconds to escape a wildfire. This spring, due to the drought, three oak trees, plus seven Douglas fir that I planted 25 years ago all died. The oaks simply fell over, the seven Douglas fir I had to cut down. One of the oaks fell across my driveway leaving sixty feet of

tangled branches across my driveway, stranding the house and my vehicles on the wrong side of the blockage. I had to cut for days and days to make pieces small enough to stack on level ground. The Douglas fir I cut up to pack uphill out of the woods. I don't know what I'd do with battery-powered chain saw, or an electric one. (6-Docket)

A lot of forest waste can be chipped instead of control burned. But chippers need gas engines, and don't work very far from a road. Obviously the problem of dead trees isn't just my own, it extends all over fire-prone northern and central California. (6-Docket)

Comment: The current proposal to ban the sale of gas powered chainsaws is set to cause immeasurable safety issues for rural California. While electric chainsaws may work for suburban homeowners and businesses, they are patently unsafe for large jobs including falling trees for firewood or as used by HotShot crews to remove hazard trees in fire zones. It is unsafe to have a chainsaw run out of power out in the woods mid-cut and is obviously not possible to simply plug it in. An exception for rural CA should be made. (24-Docket)

Comment: I am against this proposal. I urge you vote against it. It absolutely no sense at all. How do you propose loggers to pack around a bunch of batteries in the woods? How many people do you want to put out of work? (25-Docket)

Comment: I think that it should be regulated, granted. By the county and needs of said counties. Highly treed counties with lesser population should be exempt. The very tools that are used daily to survive in these counties are being affected by this proposed amendment. People that use wood to heat their homes = you suckers just freeze. loggers that help thin and manage the forests, What will they do for work? Loggers are a special breed of people we need those people to be in the woods where they are happy and thrive. The monies that the government has taken and supposed to allocate towards thinning and maintaining the overgrowth needs to be sent to just that. Too many years of neglect by the politicians has lead us into another political scam of climate change. If the money taken from the American people was spent and proportioned adequately our California wild fires would have not killed so many innocent people. the forests have been neglected for decades that is evident. Our future goals should include thinning of federal and county forests with the highest regard. Tools used to do this very job should not and can not be taken away. (108-Docket)

Comment: I am writing to you today as a residential landowner living on ten acres in the urban interface. The use of gasoline powered chainsaws chipper pole saws weed eaters and mowers are key in maintaining a fire safe landscape surroundings protecting my residential dwelling. (308-Docket)

Comment: The banning of such equipment for large commercial operations, including municipality and utility tree trimming, would harshly affect the public's safety. Tree trimming is needed on large scales for municipalities to ensure safe travel for emergency vehicles and keep the public safe from falling trees and limbs. Tree trimming is also needed year-round to clear high voltage powerlines. Not clearing these lines will reduce the reliability of safe electricity to the public. It also poses electrical hazards that can cause injury or death. (477-Docket)

Comment: Professional chainsaws must be capable of cutting quickly when back cutting a tree, especially when felling straight-grained species such as fir and alder. If cut too slowly, these trees can split vertically while the tree begins to fall. The tree splits open and breaks at a pivot far above the stump. The tree then frequently kicks back toward the worker. The esoteric term for this phenomenon is "barber chair". Barber chairs can occur from operator error, particularly when the face cut (notch) is

improperly prepared. However, a barber chair can occur if the back cut is cut too slowly. Workers have been injured and killed when a tree barber chairs. (517-Docket)

Comment: Timber fallers cut the limbs off felled trees while they walk down the log. They are required to cut the limbs on the top and both sides of the felled trees. It would be extremely difficult or impossible to reach these limbs with a short bar and would likely result in serious back injuries. Short bars would also place the operator's feet dangerously close to the bar tip, significantly increasing the likelihood of chainsaw lacerations. Another factor to take into consideration is the weight of timber falling equipment. This is not just a convenience issue. It is a safety issue. The average timber faller workday is eight hours. This is eight hours of intensely physical labor, frequently conducted on steep, uneven terrain. The timber faller must be capable of moving quickly away from dangerous situations, whether during the first hour of work or the last. In 21 years of falling timber I never worked a day when I didn't have to move quickly away from a falling tree. Doing that job in an exhausted or fatigued condition was, and always will be unacceptably dangerous. (517-Docket)

Comment: And it's not just pressure washers. With the issues facing California in regards to wildfires there are no chainsaws that run on battery power that are above 15 to 20 inches long. Nothing industrial. Are you expecting that the forest service wheels out a large diesel generator with about 20 extension cords to runoff into the forest to maintain the utility areas that are continuing to catch fire? Up in a tree with extension cords? So you've reduced emissions from the smaller chainsaws but now have a large diesel generator that is putting out as much if not more than the smaller units. And by the way the generators run the entire time. Gas powered chainsaws turn off and on. (543-Docket)

**Agency Response:**

Most of these comments describe concerns for public and worker safety and the availability of equipment for wildfire mitigation and do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The following response provides clarification and context for several points within the above comments.

The Proposed Amendments would not require commercial operations and residents to use chainsaws with short bars, zero-emission chainsaws, or any chainsaw subject to CARB's SORE regulations. The Proposed Amendments would not affect the ability of commercial workers and residential users to continue to purchase and use chainsaws powered by engines with displacement 45 cc and above. Certain new small off-road engines are not subject to CARB's SORE regulations. Section 209, subsection (e)(1), of the Clean Air Act provides that new engines less than 175 horsepower which are used in farm or construction equipment or vehicles are preempt from CARB's emission standards and only subject to emission standards from U.S. EPA. CARB generally refers to engines which are not subject to California's emission standards in this fashion as "preempt."

U.S. EPA regulations implementing Section 209(e)(1) define "farm equipment or vehicle" as "any internal combustion engine-powered machine primarily used in the commercial production and/or commercial harvesting of food, fiber, wood, or commercial organic products or for the processing of such products for further use on the farm." [143] "Commercial,"

[143] 40 CFR § 1074.5

in turn, is defined to mean "an activity engaged in as a vocation," and "primarily used" is defined to mean "used 51 percent or more." [144] U.S. EPA regulations also state that "[f]or equipment that is used in applications in addition to farming or construction activities, if the equipment is primarily used as farm and/or construction equipment or vehicles (as defined in this part), it is considered farm or construction equipment or vehicles."[145]

Although a full listing of preempt equipment types is beyond the scope of this rulemaking, CARB expects that models of equipment used primarily for harvesting wood or management of land in an agricultural or agroforestry context, such as chippers, chainsaws powered by engines with displacement 45 cc and above and blade-capable brush cutters and clearing saws powered by engines with displacement 40 cc and above, will be considered preempt and therefore will not be affected by this rulemaking. As noted on pages 12 and 16 of the ISOR, chainsaws powered by engines with displacement 45 cc and above have generally been found to be preempt. Preempt equipment can be purchased by both California businesses and residents.

The chainsaws referenced in the comments seem to have engine displacement 45 cc or greater. Therefore, the Proposed Amendments are not expected to directly or indirectly impact public and worker safety. Additionally, most equipment primarily used for fire mitigation and maintenance of defensible space are typically not subject to CARB's SORE regulations. As described in the ISOR (sections I.E.1 and I.E.2), there are many ZEE options for smaller chainsaws, brush cutters, and string trimmers used for commercial and residential operations. The number of ZEE manufacturers has risen steadily over the past 15 years, and the number of zero-emission options for chainsaws, brush cutters, and string trimmers is likely to continue rising as the market for ZEE matures. The Proposed Amendments are not expected to impact the ability of firefighters, timber harvesting and tree trimming operations, and residents to obtain the equipment they need to manage forests, maintain defensible space, and cut wood to heat homes.

One of the comments requests changes, stating, "I think that it should be regulated, granted. By the county and needs of said counties. Highly treed counties with lesser population should be exempt." No change was made to the Proposed Amendments in response to this comment. It is not possible to exempt specific counties because SORE equipment is not regulated regionally in CARB's SORE regulations. If equipment is sold in some areas, that equipment will be available to anyone who has access to the store, regardless of where they will ultimately use the equipment. In addition, CARB must regulate SORE emissions because, under California HSC sections 39500 and 39602, CARB is the air pollution control agency responsible for controlling emissions from motor vehicles "for all purposes set forth in federal law." Under HSC section 39602.5, CARB is required to "adopt rules and regulations pursuant to Section 43013 that … will achieve ambient air quality standards required by the federal Clean Air Act … in all areas of the state by the applicable attainment date, and to maintain these standards thereafter." HSC section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from all mobile source categories under its jurisdiction, including off-road mobile sources such as SORE, to accomplish the attainment of ambient air quality standards at the earliest practicable

[144] 40 CFR § 1074.5

[145] 40 CFR § 1074.10

date. Under its statutory authority, CARB may adopt test and certification procedures to ensure compliance with CARB's emission standards (HSC sections 43101, 43102, and 43104). Further, California Assembly Bill (AB)1346 (Chapter 753, Stats. of 2021) requires CARB to adopt cost-effective and technologically feasible regulations by July 1, 2022, to prohibit engine exhaust and evaporative emissions from new small off-road engines. Please refer to ISOR section I.B for additional information about CARB's legal authority and responsibilities.

In response to the comment, "If the money taken from the American people was spent and proportioned adequately our California wild fires would have not killed so many innocent people…Our future goals should include thinning of federal and county forests with the highest regard,": Monies allocated towards thinning and maintaining forest overgrowth and other wildfire mitigation are beyond the scope of this rulemaking as described in the October 2021 45-Day Notice. Nonetheless, the Proposed Amendments are not in conflict with efforts to reduce forest fuels and fight fires. As described in the above response, and further in Agency Responses in sections IV.A.2.5.1, IV.A.29.1.1, IV.A.29.1.3, and A.33.2, CARB does not anticipate that the Proposed Amendments will affect the availability of equipment used for forest fuel reduction, fire mitigation, maintenance of defensible space, firefighting, and other emergency use applications. Further, SORE are substantial contributors to smog-forming pollution in California. Smog-forming pollutants are the primary pollutants whose emissions the SORE regulations are intended to reduce. The emissions of smog-forming pollutants, reactive organic gases and oxides of nitrogen, from SORE are similar in magnitude to those emissions from light-duty passenger cars, as described on page 2 of the ISOR. As described in Chapter I of the ISOR, these pollutants have adverse health effects. Health benefits of the Proposed Amendments for California residents include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease. The Proposed Amendments are necessary to help protect the health and welfare of all California residents. CARB cannot delay or discontinue this rulemaking to instead focus all monies and regulatory efforts on forest fuel mitigation because Health and Safety Code section 43018 requires that CARB endeavor to achieve the maximum degree of technologically feasible, cost-effective emission reductions from SORE by the earliest practicable date. Consequently, CARB made no changes based on this comment. For additional explanation of the necessity for the current rulemaking, its benefits for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV.

In response to the statement, "I am against this proposal. I urge you vote against it. It absolutely no sense at all. How do you propose loggers to pack around a bunch of batteries in the woods? How many people do you want to put out of work?": As noted on pages 12 and 16 of the ISOR, chainsaws powered by engines with displacement 45 cc and above have generally been found to be preempt. The commenter states opinions but does not provide evidence to support its statements. The commenter's claims of number of batteries needed for a day's use do not provide evidence of type and size of battery or equipment power output to support these claims; thus, CARB cannot evaluate the commenter's assessment of the typical number of batteries that would be needed for ZEE operators for one day due to these evidentiary defects. The CARB economic analysis calculates the number of batteries needed to operate ZEE for the average use time in the SORE2020 emissions inventory report

[CARB, 2020[146]]. Some users may require more batteries, as they have longer equipment use times, while some may need fewer. The commenter does not provide evidence that people will be put out of work. CARB's economic analysis assumed users would purchase enough batteries to complete a day of work, as described on page 39 of the SRIA. The analysis found that, while ZEE can have higher upfront purchasing costs than SORE equipment, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. For discussion of 45-day and hearing comments that express concerns about the higher upfront costs of ZEE, the ability of businesses to absorb higher costs, and concerns about potential loss of business or jobs, please refer to the Agency Responses in sections IV.A.12, IV.A.13.1.2, and IV.A.13.1.1, respectively. Please refer to ISOR Appendix I SRIA sections B and C for CARB's full economic analyses of potential economic impacts and benefits for California residents under the Proposed Amendments.

### *A.33.2. ZEE technical feasibility for emergency uses*

Comment: Batteryoperated generators do not exist nor do we see this as a viable option so again the "one size fits all" approach is perplexing. To charge a battery one must plug into the grid assuming the grid is up and running. A medical device requiring electricity is normally "plugged into" the wall and transfer switches are not uncommon to insure a continuous power source should the grid go down. A transfer switch is associated with a gas powered generator to kick in when the power is down. Without power one is unable to charge a batteryoperated generator hence a disruption in delivering a source of energy to the generator to power a medical device. (8-Docket)

Comment: Our local police departments and Search and Rescue have all purchased gas powered generators from our store for situations they could not manage any other way. (12-Docket)

Comment: First responders also require high-performing gas-powered equipment that these amendments seek to eliminate. While exempting this equipment from these rules could address the concern, the specialized use and expected volume of equipment sold would not be sufficient for dealers to keep in inventory if the sales were banned across the sector. (2001-Docket)

**Agency Response:**

These comments describe concerns that first responders and emergency personnel will not have adequate tools to meet their needs. CARB made no changes based on these comments. The following response provides clarification and context.

One of the comments discusses the use of transfer switches to direct power from generators to homes to power medical devices. CARB's SORE regulations do not prohibit the use of such technology, nor would the Proposed Amendments require anyone to stop using a portable generator to power a medical device.

Title 13, California Code of Regulations, section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine

[146] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision.

Please refer to the Agency Response in section IV.A. 29.1. for additional discussion of equipment used for emergency response.

In response to the comment,

> "First responders also require high-performing gas-powered equipment that these amendments seek to eliminate. While exempting this equipment from these rules could address the concern, the specialized use and expected volume of equipment sold would not be sufficient for dealers to keep in inventory if the sales were banned across the sector."

As explained in the Agency Responses in sections IV.A. 29.1 and IV.A.33.1, the Proposed Amendments would not prohibit the sale of CARB-certified SORE equipment or all other small off-road equipment because new engines used primarily in farm and construction equipment and vehicles under 175 horsepower are federally preempt from California SORE regulations. As explained in the above response, the Proposed Amendments would not impact the existing provision that allows emergency responders to purchase equipment powered by non-California certified engines when such equipment with a California-certified engine is not available. The commenter provides no evidence to support its statement that the expected volume of equipment sold would not be sufficient for dealers to keep in inventory. Equipment purchasers do not need permission or approval from CARB to purchase preempt equipment or CARB-certified SORE equipment. Equipment sellers do not need permission or approval from CARB to access, stock, distribute, or sell preempt equipment. The Proposed Amendments do not affect retailers' ability to sell preempt equipment. In addition, the Proposed Amendments do not affect retailers' ability to order and supply non-California certified SORE equipment for emergency responders who have CARB approval to purchase equipment powered by non-California certified engines, pursuant to title 13, California Code of Regulations, section 2403(f).

## A.34. Stakeholder outreach

### *A.34.1. Meetings*

Comment: CARB staff have consistently refused to engage with stakeholders to gain a full appreciation of the wide variety of non-handheld products that utilize SSI engines, or to understand the different performance requirements and "utility" considerations that apply to residential handheld products, on the one hand, and professional/commercial non-handheld products, on the other. (521-Docket)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. The commenter states its opinions regarding CARB staff's stakeholder engagement. CARB disagrees with the commenter's statements and conclusions. Chapter X of the ISOR discusses the public process for development of the Proposed Amendments. CARB staff met with EMA on many occasions throughout development of the Proposed Amendments and carefully considered input from EMA and EMA's comments on draft proposals released before the June 2020 and March 2021 workshops. CARB made no change based on this comment.

### A.34.1.1. NALP and CLCA

Comment: Since the publication of the ISOR in October, CARB staff has been very open and NALP has had many conversations. Unfortunately, this should have happened sooner and likely would have resulted in a more reasoned approach to emissions reductions and impacts of transitioning to ZEE on the landscape industry (533-Docket)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. The commenter states its opinions regarding CARB staff's stakeholder engagement. CARB disagrees with the commenter's conclusions. Chapter X of the ISOR discusses the public process for development of the Proposed Amendments. As discussed on page 2 of the ISOR, California Health and Safety Code (HSC) § 43018 requires CARB to "endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the state standards at the earliest practicable date." CARB made no change based on this comment.

## *A.34.2. Requests for information*

Comment: After multiple requests over an unnecessarily extended period of time, CARB staff provided the raw data for the CSUF Survey and Report to the Outdoor Power Equipment Institute (OPEI) and EMA for review. (521-Docket)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. The commenter states its opinions regarding its requests to CARB staff for information. CARB agrees that EMA and OPEI made multiple requests for information throughout the development of the Proposed Amendments. CARB disagrees with the commenter's conclusions. CARB staff met with EMA on multiple occasions to understand its requests and provided the requested information to the extent required in a timely manner. CARB made no change based on this comment.

## *A.34.3. ZEE Demonstrations*

Comment: We are eager to participate in a pilot program or demonstration project with battery equipment in the backcountry upon the approval of our MOU partners, ensuring the safety certifications are satisfied. Since our sawyers are certified through the U.S. Forest Service, we will be coordinating with our National and State partners to develop new training and safety protocols for best practices of this new equipment. (508-Docket)

**Agency Response:**

This comment does not request a change to the Proposed Amendments. ZEE demonstrations are coordinated separately from this rulemaking. CARB made no change based on this comment.

## A.35. Technological feasibility and cost-effectiveness

### *A.35.1. OPEI, NALP, CLCA, Gardenland Power Equipment, and similar technological feasibility and cost-effectiveness comments*

Comment: No I don't think they should be banned, you would still need to use a gas generator to charge batteries on electric equipment (72-Docket)

Comment: I am in favor of the ban of internal combustion engines for small engines as they disproportionately emit more pollution. Obviously must have alternative motors fully in place to minimize business disruption. (86-Docket)

Comment: In addition they would need a way to charge the batteries in the field. There are not enough manufacturers out there that offer an option to use the car or truck battery. Which means they would have to use either a Generator (Which I understand is on the list of gas powered equipment to be banned). Or use electricity and the clients location to charge their batteries. (424-Docket)

Comment: electrical equipment for the landscape is fine for homeowner but for commercial landscape side there is a great expense incurred for products that don't do as well as gas powered equipment. People banning gas power equipment have probably never been on a commercial landscape maintenance rout. Battery powered equipment have high cost to purchase and when battery is no longer useful replacement is almost as much of a cost as the original purchase. Battery equipment for large landscape maintenance is not yet economically smart at this point due to reduced power and cost compared to gas power equipment. (450-Docket)

Comment: OPEI supports ZEE as one key emission reduction strategy where technology feasibility has been demonstrated. *However, there is currently no one-size-fits-all ZEE approach to satisfy the full range of SORE powered equipment and use cases.* The Proposed Rule poses numerous technical feasibility, economic, and implementation challenges for many industry stakeholders. The ability to work all day, and in some cases days on end, without recharging and/or needing dozens of expensive batteries, as well as the cost of battery maintenance over the life the product will continue to be a technology barrier for many user categories and applications which the Proposed Rule does not consider. Collectively these challenges are currently insurmountable and will result in significant and unnecessary hardships for manufacturers, retailers and end- users, culminating in an early market shortfall of products with high consumer need and demand. (524-Docket)

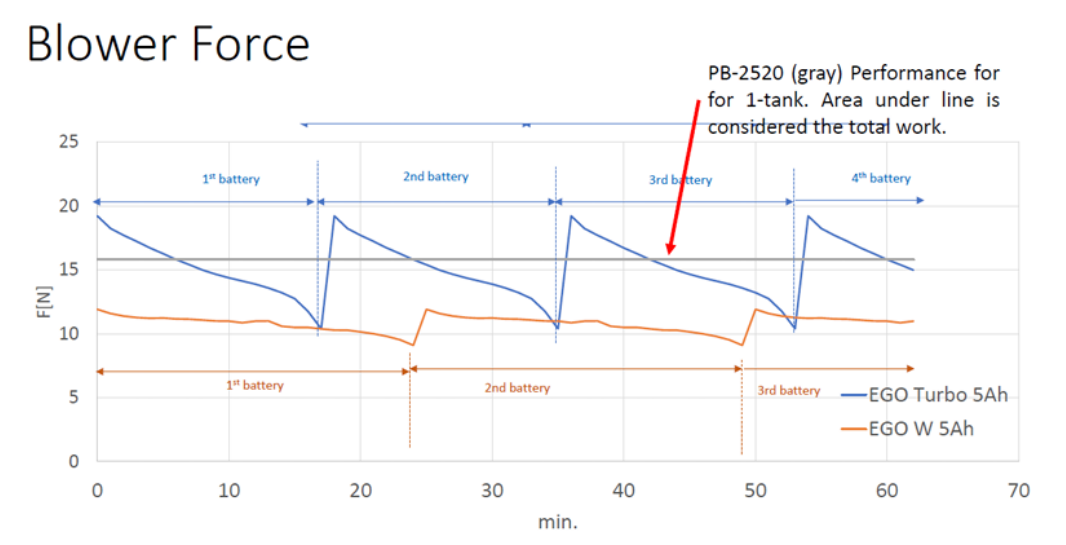
Comment: Comment 7 – The Proposed Rule fails to demonstrate ZEE is a technically feasible solution for many use cases. The Proposed Rule presents no technology feasibility test data, but instead relies exclusively on product marketing data, which highlight limited and sometimes misleading comparisons of performance and cost. OPEI members manufacturer a wide range of outdoor power equipment products, including ZEE. OPEI recognizes and supports the organic growth of ZEE. Today's ZEE products offer economic and environmental benefits for many applications; however, there is no one-size-fits-all ZEE approach to satisfy the full range of SORE- powered equipment and use cases. The Proposed Rule poses numerous technical feasibility, economic, and implementation challenges for industry stakeholders, such as landscapers, farmers, tree care experts, utility companies, rural property owners, trail clearers, and other professional users. The ability to work all day, and in some cases days on end, and/or needing dozens of expensive batteries, not to mention the cost of battery maintenance and replacement over the life of the product will continue to present challenges for many users. Collectively these challenges are currently insurmountable and will result in

significant and unnecessary hardships for manufacturers, retailers and end-users, culminating in an early market shortfall of products with high consumer need and demand. (524-Docket)

The Proposed Rule lacks a robust technical feasibility analysis. In particular, the Proposed Rule relies on very limited on-line product comparisons, minimizing the top technological requirements – continuous performance, run-time, and cost. Despite initial plans to conduct a detailed technical testing program of ZEE equipment as part of the rulemaking program, CARB conducted no ZEE product technical feasibility study of the products discussed in the rulemaking package. OPEI is concerned that the products and features selected to compare in the Proposed Rule are limited (to just one product for each category) and not "apples to apples." For example, the Proposed Rule notes one performance benefit of the residential ZEE walk-behind lawn mower is that "the zero-emissions lawn mower is self-propelled, while the SORE lawn mower is not, so the zero-emissions mower would be easier to operate for most users."[27] [Footnote 27: ISoR, pg 14] There are numerous ZEE walk-behind lawn mowers that are not self-propelled, and there are many gas-powered walk-behind lawn mowers that are self-propelled, so it is obvious that, in this example, the Proposed Rule fails to provide reliable conclusions regarding the comparison of SORE and ZEE products. (524-Docket)

More importantly, the marketing performance metrics cited for ZEE in the Proposed Rule are momentary (peak, not sustainable) – this results in technical barriers for many users and applications that required further development to overcome extended duration performance concerns. The Proposed Rule states "for the most common types of SORE equipment, there are ZEE equivalents available in the market with similar or better performance characteristics and lifetime".[28] [Footnote 28: ISoR, pg 13] The Proposed Rule describes the performance of ZEE and gas-powered handheld leaf blowers in terms of air flow and blowing force; however, the Proposed Rule does not disclose that these metrics are momentary, and that over equivalent run-times the gas-powered leaf blower sustains higher performance than the ZEE leaf blower due to battery performance loss. Due to the lack of technical feasibility and product testing in supporting the Proposed Rule, Industry conducted testing to understand how performance of the ISoR handheld leaf blowers compared. Industry was able to approximately correlate the marketing performance noted in the Proposed Rule for both units but found that after just 8 minutes of run-time, the ZEE leaf blower force fell below that of the gas-powered leaf blower. Additionally, the Proposed Rule referenced leaf blower force was only momentarily achieved at "turbo" mode, a mode where the battery lasts just 18 minutes. The leaf blower force performance cited in the Proposed Rule drops almost 50 percent over the 18-minute run-time. On the other hand, the gas-powered leaf blower is able to continuously run and sustain performance on a single tank of gas for over an hour. See Figure 7-1. These technical limitations of ZEE, and the impact on working professionals to complete jobs efficiently, must be further studied to understand the true technology feasibility of ZEE in many use cases. (524-Docket)

Figure 7-1 – Industry technology feasibility comparison of handheld leaf blowers cited in the Proposed Rule. Run-time (minutes) vs. blower force (N) (524-Docket)




The SORE2020 model suggests the average residential leaf blower is used for 30 minutes per use. Accordingly, the average homeowner would need two batteries each use, regardless of leaf blower performance mode – At least one additional battery would need to be purchased to meet SORE2020 assumptions. Using SORE2020 emission factors, OPEI estimates 1.88 batteries would be needed to meet SORE2020 average residential user leaf blower needs. This closely correlates with the technology feasibility test shown in Figure 6-1. The SRIA does not include additional batteries in its residential blower analysis.[29] [Footnote 29: SRIA, Tables G-1 though G-4, pg. 117] Similarly, many businesses and landscapers use handheld leaf blowers with equivalent performance characteristics. SORE2020 suggest the average landscaper uses each leaf blower 1.14 hour per use. To roughly match the performance of the gas-powered blower, using "turbo" mode, a landscaper would require three to four batteries per leaf blower per day. The SRIA provides no analysis of handheld blowers for professional use. (524-Docket)

Industry further studied technical feasibility as a function of the number of batteries required for residents and landscapers to meet the average performance needs suggested in SORE2020. Run-time is a critical consideration of many users, especially professional landscapers, and hence is an important factor in determining technical feasibility. For the average landscaper operating walk-behind mowers, string trimmers, leaf blowers and hedge trimmers, based on the CSU-F survey equipment distribution and SORE2020 suggested use factors, using conservative estimates of battery size, the average landscaper would require 36.68 batteries per day. If chain saws are included with the average landscaper equipment, they would require 48.17 batteries per day. Walk-behind lawn mowers would require 8 batteries per day, string trimmers would require 5.05 batteries per day, leaf blowers would require 18.34 batteries per day, hedge trimmers would require 5.28 batteries per day, and chain saws would require 12.5 batteries per day. Considering replacement batteries (as batteries wear out), which are not considered in Proposed Rule, an average landscaper could go through 84.32 to 103.37 batteries over the useful life (6 years) of the equipment. The associated costs with are discussed further in Comment 8. See Annex B for a summary of the OPEI battery and cost calculations (524-Docket)

For a residential wanting to do all their yardwork in a single day (mow, string trim, trim hedges, blow), using conservative estimates of battery size, it would require 11.81 batteries to achieve the average residential user performance needs suggested by SORE2020. For a residential generator to meet the performance needs suggested by SORE2020, running for 3.85 hours, a residential user may need up to 20.36 batteries, and would have to change the batteries every 23 minutes. This is an important point, as the Proposed Rule assumes no battery changes are necessary for a homeowner to complete their landscaping tasks. Nevertheless, SORE2020 models performance that requires several battery changes – Both assumptions cannot be correct. If current product battery offerings are sufficient to fulfill the average residential user needs, then SORE2020 overestimates average performance and/or length of use, and in-turn overestimates sector emissions. (524-Docket)

The SRIA underestimates the number of batteries needed to meet SORE2020 performance requirements for both residential and professional users and does not include sufficient chargers for professional users. For example, SORE2020 estimates 1.18 kW per day is needed per vendor/landscaper walk-behind lawn mower. The "professional ZEE" referenced in the SRIA includes one 48V 4A-h battery, supplying 192 w-hr per battery (without consideration of battery and motor efficiency losses). To operate the mower for one day under the assumptions included in SORE2020, a user would require 7 batteries (1180 W / 192 W-hr = 6.15 batteries); not 4 as assumed by the SRIA. 3 additional batteries and chargers would be needed for the professional user, increasing the upfront cost by more than $570 (not to mention additional chargers neglected in the original SRIA analysis or replacement batteries). The SRIA appears to include no additional batteries for chain saws. (524-Docket)

Finally, regarding a "better lifetime", the Proposed Rule provides no technical feasibility testing data to support this assumption. Professional users will need to replace batteries throughout the product life to meet SORE2020 performance estimates. To better understand survey responses and product use, OPEI visited two landscaping crews. One crew was in Ojai, CA and anther in South Pasadena, CA. These communities are important because they are American Green Zone Alliance ("AGZA") communities that operate zero-emissions equipment. Because professional riding mowers typically have hour meters, OPEI focused this study on this equipment. OPEI visited both locations four times over approximately 13 months to understand the use of the equipment. Regarding performance of the equipment over the product lifetime, during OPEI's May 2021 visit, at approximately 1400 hours on the surveyed ZEE Zero- Turn Riders (ZTR), the landscaping crew in South Pasadena reported the unit was not as powerful as it was new but reported no major issues. During OPEI's September 2021 visit, at approximately 1600 unit hours, the crew reported significant performance loss. During OPEI's September 2021 visit to Ojai, at approximately 636 hours on the surveyed ZEE ZTR, the landscaping crew reported performance loss as much as 40%, and that tall, wet grass was a particular issue. OPEI is unaware of any similar study conducted for the Proposed Rule. Being the only reliable hour and performance responses available, one cannot conclude ZEE offers "similar or better performance and lifetime (than gas-powered equipment)." OPEI's landscaper study is additionally detailed in comments below. (524-Docket)

With these concerns in mind, in addition to the concerns outlined in Comments 8 and 9 below, CARB must conduct a regulatory-appropriate technology feasibility study to understand the performance characteristics and limitations, and technology feasibility of ZEE products versus their gas-powered counter-parts – including accurate battery life and maintenance costs. During the October 27, 2017 SORE Working Group meeting CARB staff presented a test plan to "test the ability of currently available (ZEE) to meet the performance requirements of California Code of Regulations, title 13, section 2408.1 for professional level equipment". The need for testing was noted as follows: "the ability of currently-available SORE to meet tightened emission standards when retrofitted with

additional emission control technology must be demonstrated."[30] [Footnote 30: CARB Draft Test Plan – Testing to Establish Up-to-Date Exhaust Emission and Deterioration Factors for Small Off-Road Engines Using E10 Fuel.] No such testing was performed for ZEE for the Proposed Rule. In fact, none of the three technology feasibility tests outlined in the plan were completed. Lack of regulatory-appropriate testing to support the Proposed Rule not only calls into question whether the California administrative regulatory requirements were followed, but also provides another example of how the Proposed Rule is arbitrary and capricious. (524-Docket)

Comment: Comment 8 – The Proposed Rule fails to accurately address the upfront and ongoing cost of ZEE equipment. As a result, the Proposed Rule overestimates the cost benefits of the rule. (524-Docket)
As discussed in Comment 7, Industry studied technical feasibility as a function of the number and cost of batteries required for residents and landscapers to meet the average performance needs suggested in SORE2020. As noted earlier, conservatively, the average landscaper would require 36.68 batteries to 48.17 batteries per day. Considering replacement batteries, which are not considered in the Proposed Rule, an average landscaper could conservatively use 84.32 to 103.37 batteries over the useful life (6 years) of the equipment. The total cost of batteries and chargers for the average landscaper set-up could cost $18,000 to $22,000 over a six-year product useful life. It is important to note that these calculations do not account for equipment costs nor do they account for battery or motor efficiency losses. Battery and motor efficiency losses would likely result in additional batteries and costs. It does not appear the Proposed Rule accounted for efficiency when estimating battery needs. (524-Docket)

Also noted above, a residential user that wants to do all their yardwork in a single day would experience similar challenges. Conservatively, the average homeowner would require 11.81 batteries to achieve the average residential user performance suggested by SORE2020 for the pieces of equipment to do ordinary yardwork. For a residential generator to meet the performance needs suggested by SORE2020, running for 3.85 hours, a residential user may need up to 20.36 batteries, and would have to change the batteries every 23 minutes. Again, SORE2020 models performance that requires several battery changes but the Proposed Rule assumes no additional batteries are needed – Both assumptions cannot be correct. See Annex B for a summary of these calculations. (524-Docket)

Based on OPEI's analysis, the SRIA significantly underestimated the number and cost of batteries for products throughout the useful life of equipment to maintain needed performance. The SRIA states "Professional-grade equipment costs include enough batteries for ZEE to operate for the relevant portion of a full eight-hour workday," but as discussed in Comment 7, this is not true. For another comparison, OPEI found the 21" "commercial" ZEE walk-behind lawn mower used for product feature comparison in the ISoR online for $499.00 plus tax (without battery and charger).[31] [Footnote 31: https://www.rcpw.com/equipment/push-mowers/GMS210.html?gclid=CjwKCAiA7dKMBhBCEiwAO_crFKncRDC0qXZL2xNS7YOMKbdTXtpdb1wQDsG2c8WWVx OzCJBCX0hUMRoC4DcQAvD_BwE Note this cost is lower than advertised at other online retailers.] SORE2020 suggests each day the average vendor/landscaper walk-behind lawn mower requires 1.18kW of power (some will require more, and in turn more batteries). An 82V 4A-hr battery (328 W-hrs) for this mower retails for $229.00 plus tax. Note these batteries for this unit are much larger than and more expensive than the batteries included in the SRIA. Four 82V 4A-hr batteries would be required for each mower to complete an average day of work according to SORE2020 assumptions (1180/328 = 3.6 batteries), without consideration of battery and motor efficiency. In addition, assuming batteries are charged at night, four chargers would need to be

purchased at $79.00 plus tax each. The total upfront cost of this "commercial" ZEE mower would be $1731.00 plus tax, more than the $1030.71 after tax as noted in the SRIA. (524-Docket)

Comment: OPEI is also concerned about the selection method of units for comparison. The SRIA compares what appears to be a very low-end cost "professional" ZEE walk-behind mower with a cost of $499 to a very high-end cost commercial gas-powered walk- behind mower with a cost $1299. A quick Google search for "" shows there are several "professional" or "commercial" ZEE walk-behind lawn mowers available in the U.S. with costs ranging from $499 to $1,199.95. Similarly, there are "commercial" 21" walk-behind lawn mowers starting below $800. OPEI is concerned the durability of the products compared are not equal. Regarding the units selected for comparison in the SRIA, the deck design, wheels, and transmission of the gas-powered unit are significantly more robust than the ZEE walk-behind mower. Unfortunately, Industry's comparison of these units is still in-progress at this time (comment deadline), but initial findings are that the ZEE unit experienced failures of the transmission and wheels before durability testing could be completed. (524-Docket)

Comment: To achieve the 6-year useful life assumed in SORE2020, each battery would need to sustain 1440 charges – This is not a reasonable assumption for fully discharged batteries, as is the case here (three of four batteries would be fully discharged each day). According to Grepow.com[32] [Footnote 32: https://www.grepow.com/blog/charging-cycles-of-lithium-ion-polymer-batteries/] the life of a lithium-ion battery is generally 300 to 500 charging cycles. This is consistent with performance reports of ZEE riding mowers after similarly estimated charge cycles in South Pasadena and Ojai, as previously discussed. Conservatively, four batteries would need to be replaced twice throughout the useful life of a walk-behind lawn mower, adding another $1832 plus tax to the total product cost. The conservative total product cost could be $3563 plus tax over its useful life. This is significantly more than the $1030.71 (tax included) cost assumed in the SRIA. These differences must be further examined to accurately estimate the true cost benefits of the Proposed Rule. (524-Docket)

Comment: Similarly, the SRIA suggests "Residential-grade ZEE frequently comes packaged with enough batteries for average use;" however, this claim is not supported with analysis. Most residential ZEE products come with one battery, and tools can be purchased without batteries. OPEI found the 21" "residential" ZEE walk-behind lawn mower used for product comparison in the ISoR online for $569.99 (with battery and charger).[33] SORE2020 suggests each day the average walk-behind lawn mower requires 0.78kW of power (some will require more, and in turn more batteries). A 56V 7.5A-hr battery (420 w-hrs) is included. A second battery would be required to complete an average day of work according to SORE2020 assumptions (780/420 = 1.86 batteries). A second 56 V 7.5 Ah battery for this walk-behind lawn mower retails for $349.99, resulting in a total product cost of $919.98 plus tax, significantly higher than the $432.92 tax included cost assumed in the SRIA. These differences must be further examined to accurately estimate the true cost benefits of the Proposed Rule. [Footnote 33: https://www.acehardware.com/departments/lawn-and-garden/lawn-mowers/pushmowers/7804826?store=14431&gclid=CjwKCAiA7dKMBhBCEiwAO_crFCnTpttyKYAeZYZWj5ebmS9OnOd1E TucL-iIfKO2WO-DpLd0nw2-aRoCHVIQAvD_BwE&gclsrc=aw.ds] (524-Docket)

Comment: OPEI is concerned the SRIA and Proposed Rule significantly underestimate the battery and associated cost requirements over the useful life of most products. Accurate costs are essential to understand the cost and health benefits of the Potential Rule. (524-Docket)

Comment: A regulatory-appropriate technology feasibility study to understand the performance characteristics and limitations, and technology feasibility of ZEE products must be conducted, including the battery life and maintenance costs. No such testing was conducted for the Proposed

Rule rendering the rulemaking arbitrary and capricious or without reasonable or rational basis. (524-Docket)

Comment: Comment 9 – The Proposed Rule fails to demonstrate ZEE is a technically feasible solution for many use cases. CARB survey and Roadshow data support the conclusion that additional technology development is needed to meet many user needs. (524-Docket)

Comment: According to the CSU-F survey, today's landscaper ZEE deployment continues to face challenges. Landscaper deployment of their most common equipment (walk- behind lawn mowers, chain saws, leaf blowers and trimmers) ranges from just 3 percent (chain saws) to 8.6 percent (leaf blowers).[34] [Footnote 34: SRIA, pg 13] The Proposed Rule notes that "60 percent of (surveyed) landscape vendors stated that they know of electric versions of the equipment types they own", and "landscape vendors use their equipment more regularly than residential users, and turnover is faster in this market segment so it is notable that only 8 percent of this extensively used equipment is ZEE."[35] [Footnote 35: SRIA pg 11] OPEI agrees these points are notable. Despite knowledge and use of ZEE equipment, and frequent fleet turnovers, landscapers continue to rely on gas-powered equipment to meet many of their performance, run-time and cost needs. (524-Docket)

The survey supports the conclusion that landscape vendors are familiar with ZEE, but ZEE equipment performance, run-time, and cost are common concerns for working professionals for many equipment types and uses. Further technology advancement is needed to overcome these challenges and for widespread ZEE deployment in high-performance and high use applications. The following CSU-F survey response examples support this conclusion. (524-Docket)

Example 9-1: Survey respondent vendor/landscaper V38-G2 reports owning eight pieces of equipment. Of the eight pieces equipment two are ZEE, the remaining six are gas-powered. The oldest piece of equipment is reported to be a 10-year-old ZEE leaf blower. Despite a long familiarity with ZEE blowers, V38-G2 opted for a new gas- powered leaf blower just weeks before the survey. V38-G2 reported using the ZEE blower just 3.33 hours per year, and the gas-powered blower 260 hours per year. In the year before the survey, this landscaper bought five pieces of equipment, one ZEE hedge trimmer and four gas-powered units (a leaf blower, a chain saw, a string trimmer and a gas walk-behind lawn mower). It can be easily concluded V38-G2 understands ZEE equipment yet selects gas-powered equipment for certain performance needs. (524-Docket)

Example 9-2: Survey respondent vendor/landscaper V3-G2 reports owning 12 pieces of equipment. Of the 12 pieces of equipment two are ZEE leaf blowers, the remaining 10 are gas-powered. Despite familiarity with ZEE leaf blowers, V3-G2 opted for a new gas- powered leaf blower just months before the survey. V3-G2 reported using the ZEE blowers 260 hours per year, and the two gas-powered leaf blowers 1820 hours per year. In the 2 years before the survey the landscaper bought nine pieces of equipment, the afore mentioned ZEE blowers, one gas-powered leaf blower, two gas-powered string trimmers, one gas-powered hedge trimmer, one gas-powered chain saw, one gas-powered riding mower and one gas-powered walk-behind lawn mower. It can be easily concluded V38-G2 understands ZEE equipment yet selects gas-powered equipment for particular product and performance needs. (524-Docket)

In addition to survey work, CARB staff organized a project call the ZEE Roadshow, where several brands of zero-emission lawn and garden equipment designed for professional use were loaned to "landscaping" crews throughout the state. While several respondents found the performance of ZEE equipment, in combination with the incentive programs, satisfactory, some did not. OPEI is concerned the Proposed Rule fails include an accurate recount of and summary of responses received

about the program. Specifically, the Proposed Rule does not appear to include the response from the LA County Zoo, or provide enough context of the response from UC Santa Barbara, both highlighted below. Following are 2 of the 8 responses provided to staff regarding their experience with the ZEE Roadshow. The following responses support the conclusions that there is no-one-size-fits-all performance solution, that gas- powered units are critical for some performance needs, and that additional ZEE technology advancement is needed to address the performance needs of all users. (524-Docket)

Example 9-3: UC Santa Barbara – "Goal is to replace all 2-cycle power tools with battery. We will keep a select assortment of 2-cycle equipment for bigger jobs on check- out program. We will also keep a few 4-cycle pieces in the field, all blowers for staff that have large hardscapes to blow off – mostly tennis courts." Having participated in the ZEE Roadshow, it is clearly concluded the UC Santa Barbara understands ZEE equipment yet selects gas-powered equipment for particular product and performance needs. (524-Docket)

Example 9-4: LA County Zoo – "Testing of electric equipment went well even if the result was not as we had hoped. Several of our employees had trouble with the battery life and power output of the equipment when compared to gas powered equipment. Our surveys also concluded that most electric cutters and trimmers are inadequate for the time being. Survey results did not give us enough information to recommend a full overhaul of gas equipment for electric powered tools. Low user scores regarding being able to perform "normal work" when using the equipment. Husqvarna 436LiB worked well. The main negative takeaways from our crew was the lack of power output when compared to gas-powered equipment and battery life of electric equipment (including remember to charge the equipment the day before rather than fill up with fuel as needed)." (524-Docket)

Regarding the ZEE Roadshow, it is important to note that none of the 20 entities that participated met the definition of "landscaper", as defined by the US Census and that was used by CARB and CSU-F in its survey. No landscapers participated in the ZEE Roadshow. OPEI is concerned that no professional landscapers participated in the ZEE Roadshow or were able to provide feedback on the performance of the equipment. Furthermore, there are a number of other flaws with regard to this survey. For one thing it appears that CARB did not monitor the equipment for use trends, including what equipment was used and for how long by each participant. Instead, CARB only appeared to seek feedback after OPEI inquired about the program in April 2021 – 2 years later in most cases.[36] [Footnote 36: The majority of participants tested product in 2019. OPEI inquired about the status of the Roadshow on 4/12/2021. CARB staff solicited feedback on 5/18/2021.] In addition, more than half of the participants did not respond, or if participants did respond, their responses were excluded from the Proposed Rule package. Other issues identified by OPEI include that 2018 ZEE testing at Capital Park, Sacramento State and the Department of Transportation[37] are not discussed in the Proposed Rule package. OPEI's notes from an April 10, 2018 meeting with CARB indicate CARB received "generally positive feedback, with no negative feedback on trimmers, but that users had commented that ZEE leaf blowers were not the tool of choice when needing more power." None of these test participants or their feedback were included in the summary provided to OPEI in May 2021, nor does it appear were they included in the Proposed Rule's summary of the ZEE Roadshow. [Footnote 37: OPEI staff and members met with CARB staff at CARB facilities in El Monte, CA on April 10, 2018 to discuss rulemaking activities.] (524-Docket)

Comment: With these concerns in mind, CARB must conduct a regulatory-appropriate technology feasibility study to understand the performance characteristics and limitations, and technology feasibility of ZEE products versus their gas-powered counter-parts, including using the data to

accurately understand the product life battery and maintenance costs. CARB has conducted no such testing for ZEE for the Proposed Rule, which is a fundamental flaw in this rulemaking. (524-Docket)

Comment: Comment 10 – The Proposed Rule fails to consider real-world barriers to a complete transition to ZEE on its accelerated timeline, including in-service charging options, recycling strategies, and U.S. Department of Transportation regulations. Additional time is needed to allow for the development of adequate technology and infrastructure to support a successful ZEE transition. (524-Docket)

Comment: Annex B - OPEI ZEE Battery Use and Cost Analysis (Comment 7 & Comment 8) (524-Docket)

**Landscaper ZEE Cost Analysis**

| Equipment Type | Power (kW)[1] | Load Factor[1] | Annual Use[1] | Uses/Year[1] | Hr/Use[1] | Avg # Units/Landscaper[2] | Total kW/day for Equipment Type | # Batteries Day[4] | # Batteries Rounding Up[5] | Start-Up Battery Cost[6] | Additional Battery Cost Per Repower[7] | Additional Charger Cost[8] | Age Where Less Than 50% of Population Remains ("Useful Life")[9] | Age-Hours at Useful Life | Number of Battery Repowers | Total Repower Batteries | Total Repower Baattery Cost | Total Batteries | Total Battery Cost | Final Total Battery & Charger Cost Per Equipment Cycle[10] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Walk Behind Mower | 2.86 | 0.36 | 240 | 210 | 1.14 | 2.04 | 2.40 | 8.00 | 8 | 1341.33 | 1800.33 | 350.07 | 6 | 1440 | 1.52 | 12.16 | 2736.50 | 20.16 | 4077.83 | 4427.90 |
| String Trimmer | 0.8 | 0.94 | 162 | 184 | 0.88 | 2.29 | 1.52 | 5.05 | 6 | 621.88 | 1137.13 | 202.70 | 6 | 972 | 1.21 | 6.11 | 1373.66 | 11.16 | 1995.54 | 2198.24 |
| Leaf Blower | 2.36 | 0.94 | 240 | 210 | 1.14 | 2.17 | 5.50 | 18.34 | 19 | 3637.97 | 4126.22 | 866.94 | 6 | 1440 | 1.52 | 27.87 | 6271.86 | 46.21 | 9909.83 | 10776.77 |
| Hedge Trimmer | 0.8 | 0.94 | 126 | 107 | 1.18 | 1.79 | 1.59 | 5.28 | 6 | 786.08 | 1188.83 | 214.18 | 6 | 756 | 0.28 | 1.50 | 337.63 | 6.78 | 1123.70 | 1337.89 |
| Chain Saw | 1.23 | 0.7 | 140 | 127 | 1.10 | 3.95 | 3.75 | 12.50 | 13 | 1923.06 | 2811.81 | 574.85 | 6 | 840 | 0.52 | 6.55 | 1473.39 | 19.05 | 3396.45 | 3971.29 |
| | 2.36 | | | | | TOTAL W/O Chain Saw[3] | 11.00 | 36.68 | 39 | 6387.27 | 8252.52 | 1633.89 | 8021.16 | | | 47.64 | 10719.65 | 84.32 | 17106.91 | 18740.80 |
| | | | | | | TOTAL W/ Chain Saw | 14.75 | 49.17 | 52 | 8310.32 | 11064.32 | 2208.74 | 10519.06 | | | 54.19 | 12193.03 | 103.37 | 20503.36 | 22712.10 |
| **Commercial Riding Mower** | 16.90 | 0.38 | 246 | 160 | 1.54 | | 9.87 | 1.00 | | 0.00 | UNK | | | | | | | | | |
| **Residential ZEE Cost Analysis** | | | | | | | | | | | | | | | | | | | | |
| Walk Behind Mower | 2.86 | 0.36 | 19 | 25 | 0.76 | | 0.78 | 2.61 | | 361.87 | | 0.00 | | | | | | | | 361.87 |
| String Trimmer | 0.8 | 0.94 | 15 | 18 | 0.83 | | 0.63 | 3.13 | | 320.00 | | 0.00 | | | | | | | | 320.00 |
| Leaf Blower | 0.80 | 0.94 | 15 | 30 | 0.50 | | 0.38 | 1.88 | | 131.37 | | 0.00 | | | | | | | | 131.37 |
| Hedge Trimmer | 0.8 | 0.94 | 10 | 13 | 0.77 | | 0.58 | 2.89 | | 283.85 | | 0.00 | | | | | | | | 283.85 |
| Chain Saw | 1.23 | 0.7 | 18 | 10 | 1.80 | | 1.55 | 7.75 | | 1012.35 | | 0.00 | | | | | | | | 1012.35 |
| | | | | | | TOTAL Turf W/O Chain Sa | 2.36 | 11.81 | | 1097.09 | | 0.00 | | | | | | | | 1097.09 |
| | | | | | | TOTAL Turf W/ Chain Saw | 3.91 | 19.56 | | 2109.44 | | 0.00 | | | | | | | | 2109.44 |
| **Residential ZEE Generator Cost Analysis** | | | | | | | | | | | | | | | | | | | | |
| Generator (2-5hp category) | 2.33 | 0.68 | 50 | 13 | 3.85 | | 6.11 | 20.36 | | 4355.15 | | 967.81 | | | | | | | | 5322.96 |
| **Commercial ZEE Generator Cost Analysis** | | | | | | | | | | | | | | | | | | | | |
| Generator (2-5hp category) | 2.33 | 0.68 | 146 | 49 | 2.98 | | 4.73 | 15.77 | | 3323.22 | 3548.22 | 738.49 | 6 | 876 | 0.00 | 0.00 | 0.00 | 15.77 | 3323.22 | 4061.71 |
| Generator (5-15hp category | 7.05 | 0.68 | 146 | 49 | 2.98 | | 14.28 | 47.61 | | 10487.67 | 10712.67 | 2330.59 | 6 | 876 | 0.00 | 0.00 | 0.00 | 47.61 | 10487.67 | 12818.26 |

[1] Per CARB SORE2020
[2] Per CSU-F survey. Not all landscapers own each type of equipment, but those that do on average own this many pieces
[3] Per the CSU-F survey it is reasonable many professional landscapers use at least these items - WBM, ST, LB & HT. Some may additionally use chainsaws, so these summaries have been analyzed separately.
[4] Assumes 300 W-hr battery and that batteries are charged once per day of use for landscape and commerical use, and generators. Assumes 200-W-hr battery charged once per day of use for residential use, excluding walk-behind mowers and generators which are assume 300 W-hr battery. Assumes 13-19 kW battery for commercial mowers based on product comparison of one brand.
[5] For reference only. The batteries calcluated in column result in fractions of a battery, so it could be argued that actual batteries need to be rounded up. However, since the other calculations rely on fractions of units/landscaper, this is just for reference and is not used the other calcluations in this table.
[6] Assumes retail cost $0.75 per W-hr. This is a conservative estimate for professional products (low cost estimate). A 40V 5amp-hour (200 w-hour) battery from the leading brand at The Home Depot retails for $179. This assumes 1 battery is included for in the cost of the machines - Those batteries are not included in "start-up battery cost".
[7] Assumes batteries are replaced after 500 charge cycles. Assumes retail cost $0.75 per W-hr. This is a conservative estimate for professional products (low cost estimate). Replacing all original batteries (ie., Including battery originally provided with machine).
[8] Assumes reatil cost of $50 per charger and that the chargers do not need to be replaced over the useful life. Assumes no additional chargers needed for residential (one comes with product). This is a conservatie estimate for professionals products (low cost estimate). A 40V battery charger from the leading brand at The Home Depot retails for $55. "Fast chargers" a significantlly more expensive.
[9] Per CARB SORE 2020 the average useful life (Age at which 50% of the population is no longer in use) is 6-7 years for these products. For the purpose of estimating total landscaper cost over one period, 6 years was used for all points.
[10] Does not include initial cost of equipment. Sum of new batteries and chargers purchased to achieve useful life. This cost will be less for units that do not achieve useful life, and more for products that do.

Comment: In-Service Charging Challenges
While ZEE is an acceptable replacement for SORE for certain applications, charging remains a challenge for extensive and professional users. As discussed in Comment 7, dozens of batteries would be needed to complete a day's work for the average landscaper. Alternatively, users who require several batteries per piece of equipment may consider mobile charging. Industry continues to work towards viable mobile charging solutions, but such solutions are simply not yet available at a reasonable cost and are not readily available in the marketplace in sufficient volumes to support a wholesale transition to ZEE. For large residential landowners who must clear their properties for fire season preparation and other fuel mitigation purposes, and for landscapers, utilities companies, or other professionals who must transport equipment to work sites and extensively use outdoor power equipment and ground supported equipment throughout the day, away from charging sources, the option of remote charging poses significant challenges. The best viable solution for mobile charging of battery powered handheld outdoor power equipment is portable gasoline generator charging. However, the resulting HC+$NO_x$ output from charging batteries with portable gasoline generators in the field may be significantly HIGHER than SORE-powered equipment, negating zero emissions benefits. (524-Docket)

Comment: We do not believe that CARB has adequately addressed the technical feasibility and impacts for commercial, not residential uses. (533-Docket)

Comment: Equipment performance and run-time are common concerns for landscape professionals and present technological challenges that must be overcome for widespread use of zero-emission equipment (ZEE) landscape equipment. Unlike a homeowner that uses an electric powered leaf blower or mower for less than an hour, maybe in a given week, the landscape industry is operating

commercially using this equipment daily, under rigorous conditions and during long durations. Also, many landscape professionals operate on commercial properties like corporate campuses, parks, resorts and other large green spaces which demand stronger performance and power capabilities. Unfortunately, the available ZEE is not capable of this sort of use pattern currently. Equipment such as riding mowers and leaf blowers present some of the largest challenges with lack of run time and power for both being significantly different than their most modern gas-powered counterparts. (533-Docket)

Comment: NALP also acknowledges that in some instances companies have been able to successfully transition, detailed in NALP survey results. BUT those companies are significantly in the minority and operate in very affluent and wealthy areas. (533-Docket)

Comment: Costs associated with a complete transition is a significant impediment for the landscape industry; however, understanding how the increases actually impact the landscape industry has not been fully appreciated by CARB (533-Docket)

Comment: Compatibility is also an issue for batteries. Battery technology for ZEE is proprietary information and therefore the batteries are not compatible between different manufacturers. This presents a problem because it would require landscape companies to move to a single manufacturer approach rather than using different equipment from different manufactures. This could lead to companies being lock into one manufacturer, reduce competition, and strengthening manufacturer influence over the company based on their specific needs. (533-Docket)

Comment: This low adoption rate is not due to an unwillingness to use ZEE equivalents but rather evidence that the equipment is not technologically capable to be the exclusive equipment used by commercial landscape companies at this time. (533-Docket) (533-AppA-Docket) (542-Docket)

Comment: During trial programs that CARB has relied upon to form their proposal, equipment was provided to groundskeepers. One of these trial programs involved groundskeepers for the Los Angeles Zoo. Important to note that these are groundskeepers in a static location, not a landscape professional crew that is traveling from site to site. The problems identified below will only be compounded by a landscape professional moving around from site to site. This was the opinion of end users at the zoo: (533-Docket)

> "Several of our employees had trouble with the battery life and power output of the equipment when compared to gas powered equipment. Our surveys also concluded that most electric cutters and trimmers are inadequate for the time being. Survey results did not give us enough information to recommend a full overhaul of gas equipment for electric powered tools. Low user scores regarding being able to perform "normal work" when using the equipment. Husqvarna 436LiB worked well. The main negative takeaways from our crew was the lack of power output when compared to gas-powered equipment and battery life of electric equipment (including remember to charge the equipment the day before rather than fill up with fuel as needed)."[4] [Footnote 4: Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Population, Prepared by the Social Science Research Center (SSRC) at CSU, Fullerton (May 15, 2019)] (533-Docket)

NALP also conducted a survey[5] in conjunction with CLCA to poll professional landscape companies in California. Both performance and cost remain tremendous hurdles, specifically for the larger commercial equipment that requires significantly more run time and power. [Footnote 5: See Appendix B "CLCA and NALP Battery Powered Equipment Survey" CLCA conducted the survey

separately from NALP but the data was then merged. CLCA polled California landscape companies in September 2021 while NALP conducted the same survey in June 2021 with larger national companies that have operations in California. NALP and CLCA presented this information through six of the companies that participated in the survey to CARB staff on October 13, 2021.] (533-Docket)

Comment: Additionally, some specific concerns from landscape professionals that participated in the survey include:

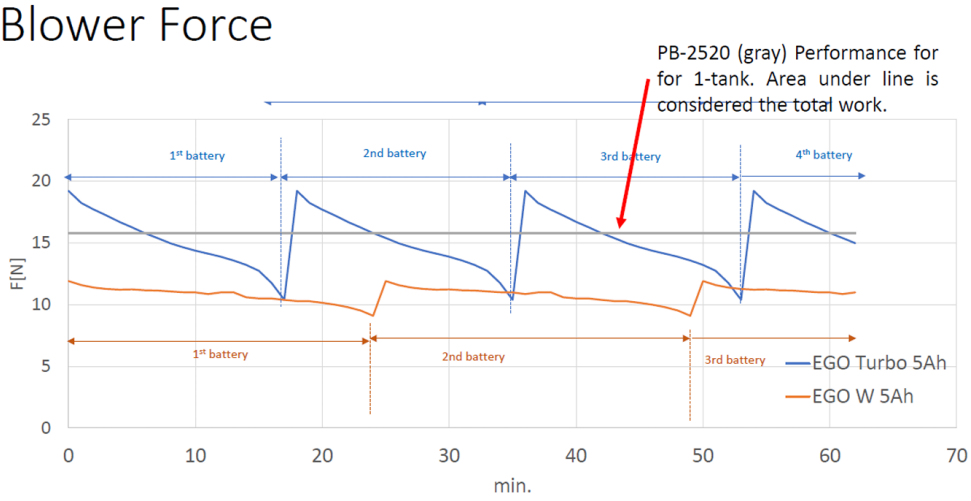
> "Product availability. While many products are available and the technology is advancing, commercial use electrical hand-held equipment is still limited and presents challenges. Product reliability, charging station access, and maintenance operations are just a few challenges that I feel are at the forefront of the issue."
>
> "Durability of the machines, the batteries are so heavy the frame has to be light. Mowing slopes, they are so heavy they don't hold hills. Lack of repair expertise loyalty. Parts are difficult to acquire and take a long time to get. Battery life in heavy cutting conditions and longer mow times due to double cutting."
>
> "Blower power and battery life especially during leaf removal. Building out branch charging infrastructure is also a challenge as it is costly and often requires rewiring the whole building to supply enough power to recharge a whole branch. (533-Docket) (533-AppA-Docket)

This is some of the most compelling evidence NALP can provide in support of our position and echoes the sentiment of what we hear from our members on this issue daily, not only in California but throughout the Nation. (533-Docket) (533-AppA-Docket)

Comment: Unfortunately, CARB seems to be putting a greater weight and emphasis on the small minority of companies that are transitioning. CARB has minimized the fact that all the data that both CARB and NALP have collected via both surveys indicate that the equipment is lacking for commercial/professional purposes and the vast majority is not ready for nor can accomplish a complete transition in only two years (533-Docket)

To further support the performance deficiencies is data from a report[6] provided by a major equipment manufacturer that produces ZEE and non-ZEE SORE. [Footnote 6: See Appendix C Industry technology feasibility Comparison of Handheld Leaf Blowers] (533-Docket)

Comment: Figure: Blower Force




(533-Docket)

The graph clearly shows that a ZEE blower is not comparable at this time. The performance of the ZEE immediately begins to decline the moment it begins until the battery dies only 18 minutes later, while the gas-powered blower maintains a strong performance the entire hour and without unnecessary downtime to change batteries. (533-Docket)

Comment: In other instances, landscape companies switching to battery powered equipment may need to also purchase portable generators to charge their equipment. (533-Docket)

Comment: Now let's talk batteries. Batteries remain a significant barrier for the transition to occur based on cost, amount needed, how they're charged and how they're disposed. Run time for the batteries varies by equipment. For a rider mower the run time for a battery is somewhere between 4 and 6 hours, while for handheld equipment that run time is somewhere between 10 and 30 minutes per battery. With this data we examined what a typical three-person landscape crew may require from a battery standpoint.[8] [Footnote 8: Similar to the universe of companies that NALP polled for the CLCA/NALP Survey, NALP created an advisory group of larger national landscape companies. This group provided NALP with a range of data and technical guidance and the information in this table are conservative estimations. This scenario is based more off residential services as they are simpler to model based on quarter acre lots. The reality is that total batteries needed is likely higher in exclusive commercial and larger settings where landscape services are performed.] (533-Docket)

| | Active Use Time of Equipment per lawn | X 20 Lawns | # of Batteries Needed |
|---|---|---|---|
| Rider Mower | 20 Minutes | 6 hours, 40 minutes | internal |
| String Trimmer | 10 Minutes | 3 hours, 20 minutes | 14 batteries |
| Edger | 5 Minutes | 1 hour, 40 minutes | 10 batteries |
| Blower | 5 Minutes | 1 hour, 40 minutes. | 10 batteries |

(533-Docket)

Looking at this data it would take an average crew 34 batteries in ONE day to complete a typical day; while the rider mower would not have enough charge to complete all 20 lawns. The rider mower is an important piece of landscape equipment that currently has the largest cost and efficiency hurdles between gas and ZEE models. Switching batteries this frequently reduces productivity and efficiency for the landscape crew. The costs associated with those batteries:

| Battery Cost | Charger Cost | Total |
|---|---|---|
| $179<br>*-price based on retail price at Home Depot from a leading manufacturer* | $50<br>*-price based on retail price at Home Depot from a leading manufacturer* | $229 x 34 = $7,786<br>*just for this **one** crew which also excludes the riding mower battery* |

(533-Docket)

Considering that the batteries will need to be replaced every 300-500[9] charge cycles which would mean that they would likely need to be replaced at least once during the product's life cycle we can estimate a total for this three-man crew to be (2 x $7,786) = $15,572. The costs associated with these batteries is significant and charging each battery for approximately 8 hours will add an additional $5 to $6 daily in energy costs associated for charging each battery prior to each day the battery is used. [Footnote 9: GrePro Blog "The Charging Cycles of Lithium-Ion Polymer Batteries" March 25, 2020 https://www.grepow.com/blog/charging-cycles-of-lithium-ion-polymer-batteries/]. (533-Docket)

Comment: The last issue with cost that we want to address is labor. ZEE lacks the same performance capabilities detailed above and requires frequent battery changes both of which reduce the productivity and efficiency of a landscape crews in the field. (533-Docket)

Comment: The infrastructure on both the micro and the macro level is not currently in place to fully support this transition. On the micro level landscape companies will need to fully retrofit their shops to support the amount of voltage that will need to be used each day to safely charge all of the ZEE equipment. Vehicles used to transport crews and equipment will also need to be redesigned to support charging stations to ensure complete operational capabilities once out in the field, this will raise the overall "cost" factor detailed above significantly. (533-Docket)

Comment: Additionally, maintenance has been woefully under examined by CARB's failure to acknowledge the lack of dealers and repair shops currently in California that have the expertise or are prepared to handle repairs and maintenance issues. One Los Angeles Landscape Company attempted to make the transition but then had issues with support, stating:

> "For a commercial company like us with large acreage properties, definitely the duration of the Batteries, Responsiveness from the manufacturers, lack of support from manufacturers, we have even considered filing a lawsuit using the Lemon-Law! When a large riding mower is seating in a repair shop for over two months! Very few repair shops that have training, knowledge or have support from manufacturers, equipment is less powerful."[12] [Footnote 12: See Appendix B "CLCA and NALP Battery Powered Equipment Survey"] (533-Docket)

This company was forced to go and purchase non-ZEE traditional SORE to maintain their customer base. (533-Docket)

Comment: Appendix A "CLCA and NALP Letter to CARB" November 9, 2021 (533-Docket)

Comment: In addition, the commercial-grade battery-powered equipment currently on the market has performance issues, cost issues, and infrastructure issues. Because of these reasons, the transition is NOT technically feasible for commercial/professional grade use. (533-AppA-Docket) (542-Docket)

Comment: From a performance perspective the industry continues to hear from landscape professionals about ZEE landscape equipment:

- The power is just not comparable yet
- Impossible to use exclusively on large scale commercial jobs like HOAs, resorts, business parks and other public and commercial green spaces
- Requires too many batteries to conduct their job function in an efficient manner
- Durability concerns
- Batteries are too heavy
- Cannot mow slopes on riding mowers because of the weight issue
- Mow times are longer and batteries cannot last a full work day
- Leaf removal during seasonal changes is very difficult
- Debris removal to mitigate fire spread is significantly more difficult
- Lack of dealers and maintenance shops to support transition

- Batteries are not interchangeable between brands (533-Docket) (533-AppA-Docket) (542-Docket)

This is a non-exhaustive list of concerns we here from landscape professionals but these are the types of concerns that CARB has not fully considered in their analysis and a further indicator of low adoption rates. (533-Docket) (533-ApppA-Docket) (542-Docket)

Comment: These are significant up-front investments for landscape professionals, the majority of whom are sole- proprietor (single employee) businesses, with no guarantee they will recover the difference based on energy costs and maintenance. These costs also do not consider the number of recharges batteries can sustain, and, as a result, the need to replace batteries over a product's life. Maintenance has been woefully under examined by CARB's failure to acknowledge the lack of dealers and repair shops currently in California that have the expertise or are prepared to handle repairs and maintenance issues. (533-Docket)

As the national and state associations representing the landscape industry, not manufacturers or other groups with separate agendas, we emphatically state that it is NOT technically feasible to transition commercial/professional grade landscape equipment to ZEE by 2024. (533-Docket)

Comment: Appendix B "CLCA and NALP Battery Powered Equipment Survey" (533-Docket)

Comment: Appendix C: Blowing Force Comparison EGO EB6500 VS ECHO PB-2520 (533-Docket)

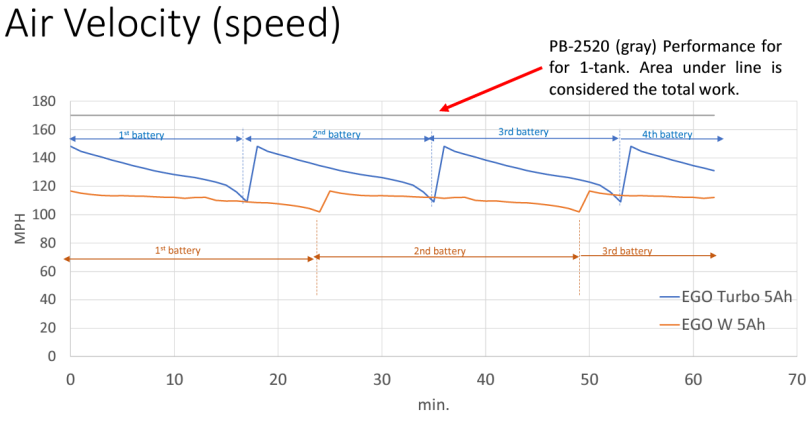
Blower Performance Parameters

- The following parameters are indicators of a blower's ability to do work
  - Air Velocity (Speed) – Speed of the blower air in mph – How fast debris can be moved, which is a factor in time on the job.
  - Air Flow (Rate) – The volumetric rate of the blower in ft^3/min – How much volume of debris can be moved at a given speed, which is a factor of time on the job.
  - Force Measurement – The force of the blower in Newtons (N) – How much mass of debris can be moved, which is a factor of time on the job.
  - Run-time – The time a blower runs in minutes (before refueling or changing batteries) (533-Docket)
- CARB includes these parameters when comparing the subject blowers in the ISOR
  - "Staff compared leaf blowers that can move similar amounts of leaves based on air flows stated in equipment specifications. The SORE equipment considered moves air at 453 ft^3/min, while the ZEE ranges from 250 to 500 ft^3/min. The blower force of the SORE blower is 15.8 Newtons. The zero- emissions leaf blower has a blowing force of 21 Newtons
  - Despite a plan to conduct ZEE durability testing, CARB conducted no technology feasibility comparisons. CARB based comparisons solely on marketing data which may not reflect the equipment performance beyond a snapshot in time or may have inaccurately depicted equivalence in performance and run time (533-Docket)
- Conclusions
  - While the CARB noted performance values are confirmed by industry testing, the performance of the ZEE blower in all three performance metrics degrades from the moment the blower is started until the battery dies. The ZEE battery lasts just 18 minutes in the "turbo" mode, the

mode that reflects the maximum performance values noted in the marketing info, while the gas-powered blower maintains it performance in all three metrics for the full 1-hour test (the equivalent of 1-tank of fuel or approximately one pint of fuel). (533-Docket)

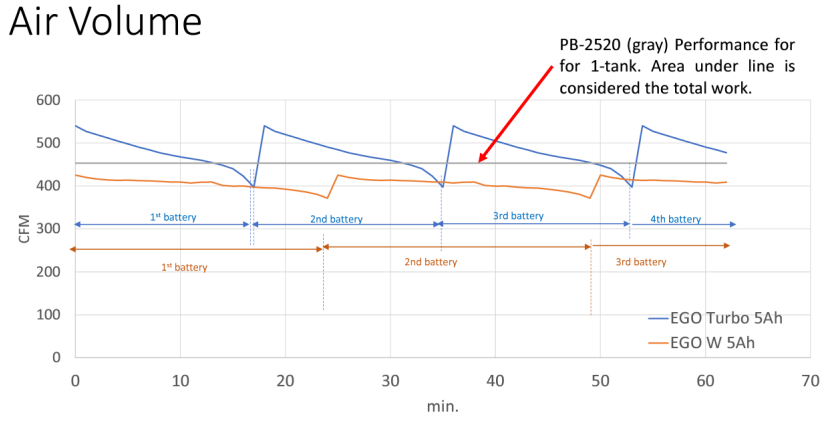
- CARB SORE2020 models average blower use at 1.15 hours/use (per day), and that on average each landscaper that uses a blower owns 2.17 blowers. According to CARB SORE2020, the average landscaper who operates a blower(s) uses them 2.5 hours/use (per day). In the low performance mode (24min/battery) the landscaper would require (7) 5 Ahr batteries (or charges) a day just for blowers. In the high performance mode (18min/battery), the mode by which the maximum air-flow and force are measured, the landscaper would require (9) 5-A-hr batteries (or charges) a day just for blowers. In HD commercial applications the performance stated in CARB's ISOR is not sufficient and in fact no battery powered blowers of this size exist on the market today. (533-Docket)
- Battery performance starts to degrade after 300 charges. Most battery makers state a goal of 85% capacity at about 300 charges. Battery capacity continues to degrade until it must be replaced. CARB models 210 starts/year (days). CARB models the median age of leaf blowers as 5 years. As a result, replacing batteries at 500 hours, landscapers would need to replace 7-9 batteries at least 2 times (3 sets of batteries) in order to achieve the median blower age. (533-Docket)
- Battery costs for a typical handheld blower may be $150 for 2.5 Ahr to 250 for a 5 Ahr – In the CONSERVATIVE case, no "turbo" used, total battery cost $250 x 5 (machines come with one battery to start, 5 extra batteries needed) + $250 x 7 x 2 = $4750+ over the life of the blowers. The cost of Fuel and oil over this time is far less. (533-Docket)

Figure: Air Velocity (speed)



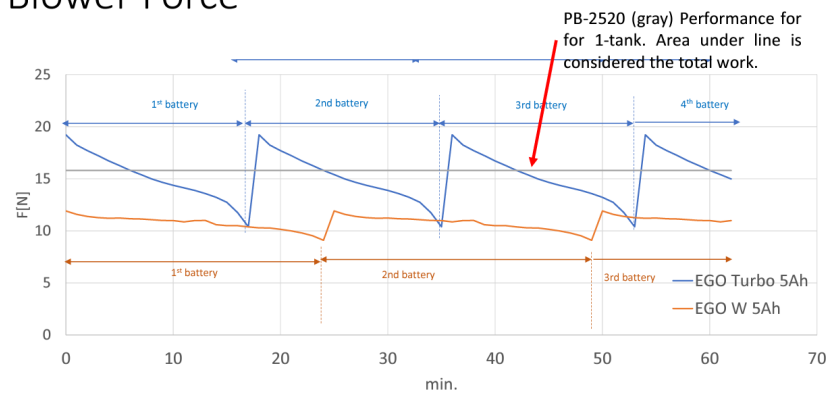

(533-Docket)

Figure: Air Volume




(533-Docket)

Figure: Blower Force




(533-Docket)

Comment: The first question asked by landscape professionals before buying any piece of equipment is 'can it meet the performance needs we ask of it?' With commercial grade landscape ZEE, the answer is usually 'not yet.' A major international manufacturer of commercial grade landscape equipment did a side-by-side analysis of the performance, power and battery run time of a ZEE blower and a gas-powered blower.[2] [Footnote 2: Report: Blowing Force Comparison EGO EB6500 VS ECHO PB-2520. November, 2021.] Please note that the models are the same handheld leaf blowers compared in the ISOR.[3] [Footnote 3: Small Off-Road Engines: Transition to Zero Emissions. CARB Staff Report: Initial Statement of Reasons, page 15, Table I-4. October 12, 2021.] The results were illuminating. We learned:

1. The "advertised" performance of the ZEE blowers are at "turbo" and degrade constantly until the batteries die. After just 7 minutes of run time, ZEE blower force drops below the gas-powered blower.
2. In "turbo" mode (roughly average performance equivalent to gas-powered), ZEE batteries need to be replaced every 18 minutes – where the gas-powered blower can run continuously for an hour. Turbo mode requires 4 batteries to run for an hour to match gas-powered continuous performance. (542-Docket)

Comment: Unfortunately, battery technology is not yet qualified to meet the needs of all day ZEE use without either frequent recharges (which is challenging, particularly for landscape maintenance professionals who tend to multiple sites each day) or multiple batteries. Using CARB SORE2020

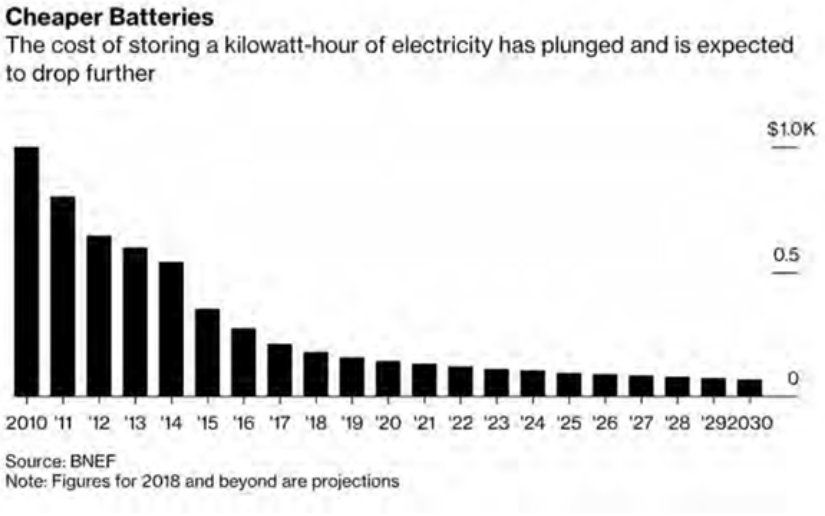
performance data, an average landscape professional that does not use a chainsaw would need an estimated 36.68 batteries a day.[4] [Footnote 4: CARB SORE2020 Equipment Use Battery Comparison 211122.] This assumes the average landscape professional is using a walk behind mower, leaf blower, string trimmer, and a hedge trimmer. A conservative estimate is that these extra batteries and chargers would require an additional investment of at least $7,562.16. If that average landscaper professional also used chainsaws as part of their daily landscape maintenance work, they would need 49.17 batteries a day with a start-up battery and charger cost of $11,064.32. Please note, all cost totals cited are for batteries and chargers only. (542-Docket)

With an estimated 36.68 batteries to handle a single day's landscape maintenance work, all batteries must be charged and ready to go at the start of your workday. Many companies will need to upgrade their building electrical system to handle the load. In speaking with power equipment manufacturers, they estimate another 100A circuit would be needed to support this type of charging, plus consideration of safety for charging these batteries each night (additional fire safety and/or full-time monitoring staff (542-Docket)

In our reading of the ISOR, it appears CARB staff assume batteries will last the life of the product. This is not consistent with lithium-ion battery technology. Lithium-ion batteries start to degrade after 500 recharge cycles.[5] [Footnote 5: GrePro Blog "The Charging Cycles of Lithium-Ion Polymer Batteries" March 25, 2020 https://www.grepow.com/blog/charging-cycles-of-lithium-ion-polymer-batteries/] Battery capacity then continues to degrade until it must be replaced. CARB models 210 starts/year (days) and models the median age of leaf blowers as 5 years. As a result, by needing to replace batteries at 500 recharge cycles, landscape professionals would need to replace 7-9 batteries at least twice (3 sets of batteries to achieve the median blower age). Replacing batteries after 500 recharge cycles would add an additional $10,000 to the ongoing cost of utilizing commercial grade landscape ZEE. In total, for the average landscaper as modeled by the survey and CARB, battery and charger costs could reasonably be $18,000 - $22,000 over the 6-year useful life of the combined products (542-Docket)

In the ISOR, CARB staff states "It is projected that from 2010 to 2030, the price of a battery holding a kilowatt-hour of energy will decrease by over 90 percent (Martin, 2019)."[6] [Footnote 6: Small Off-Road Engines: Transition to Zero Emissions. CARB Staff Report: Initial Statement of Reasons, page 11. October 12, 2021.] However, CARB staff omitted an important point: in reading the actual article, the overwhelming drop in battery prices has already taken place by 2021 as shown in the graph[7] on the next page. [Footnote 7: Graphic from Martin, Chris. Better Batteries. Bloomberg. October 11, 2019.] (542-Docket)

Figure: Cheaper batteries




(542-Docket)

Comment: Maintenance of commercial grade landscape ZEE has been woefully under examined as evidenced by CARB's failure to acknowledge the lack of dealers and repair shops currently in California that have the expertise or are prepared to handle repairs and maintenance issues. Equipment maintenance shops and their staff need more time to acquire the training and materials to be able to handle and perform repairs and maintenance on commercial grade landscape ZEE. In an October 13, 2021 meeting with CARB staff, a San Fernando valley landscape maintenance contractor shared that his ZEE riding mower had been in the repair shop for three months due to the lack of expertise and applicable repair materials. As of the date of this letter, it still has not been repaired.[9] [Footnote 9: CARB staff meeting with CLCA, NALP and various landscape professionals. October 13, 2021.] (542-Docket)

Comment: Attachment: Blowing Force Comparison EGO EB6500 VS ECHO PB-2520 (542-Docket)

Comment: Attachment – Table – CLCA calculations to estimate number of batteries needed per day for different types of landscaping equipment using information from the CARB CSU-F Survey and SORE2020 Model (542-Docket)

**PER CARB CSU-F SURVEY & SORE2020 MODEL**

**Landscaper ZEE Cost Analysis**

| Eqiupment Type | Power (kW)[1] | Load Factor[1] | Annual Use[1] | Uses/Year[1] | Hr/Use[1] | Avg # Units/Landsacper[2] | Total kW/day for Equipment Type | # Batteries Day[4] | # Batteries Rounding Up[5] | Start-Up Battery Cost[6] | Additional Battery Cost Per Repower[7] | Additional Charger Cost[8] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Walk Behind Mower | 2.86 | 0.36 | 240 | 210 | 1.14 | 2.04 | 2.40 | 8.00 | 8 | 1341.33 | 1800.33 | 350.07 |
| String Trimmer | 0.8 | 0.94 | 162 | 184 | 0.88 | 2.29 | 1.52 | 5.05 | 6 | 621.88 | 1137.13 | 202.70 |
| Leaf Blower | 2.36 | 0.94 | 240 | 210 | 1.14 | 2.17 | 5.50 | 18.34 | 19 | 3637.97 | 4126.22 | 866.94 |
| Hedge Trimmer | 0.8 | 0.94 | 126 | 107 | 1.18 | 1.79 | 1.59 | 5.28 | 6 | 786.08 | 1188.83 | 214.18 |
| Chain Saw | 1.23 | 0.7 | 140 | 127 | 1.10 | 3.95 | 3.75 | 12.50 | 13 | 1923.06 | 2811.81 | 574.85 |
| | 2.36 | | | | | TOTAL W/O Chain Saw[3] | 11.00 | 36.68 | 39 | 6387.27 | 8252.52 | 1633.89 |
| | | | | | | TOTAL W/ Chain Saw | 14.75 | 49.17 | 52 | 8310.32 | 11064.32 | 2208.74 |
| **Commercial Riding Mower** | 16.90 | 0.38 | 246 | 160 | 1.54 | | 9.87 | 1.00 | | 0.00 | UNK | |
| **Residential ZEE Cost Analysis** | | | | | | | | | | | | |
| Walk Behind Mower | 2.86 | 0.36 | 19 | 25 | 0.76 | | 0.78 | 2.61 | | 361.87 | | 0.00 |
| String Trimmer | 0.8 | 0.94 | 15 | 18 | 0.83 | | 0.63 | 3.13 | | 320.00 | | 0.00 |
| Leaf Blower | 0.80 | 0.94 | 15 | 30 | 0.50 | | 0.38 | 1.88 | | 131.37 | | 0.00 |
| Hedge Trimmer | 0.8 | 0.94 | 10 | 13 | 0.77 | | 0.58 | 2.89 | | 283.85 | | 0.00 |
| Chain Saw | 1.23 | 0.7 | 18 | 10 | 1.80 | | 1.55 | 7.75 | | 1012.35 | | 0.00 |
| | | | | | | TOTAL Turf W/O Chain Saw[3] | 2.36 | 11.81 | | 1097.09 | | 0.00 |
| | | | | | | TOTAL Turf W/ Chain Saw | 3.91 | 19.56 | | 2109.44 | | 0.00 |
| **Residential ZEE Generator Cost Analysis** | | | | | | | | | | | | |
| Generator (2-5hp category) | 2.33 | 0.68 | 50 | 13 | 3.85 | | 6.11 | 20.36 | | 4355.15 | | 967.81 |
| **Commercial ZEE Generator Cost Analysis** | | | | | | | | | | | | |
| Generator (2-5hp category) | 2.33 | 0.68 | 146 | 49 | 2.98 | | 4.73 | 15.77 | | 3323.22 | 3548.22 | 738.49 |
| Generator (5-15hp category) | 7.05 | 0.68 | 146 | 49 | 2.98 | | 14.28 | 47.61 | | 10487.67 | 10712.67 | 2330.59 |

[1] Per CARB SORE2020

[2] Per CSU-F survey. Not all landscapers own each type of equipment, but those that do on average own this many pieces

[3] Per the CSU-F survey it is reasonable many professional landscapers use at least these items - WBM, ST, LB & HT. Some may additionally use chainsaws, so these summaries have been analyzed separately.

[4] Assumes 300 W-hr battery and that batteries are charged once per day of use for landscape and commerical use, and generators. Assumes 200-W-hr battery charged once per day of use for residential use, excluding walk-behind mowers and generators wh

[5] For reference only. The batteries calcluated in column result in fractions of a battery, so it could be argued that actual batteries need to be rounded up. However, since the other calculations rely on fractions of units/landscaper, this is just for reference a

[6] Assumes retail cost $0.75 per W-hr. This is a conservative estimate for professional products (low cost estimate). A 40V 5amp-hour (200 w-hour) battery from the leading brand at The Home Depot retails for $179. This assumes 1 battery is included for in

[7] Assumes batteries are replaced after 500 charge cycles. Assumes retail cost $0.75 per W-hr. This is a conservative estimate for professional products (low cost estimate). Replacing all original batteries (ie.. Including battery originally provided with machi

8 Assumes reatil cost of $50 per charger and that the chargers do not need to be replaced over the useful life. Assumes no additional chargers needed for residential (one comes with product). This is a conservatie estimate for professionals products (low cc

[9] Per CARB SORE 2020 the average useful life (Age at which 50% of the population is no longer in use) is 6-7 years for these products. For the purpose of estimating total landscaper cost over one period, 6 years was used for all points.

[10] Does not include initial cost of equipment. Sum of new batteries and chargers purchased to achieve useful life. This cost will be less for units that do not achieve useful life, and more for products that do.

(542-Docket)

| Age Where Less Than 50% of Population Remains ("Useful Life")[9] | Age-Hours at Useful Life | Number of Battery Repowers | Total Repower Batteries | Total Repower Baattery Cost | Total Batteries | Total Battery Cost | Final Total Battery & Charger Cost Per Equipment Cycle[10] | Start-up Battery Per Unit |
|---|---|---|---|---|---|---|---|---|
| 6 | 1440 | 1.52 | 12.16 | 2736.50 | 20.16 | 4077.83 | 4427.90 | 657.51 |
| 6 | 972 | 1.21 | 6.11 | 1373.66 | 11.16 | 1995.54 | 2198.24 | 271.57 |
| 6 | 1440 | 1.52 | 27.87 | 6271.86 | 46.21 | 9909.83 | 10776.77 | 1676.49 |
| 6 | 756 | 0.28 | 1.50 | 337.63 | 6.78 | 1123.70 | 1337.89 | 439.15 |
| 6 | 840 | 0.52 | 6.55 | 1473.39 | 19.05 | 3396.45 | 3971.29 | 486.85 |
| 8021.16 | | | 47.64 | 10719.65 | 84.32 | 17106.91 | 18740.80 | |
| 10519.06 | | | 54.19 | 12193.03 | 103.37 | 20503.36 | 22712.10 | |
| | | | | | | | 361.87 | |
| | | | | | | | 320.00 | |
| | | | | | | | 131.37 | |
| | | | | | | | 283.85 | |
| | | | | | | | 1012.35 | |
| | | | | | | | 1097.09 | |
| | | | | | | | 2109.44 | |
| | | | | | | | 5322.96 | |
| 6 | 876 | 0.00 | 0.00 | 0.00 | 15.77 | 3323.22 | 4061.71 | |
| 6 | 876 | 0.00 | 0.00 | 0.00 | 47.61 | 10487.67 | 12818.26 | |

ıich are assume 300 W-hr battery. Assumes 13-19 kW battery for commercial mowers based on product comparison of one brand.
nd is not used the other calcluations in this table.
the cost of the machines - Those batteries are not included in "start-up battery cost".
ne).
ɔst estimate). A 40V battery charger from the leading brand at The Home Depot retails for $55. "Fast chargers" a significanltly more expensive.

(542-Docket)

Comment: Attachment –Article – The Charging Cycles of Lithium-ion Polymer Batteries (542-Docket)

Comment: Every time a charging cycle is completed, the battery capacity decreases a bit. However, the reduced capacity is very small. High-quality batteries will still retain 80% of their original capacity after many cycles of charging. Many lithium battery products will still be used after two or three years. Of course, after the end of the lithium battery life, it still needs to be replaced. Ultimately, a 500-cycle life means that a manufacturer has achieved about 625 recharge times at a constant discharge depth (such as 80%) and reached 500 charging cycles. In other words, if we ignore other factors that could reduce the Lithium-ion battery capacity and we take 80% of 625, we receive 500.However, due to various factors in life, especially considering how the depth of discharge (DOD) during charging is not constant, "500 charging cycles" can only be used as a reference to battery life. (542-Docket)

Comment: To get the most out of lithium-ion batteries, you need to use it often so that the electrons in the Lithium batteries are always in a flowing state. If you do not use lithium batteries often, please remember to complete a charging cycle every month and do a power calibration, i.e. deep discharge and deep charge, once. After the nominal number of charge and discharge cycles is used up, a battery's ability to store power will drop to a certain level, but the battery can continue to be used. Lithium batteries have no limit on the number of times they can be recharged. Regular manufacturers can charge and discharge batteries at least 500 times, and the capacity is maintained at more than 80% of the initial capacity. (542-Docket)

Comment: Moreover, given the functional limitations that exist with ZEE, such as battery life, local agencies and other commercial operators may need to procure more equipment or back-up batteries at an additional cost to complete jobs in a timely manner. We urge the Economic Analysis to include these additional consequences in its calculations. (548-Docket)

Comment: Attachment – Article – QuickTake: Better Batteries (542-Docket)

Comment: The Outdoor Power Equipment Institute (OPEI) respectfully submits the following supplement to previously submitted COMMENT 8 regarding the California Air Resources Board (CARBs) Proposed Amendments to the Small Off-Road Engine (SORE) Regulations: Transition to Zero Emissions ("the Proposed Rule"). **Supplement to Comment 8 – The Proposed Rule fails to accurately address the upfront and ongoing cost of ZEE equipment. As a result, the Proposed Rule overestimates the cost benefits of the rule.** (560-Docket)

OPEI is also concerned about the selection method of units for comparison in the ISoR and SRIA. The SRIA compares what appears to be a very low-end cost "professional" ZEE walk-behind mower with a cost of $499 to a very high-end cost commercial gas-powered walk-behind mower with a cost $1299. These are not "apples to apples" comparisons. A quick Google search shows there are several "professional" or "commercial" ZEE walk-behind lawn mowers available in the U.S. with costs ranging from $499 to $1,199.95. Similarly, there are "professional" or "commercial" 21" walk- behind lawn mowers starting below $800. (560-Docket)

Regarding the cost comparison units in the SRIA, the durability of the products compared are not equal. The gas-powered mower has been developed and evolved over decades. The gas-powered mower has been tested by and meets the performance requirements of the most demanding professional landscapers. It is true the ZEE lawnmower offers a longer warranty. The Proposed Rule suggest the longer warranty period for ZEE provide equal or superior lifetime than SORE-powered equipment[1], however, that is not true. [Footnote 1: CARB Public Hearing to Consider Proposed Amendments to the SORE Regulations: Transition to Zero Emissions– Staff Report: Initial Statement of Reason (ISoR), October 21, 2021, pg 19] The gas-powered mower offers several more robust components and features that are critical to professional users. The gas-powered mower handle

design is 14 gauge (1.9mm) steel with a support while the ZEE walk- behind mower is 16 gauge (1.6mm) 2-piece handle with no support. The gas-powered mower has a weld-reinforced deck. The gas-powered mower has PC-PBT structure wheels with steel hubs, double bearings and a rubber tire. The ZEE mower has plastic hub, no bearing and a plastic tire. The ZEE mower tire failed one manufacturers durability test at 20% of product life. The gas-powered mower has durable hydrostatic transmission that has evolved over decades to meet the most rugged commercial user needs. The ZEE mower is electric motor driven. The ZEE mower transmission motor failed one manufacturers durability test at 12% of product life. Similar ZEE mower electric motor transmissions failed testing at less than 200 hours, experiencing failures related to brush-motor wear and worn dog clutch teeth – contrary to information presented in the ISoR. The ZEE mower is IPX4 rated, meaning electrical components have limited protection against rain and weather elements. The gas-powered mower can be used in any weather conditions. The ISoR limits quality comparison of the units to warranty period, and vaguely compares the deck size (21"), propulsion method (self- propelled and speed ranges), and a single blade feature (mulching). The ISoR in an incomplete and inappropriate comparison for rulemaking purposes. (560-Docket)

OPEI is unaware of any similar product testing or study conducted for the Proposed Rule. With these concerns in mind, in addition to the concerns outlined in Comments 7 and 9, CARB must conduct a regulatory-appropriate technology feasibility study to understand the performance characteristics and limitations, and technology feasibility of ZEE products versus their gas-powered counter-parts – including accurate battery life and maintenance costs. Following testing and additional product research, the SRIA and ISoR must be updated with more appropriate product, and in-turn accurate cost and benefit comparisons. In the absence of a technology feasibility study and with significantly incomplete comparison analysis, the rulemaking arbitrary and capricious or without reasonable or rational basis. (560-Docket)

Comment: We wanted to follow up with a formal letter stating our request for an amendment that we would like to further discuss with you. We have also added in a column on the survey to more clearly articulate the business type for each company (ie. Residential, commercial, maintenance, install, etc.) We are also planning to share this letter with Board members over the coming weeks and will be submitting formal comments to the dockets for NALP and CLCA independently prior to the deadline. Could we have another discussion once you review this letter possibly next Thursday or Friday between the times of 9:00 and 3:00 (pacific)? Thank you again for your continued engagement. (586-Email)

Comment: Thank you for setting up our meeting today with CARB member Dr. PachecoWerner. During our conversation, she requested I send the attached copy of our CLCA comment letter complete with the scientific study comparing batterypowered leaf blower vs SORE leaf blower as called out in the staff's ISOR. (2005-Docket)

Comment: I am the GM of distribution for Walker Distributing, based in Colorado. I wanted to point out one of the current limitations of batteries for large equipment - specifically the duty cycle requirements for landscapers using zero-turn mowers. The typical all-electric ZT mower today (see the Greenworks GZ series) will offer about 1.75 hours of use at full speed, and then they will require as much as 12 hours to recharge. The battery is so large that it does not allow user replacement on the fly. This simple configuration yields a predicted duty cycle of 1.75 / 13.75 = 12.7%. That is, a landscaper could use this mower for less than two hours and then would have to park it for up to 12 hours before using it again. To work straight through an 8-hour day, a landscaper would have to purchase five of these mowers. That is an unusually large burden on the typical landscaper. Battery equipment that can be easily changed on the fly – like modular batteries for chain saws, trimmers, etc

- is ready for the new policy. But for certain types of equipment, such as large items (like zero-turn mowers), the viable technology is still many years away. I ask that you consider exempting zero-turn mowers 17 horsepower and above from the regulations under AB 1346. (2013-Docket)

Comment: We have collected feedback with some -- from some of our commercial customers who bought battery units and also have inverters on their trucks. They have enough battery power to sustain the number of properties they service in a day. To do that, they keep their trucks running to charge their extra batteries for the next site. I can't imagine how many vehicles will be kept running on the job sites from the small to the large commercial landscaper to cut back on the purchase of extra expensive batteries. (3012-Oral Testimony)

Comment: Hello. I'm a homeowner, a couple acres in the foothills and I do own and operate battery equipment and gas-powered equipment. And I would like to say that the battery technology is just not quite there. Even with some of the marketing from some of the brands, it's not equivalent to gas-powered equipment. And if you want to try and purchase battery equipment that is comparable, or supposed to comparable to gas-powered equipment, it's about triple the price is about what I've had to spend on average. So just not quite there and not cost effective as well. (3033-Oral Testimony)

Comment: Thank you, Chair Randolph and CARB for the opportunity to testify on behalf of the National Association of Landscape Professionals. The landscape industry supports the transition from gas to electric equipment. As an industry, the health of our environment is inherent to our industry and we take our responsibility care for the environment very seriously. Virtually all landscape companies are purchasing, testing, and trying zero-emission equipment. But at this time, it is not technologically feasible for the landscape industry to make a complete transition to ZEE. The inevitable transition to ZEE must be done in a responsible manner. (3034-Oral Testimony)

Comment: It is not a coincidence that according to CARB's own data, that less than five percent of landscape companies have made this transition. That is actually compelling evidence that the ZEE equipment is not ready and it is alarming that the proposal before you is pushing for this transition for the 95 percent majority of companies in only two short years. ZEE equipment has performance deficiencies, it's cost prohibitive, and the infrastructure to support the transition is not yet in place. (3034-Oral Testimony)

Comment: CARB modeling estimates a landscape needs 1,180 watts of power, or 6.8 batteries per day for each lawn mower. But the impact assessment only specifies 690 watts of power or four batteries for the selected ZEE mower. If the model is correct, the proposed rule significantly underestimates the cost needed for landscaper tools by thousands of dollars. On the other hand, if the impact assessment is correct, the model overestimates the base line product emissions by 70 to 200 percent. Bigger batteries are more expensive and the cost must be accounted for if the cost analysis -- in the cost analysis, if that's staff's response to concerned comments. (3039-Oral Testimony)

Simply put, both the model and the impact assessment cannot be true. The proposed rule overestimates sector emissions. They are not equal to passenger cars and/or underestimates the rule cost. Ms. Ostad and Assemblymember Berman noted that landscaper ZEE adoption rate of 27 percent in 2020, up from three percent in 2018. This is not reflected in the SORE 2020 model from to 2018 to '24. (3039-Oral Testimony)

Comment: Finally, I'd like to clarify a few staff points regarding the ZEE Roadshow. It should be noted that none of the participants met the definition of the 80,000 plus landscape professionals estimated by CARB's survey. (3039-Oral Testimony)

Comment: Other things that are critical are the lack of affordable commercial quality ZEE equipment. The reality is there's less than a dozen manufacturers out there. And I won't go into the supply chain challenges they face, but the number isn't 42 ZEE manufacturers. The conversion to battery-powered equipment is very expensive and could cost up to three to four times the cost for gas powered. A typical cost to convert one landscape crew to battery powered is probably between six to fifteen thousand dollars, and that's cost prohibitive to many of the landscape businesses that are out there. (3048-Oral Testimony)

**Agency Response:**

These comments include expressions of the commenters' opinions and concerns regarding CARB's determination of technological feasibility of the Proposed Amendments. CARB made no change based on these comments. Many of the above comments address the same issues discussed in the Agency Response in section IV.A.35.2. Please refer to the Agency Response in section IV.A.35.2. for additional discussion of the issues presented in these comments.

Several commenters quote, misquote, or imply they are quoting the ISOR by using quotation marks around certain words or phrases in their comments; the commenters state their assessments of text in the ISOR and state opinions or beliefs regarding the text and conclusions in the ISOR. Often, these comments amount to subjective statements without evidence or other support. They suggest displeasure with the Proposed Amendments and the technological feasibility assessment in the ISOR, and they complement other statements from the commenters that express general opposition to the Proposed Amendments. These comments do not demonstrate that the technological feasibility assessment in the ISOR is insufficient or inappropriate.

In response to the statement, "Battery equipment for large landscape maintenance is not yet economically smart at this point due to reduced power and cost compared to gas power equipment,": Upfront costs for landscapers to purchase ZEE are significant; however, savings in ongoing costs can exceed the increase in upfront costs, as described in Chapter VII of the ISOR. Moreover, the commenters omit important cost benefits of the Proposed Amendments from the emission reductions' impact on health outcomes. The Proposed Amendments would have a cumulative net benefit of $3.81 billion and a benefit-cost ratio of 1.26 over the regulatory horizon of 2023 through 2043, as further described in section II.D of this FSOR.

In response to the statements, "Must have alternative motors fully in place to minimize business disruption," "The Proposed Rule fails to demonstrate ZEE is a technically feasible solution for many use cases. The Proposed Rule presents no technology feasibility test data, but instead relies exclusively on product marketing data, which highlight limited and sometimes misleading comparisons of performance and cost," and similar statements: Chapter I.E of the ISOR discusses the availability and technological feasibility of ZEE. The commenters do not specify the equipment types that use engines subject to the SORE regulations or the use cases for which they believe CARB has not demonstrated that ZEE is a technologically feasible solution. The commenters do not specify the test data they believe CARB did not present or which they believe is necessary to present to make a determination that a transition to ZEE is technologically feasible.

In response to comments comparing the blowing force of SORE and ZEE leaf blowers (included in OPEI's, NALP's, and CLCA's comments): CARB disagrees with the commenters' conclusions regarding the implication of their testing. The commenters present data on their testing and make statements, such as, "Industry was able to approximately correlate the marketing performance noted in the Proposed Rule for both units but found that after just 8 minutes of run-time, the ZEE leaf blower force fell below that of the gas-powered leaf blower." The commenters do not provide evidence that leaf blowers must be operated at full throttle to perform useful work or that operation at continuous full throttle until batteries or fuel tanks are drained is typical or representative. When using a leaf blower, an operator may choose to vary the throttle position depending on the material to be moved with the leaf blower. The commenters' test data do not demonstrate that ZEE leaf blowers are not feasible for use in real-world conditions. In response to the statement, "The SORE2020 model suggests the average residential leaf blower is used for 30 minutes per use. Accordingly, the average homeowner would need two batteries each use, regardless of leaf blower performance mode – At least one additional battery would need to be purchased to meet SORE2020 assumptions," and similar statements: The EGO LB6500 leaf blower can operate much longer than 30 minutes with one battery [Lowes, 2021[147]]. It is true that an operator could drain the battery in fewer than 30 minutes when operating at full throttle. However, the blower can be operated at varied throttle positions, depending on the work to be performed. CARB's economic analysis assumed users would purchase enough batteries to complete a day of work with fully charged batteries at the start of the day, as described on page 39 of the SRIA. Average use times for each equipment type during a day of work were obtained from the SORE2020 emissions inventory report [CARB, 2020[148]]. Some users may require more batteries for longer use times, while others may require fewer. As the commenter notes, CARB included one battery for the EGO LB6500 leaf blower because one battery is sufficient for typical daily use by a residential user. The commenter claims, "The SRIA provides no analysis of handheld blowers for professional use." CARB disagrees with that statement. The Stihl BGA 100 leaf blower can be operated like a handheld blower or like a backpack blower. CARB disagrees with the commenters' conclusions.

OPEI's Annex B, titled "OPEI ZEE Battery Use and Cost Analysis (Comment 7 & Comment 8)" and included in its comments, contains a table with subsections titled "Landscaper ZEE Cost Analysis," "Residential ZEE Cost Analysis," "Residential ZEE Generator Cost Analysis," and "Commercial ZEE Generator Cost Analysis." This table is reproduced in CLCA's comments. OPEI's comments include the statement, "For the average landscaper operating walk-behind mowers, string trimmers, leaf blowers and hedge trimmers, based on the CSU-F survey equipment distribution and SORE2020 suggested use factors, using conservative estimates of battery size, the average landscaper would require 36.68 batteries per day. If chain saws are included with the average landscaper equipment, they would require 48.17 batteries per day." CARB disagrees with the commenter's conclusions. The commenter assumed ZEE would require the same power as SORE and therefore need the same amount of energy as SORE.

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[147] Lowes. 2021. EGO POWER+ 650-CFM 56-Volt 180-MPH Brushless Handheld Cordless Electric Leaf Blower 5 Ah (Battery & Charger Included) Model #LB6500. Available at: https://www.lowes.com/pd/EGO-Power-56-Volt-Lithium-Ion-BrushlessCordless-Electric-Leaf-Blower-Battery-Included/1003130708. Last accessed March 29, 2021.

[148] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

ZEE with equivalent power to SORE equipment generally have greater torque than the SORE equipment. Therefore, ZEE may not need to have the same power rating as SORE equipment to be able to perform the same work. CARB's analysis of battery needs for ZEE took into consideration the power that would be consumed by ZEE rather than the power of SORE, as the commenter assumed. The commenter does not provide evidence that ZEE need to have the same power rating as SORE equipment to be able to perform the same work. The commenter's analysis is inaccurate and does not demonstrate CARB's analysis was insufficient or inappropriate.

In response to comments regarding the packaging of batteries with residential-grade ZEE: The commenter states opinions regarding the statement on page 39 of the SRIA, "Residential-grade ZEE frequently come packaged with enough batteries for average use." The commenter mentions that equipment can be purchased without batteries. That is true. The statement in the SRIA uses the word "frequently" because residential-grade ZEE is not always sold with enough batteries for a day of work. The commenter asserts that two batteries would be needed for the EGO lawn mower used in CARB's economic analysis, based on the commenter's battery analysis. CARB disagrees with the commenter's battery analysis and assessment regarding the EGO lawn mower, as discussed in this Agency Response. The commenter does not demonstrate that the statement on page 39 of the SRIA regarding the packaging of batteries with residential-grade ZEE is not supported by information in the SRIA and ISOR.

In response to the statement, "Considering replacement batteries (as batteries wear out), which are not considered in Proposed Rule, an average landscaper could go through 84.32 to 103.37 batteries over the useful life (6 years) of the equipment. The associated costs are discussed further in Comment 8. See Annex B for a summary of the OPEI battery and cost calculations,": CARB disagrees with the commenter's conclusions. The commenter uses incorrect values (6 years) for useful life for the equipment in its table. As described on page 44 of the SORE2020 Technical Documentation, "useful lives of 5 years, 4 years, and 9 years are assumed for commercial, vendor, and residential lawn mower categories, respectively." ("Vendor," as used in the previous sentence, refers to landscapers.) The commenter states that replacement batteries would be needed but neglects the impact that running SORE equipment for an equivalent number of hours would have. For example, a landscaper might have to purchase five commercial SORE leaf blowers with useful life of 300 hours to operate the 1,440 hours the commenter calculates in its analysis. The commenters' analyses do not demonstrate CARB's analysis was insufficient or inappropriate.

In response to the statement, "For a residential wanting to do all their yardwork in a single day (mow, string trim, trim hedges, blow), using conservative estimates of battery size, it would require 11.81 batteries to achieve the average residential user performance needs suggested by SORE2020. For a residential generator to meet the performance needs suggested by SORE2020, running for 3.85 hours, a residential user may need up to 20.36 batteries, and would have to change the batteries every 23 minutes,": These portions of the commenters analysis use similar assumptions to those discussed for landscapers in the previous paragraph. CARB disagrees with the commenter's conclusions for the same reasons discussed in the previous paragraph. CARB disagrees with the commenter's conclusions regarding the need for extra chargers for the same reasons CARB disagrees with the commenter's conclusions regarding the need for extra batteries.

In response to the statement, "In the low performance mode (24min/battery) the landscaper would require (7) 5 Ahr batteries (or charges) a day just for blowers. In the high performance

mode (18min/battery), the mode by which the maximum air-flow and force are measured, the landscaper would require (9) 5-A-hr batteries (or charges) a day just for blowers. In HD commercial applications the performance stated in CARB's ISOR is not sufficient and in fact no battery powered blowers of this size exist on the market today.": This comment is similar to comments from OPEI discussed in this Agency Response. The comment refers to the same comparison testing as OPEI's comments. CARB disagrees with the commenter's conclusions regarding the number of batteries a landscaper would need for the same reasons described earlier in this Agency Response. The commenter has not demonstrated that ZEE leaf blowers have insufficient performance. The total number of batteries a landscaper may need will vary depending on the work the landscaper performs, the equipment the landscaper uses, and the batteries the landscaper selects. Users have flexibility in the capacity of batteries when making purchase decisions. Those who value longer runtime may choose to purchase higher-capacity batteries, including backpack batteries. Those who value lighter-weight equipment or prefer not to wear a backpack may choose to purchase lower-capacity batteries.

In response to comments on visits and discussions with landscaping crews in South Pasadena and Ojai: The commenter relates anecdotal feedback from crews after extensive use of ZEE riding mowers. SORE riding mowers have emissions durability periods up to 1,000 hours. The commenter states that one crew provided feedback after operation of the mower for 1,400 and 1,600 hours of operation, both of which are significantly beyond the emissions durability period of a SORE riding mower. The commenter does not state whether feedback from the crews on performance loss indicated unacceptable performance or whether the performance loss indicated a decrease in power, runtime, or something else. These comments do not suggest that ZEE riding mowers are not technologically feasible.

In response to the statement, "CARB must conduct a regulatory-appropriate technology feasibility study to understand the performance characteristics and limitations, and technology feasibility of ZEE products versus their gas-powered counter-parts – including accurate battery life and maintenance costs,": CARB disagrees with the commenter's implications that the ISOR does not accurately assess battery life and maintenance costs. The ISOR does include an appropriate assessment of technological feasibility. Responses to OPEI's other comments are included throughout this Chapter IV of this FSOR.

In response to the statement, "During the October 27, 2017 SORE Working Group meeting CARB staff presented a test plan…Lack of regulatory-appropriate testing to support the Proposed Rule not only calls into question whether the California administrative regulatory requirements were followed, but also provides another example of how the Proposed Rule is arbitrary and capricious,": Please refer to the Agency Response in section IV.A.35.2.

In response to the statement, "The Proposed Rule fails to demonstrate ZEE is a technically feasible solution for many use cases. CARB survey and Roadshow data support the conclusion that additional technology development is needed to meet many user needs," and related comments: CARB disagrees with the commenters' conclusion that the Proposed Amendments do not demonstrate ZEE is technologically feasible. In response to the OPEI comment, "According to the CSU-F survey, today's landscaper ZEE deployment continues to face challenges … Further technology advancement is needed to overcome these challenges and for widespread ZEE deployment in high-performance and high use applications,": CARB disagrees with the commenter's characterization of the adoption rate of ZEE among landscapers. As described on page 22 of the ISOR, 27 percent of surveyed landscapers' purchases were ZEE in 2020, versus 21 percent in 2018, according to a Farnsworth Group

survey [The Farnsworth Group, 2021[149]]. CARB disagrees with the commenters' conclusion that CSUF survey and ZEE Roadshow data indicate that additional technology development is needed to meet many user needs. In response to the statement, "Despite a long familiarity with ZEE blowers, V38-G2 opted for a new gas- powered leaf blower just weeks before the survey," and similar statements: Purchasing and using SORE equipment do not indicate ZEE is not technologically feasible. It indicates the necessity of this rulemaking. As described on page 3 of the ISOR, a transition to ZEE is not expected to occur without the Proposed Amendments.

In response to the statement, "OPEI is concerned the Proposed Rule fails include an accurate recount of and summary of responses received about the program," and similar statements: The commenters state opinions regarding the ZEE Roadshow and feedback from participants but do not demonstrate CARB's description of feedback from the Roadshow was inaccurate. The commenters offer criticism of the feedback CARB received and state opinions regarding information that is and information that is not included in the ISOR. The commenters also discuss ZEE demonstrations that occurred prior to the ZEE Roadshow and were not part of the ZEE Roadshow. Such demonstrations were not included in summaries of the ZEE Roadshow because they were not part of the ZEE Roadshow. As described on page ES-11 of the ISOR, the response to the ZEE Roadshow has been overwhelmingly positive, with nearly all crews finding at least one ZEE type that they preferred over SORE equipment. Participants' continued use of SORE equipment does not indicate ZEE is not technologically feasible. In response to the statement, "No landscapers participated in the ZEE Roadshow,": The commenter does not provide evidence for this statement. Several participants do professional landscaping work on weekends in addition to their jobs working for organizations that participated in the ZEE Roadshow. The commenter does not demonstrate that the work performed by landscapers differs significantly from the work performed by the crews that participated in the ZEE Roadshow or that ZEE Roadshow participants' feedback does not provide useful information on the technological feasibility of ZEE for use by landscapers.

Comments related to charging infrastructure and electrical service address the same concerns as other comments submitted by these commenters and others. Please refer to the Agency Response in section IV.A.6.1 for discussion of those comments.

In response to comments about comparisons of SORE equipment and ZEE lifetime and warranty periods: Equipment lifetimes are discussed on pages 18-21 of the ISOR. Commenters present criticisms of the discussion in the ISOR but do not provide information contrary to the ISOR discussion.

In response to comments about the prices and features of professional SORE and ZEE lawn mowers, CARB made a modification to the economic analysis. CARB updated the model and price estimate for the professional ZEE lawn mower used in the economic analysis using new information, as described in section II.A of this FSOR. The characteristics of the updated professional ZEE lawn mower more closely match those of the professional SORE lawn mower used in the economic analysis. The process by which example equipment was selected for the economic analysis can be found in Section C.1.c.i of the SRIA. Major retailer and manufacturer websites were used for the pricing exercise.

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[149] The Farnsworth Group. 2021. Pro Battery Powered OPE Trends. 2021. (Web link: https://www.thefarnsworthgroup.com/blog/pro-battery-powered-ope-trends. Last accessed August 13, 2021.)

In response to comments about the use of one type of battery for more than one equipment type from the same manufacturer and scheduled maintenance of ZEE and SORE equipment: As described on page 68 of the ISOR, ZEE batteries can often be used in several products within a manufacturer's family of ZEE. This is true of the batteries used for the EGO LM2102SP lawn mower and EGO LB6500 listed on page 118 of the SRIA. It is also true for the batteries used for the Husqvarna 536 LiLx trimmer (page 120 of the SRIA) and the Husqvarna W520i lawn mower [Husqvarna, 2020 and 2022a[150,151]]. CARB disagrees with commenters' statements that CARB did not cite data to support the statement, "Maintenance is also much less intensive and required less frequently on ZEE," on page 68 of the ISOR. An example of the differences in scheduled maintenance between SORE and ZEE lawn mowers is provided on pages 68 and 69 of the ISOR. Scheduled maintenance costs are further discussed in "Technical Support Document: Evaluation of Maintenance Frequencies and Costs for Small Off-Road Engines in California," [CARB, 2021[152]].

In response to comments about the interchangeability or compatibility of batteries between brands: The Proposed Amendments do not require landscapers to purchase ZEE from one manufacturer exclusively. The economic analysis in the ISOR does not assume that a landscaper would purchase ZEE from one manufacturer exclusively. The equipment in the economic analysis are from many different manufacturers. As described on page 67 of Appendix I to the ISOR (SRIA), a sole-proprietor landscaper could see net cost-savings between two and three years after purchasing ZEE. A landscaper could save money sooner if they purchase more than one piece of equipment from the same manufacturer and can use the same batteries for their equipment. The compatibility of batteries between brands of ZEE is beyond the scope of the Proposed Amendments. The commenters do not provide evidence that a lack of compatibility of batteries between brands of ZEE would reduce competition or strengthen manufacturer influence over landscapers.

In response to the statement, "This low adoption rate is not due to an unwillingness to use ZEE equivalents but rather evidence that the equipment is not technologically capable to be the exclusive equipment used by commercial landscape companies at this time," and similar statements: CARB disagrees with the commenters' conclusions. A lower adoption rate of ZEE among landscapers does not indicate ZEE is not technologically feasible. It indicates the necessity of this rulemaking. As described on page 3 of the ISOR, a transition to ZEE is not expected to occur without the Proposed Amendments.

Appendix A in NALP's comments, which is a letter with the salutation addressed to "CARB Board Member," dated November 9, 2021, from Sandra Giarde, CAE, Executive Director, CLCA and Andrew Bray, VP Government Relations, NALP, describes CLCA's and NALP's

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[150] Husqvarna. 2020. Husqvarna Battery BLi300. https://www.husqvarna.com. 2020; archived at Wayback Machine:
http://web.archive.org/web/20200921141137/https://www.husqvarna.com/us/accessories/battery/battery-bli300/967071901/; citing a capture dated September 21, 2020.

[151] Husqvarna. 2022a. Husqvarna W520i Push Walk-Behind Mower. (Web link:
https://www.husqvarna.com/us/walk-behind-mowers/w520i/. Last accessed: February 10, 2022.

[152] CARB. 2021. Technical Support Document: Evaluation of Maintenance Frequencies and Costs for Small Off-Road Engines in California. Microsoft Excel workbook compiled by staff of the Monitoring and Laboratory Division. October 2021.

concerns with the Proposed Amendments, asking Board members to "support an amendment to the ISOR and delay implementation of the transition to Zero Emissions Equipment (ZEE) ONLY for commercial/professional grade small off-road engines (SORE)." The letter expresses support for reducing emissions from gas-powered landscape equipment and describes the landscape industry in California. It mentions the CSUF survey and adoption rates of ZEE among landscapers. The letter repeats concepts and comments in the main body of CLCA's and NALP's comments and includes the statement, "Solution - Extend the time period to transition to zero emission "commercial/professional grade" equipment beyond 2024 but maintain the 2024 end of sale date for zero emission residential SORE." Comments similar to this statement are discussed in the Agency Response in section IV.A.2.4.2. of this FSOR. Responses to the other comments are addressed throughout this Chapter IV of this FSOR. The November 9, 2021, letter also was submitted to CARB via email on November 12, 2021, as noted at the beginning of this FSOR Chapter IV in Table 1. The email text is included in the above comments, as identified with commenter code 586-Email. In response to their emailed request, CARB staff and Board Members had multiple meetings with CLCA and NALP representatives to discuss their concerns and recommendations for modifications to the Proposed Amendments described in their November 12 email.

Appendix B in NALP's comments, titled "CLCA and NALP Battery Powered Equipment Survey," contains a table with information from surveys performed by NALP and CLCA of their members. The table also was submitted to CARB via email on November 12, 2021, along with the November 9, 2021, letter from CLCA and NALP. Participants provided information on their city, type of company, types of battery-powered equipment their company used, the percentage of the equipment their company was using that was battery-powered at the time of the survey, the types of battery equipment their company had tested but did not use regularly, the reason for not using battery equipment their company had tested but did not use regularly, challenges they saw when it came to their crews using battery-powered small handheld equipment, advantages of using battery-powered small handheld equipment, challenges they saw when it came to their crews using battery-powered mowers, advantages of using battery-powered mowers, challenges their technicians would face if they had to use only battery-powered equipment, challenges they thought their companies would face if making the switch from gas to battery-powered equipment, the impact on their operations they thought would occur if air board regulators required a switch from gas-powered equipment to battery-power equipment, and any other comments they wanted to share about the possible impacts of a shift from gas-powered equipment to battery-powered equipment.

The participants operated in various locations throughout California or were described as "National Company, top 20 locations in California." The companies mentioned performing residential landscaping, commercial landscaping, or both, in some cases. Other companies focused on arboreal maintenance or were equipment distributors. Participants used a variety of types of ZEE and reported using from 0 to 95 percent ZEE. They reported trying various equipment types and not using them regularly due to performance or charging concerns. They reported challenges including battery capacity and charging, as well as challenges with SORE equipment. (The survey did not appear to ask about challenges with SORE equipment, but one participant wrote, "they do have occasional problems. That's true for gas tools as well.") Participants reported advantages such as environmental benefits, low noise, client satisfaction, reduced routine maintenance requirements, the ability to carry less fuel, lower weight, and ability to work in municipalities that do not allow two-stroke engines and in quiet residential areas. Challenges participants described for their technicians and companies included mechanic retraining, cost of replacing equipment, charging, ability to repair equipment in the

field, and ability to carry enough batteries for a shift. Participants thought impacts of a switch would include financial impacts, benefits for the environment, challenges with product availability, and impacts on efficiency; some participants thought there would be no impacts or challenges. Additional comments included a desire for incentives, expressions of the importance of the green industry, a need for balance, and benefits to the environment, support for a shift to battery operated tools, and concerns about cost.

In response to the statement, "NALP also conducted a survey in conjunction with CLCA to poll professional landscape companies in California. Both performance and cost remain tremendous hurdles, specifically for the larger commercial equipment that requires significantly more run time and power," the results of the survey, and additional feedback from landscapers in NALP's and CLCA's comments, such as "Charging issues in the field and in the workshop": CARB understands landscapers have concerns about transitioning to ZEE. The Proposed Amendments do not require anyone to stop using SORE equipment. The question in NALP's and CLCA's surveys, "If air board regulators required a switch from gas-powered equipment to battery-power equipment, what impact do you think it would have on your operations? (Please share any specific examples about the challenges it would pose to getting the work done if your equipment needed to be 100% battery operated.)," does not accurately characterize the Proposed Amendments. Answers to that question would describe a scenario that would not result from the Proposed Amendments. Upfront costs for landscapers will be significant, and savings in ongoing costs can exceed the increase in upfront costs, as described in the SRIA. Overall, the NALP and CLCA surveys indicate significant use of ZEE by landscapers and demonstrate the necessity of this rulemaking, since a transition to ZEE is not expected to occur without the Proposed Amendments. In response to the statement, "NALP also acknowledges that in some instances companies have been able to successfully transition, detailed in NALP survey results. BUT those companies are significantly in the minority and operate in very affluent and wealthy areas,": NALP provides no evidence that would suggest that a transition to ZEE is not possible in less affluent areas. CARB has no evidence to suggest that a transition to ZEE is not possible for all landscapers.

In response to the statement, "In other instances, landscape companies switching to battery powered equipment may need to also purchase portable generators to charge their equipment,": The current SORE regulations and the Proposed Amendments do not specify the purposes for which users may use SORE generators. The commenter raises the possibility of using a SORE generator to charge batteries for ZEE. Such use of a SORE generator is not the goal of the Proposed Amendments and could result in avoidable emissions. The commenter does not demonstrate that such use would be prevalent or would significantly impact the emission reduction benefits of the Proposed Amendments. The comment implies that any use of a SORE generator that might be avoidable would indicate the Proposed Amendments were ineffective and should therefore be abandoned. CARB disagrees with that conclusion. A significant amount of SORE emissions are created by activities that are often recreational or discretionary, such as the use of an RV or landscape maintenance. The SORE regulations do not limit users' ability to engage in these activities. CARB's economic analysis assumed users would purchase enough batteries to complete a day of work with fully charged batteries at the start of the day, as described on page 39 of the SRIA. The comment does not demonstrate that the Proposed Amendments are not technologically feasible.

Comments from NALP on battery needs and costs are similar to those from OPEI, which are addressed in this Agency Response. The comments do not demonstrate that CARB's analysis is insufficient or inappropriate.

In response to the statement, "while the rider mower would not have enough charge to complete all 20 lawns," and similar statements: The commenters outline scenarios based on their assumptions. While it may be true that some ZEE riding mowers would need to be recharged before they would be able to complete the tasks in the commenters' scenarios, a landscaper could choose a ZEE riding mower with longer run time than the ones the commenters assumed would be used in the scenarios. Similar to refueling a SORE lawn mower throughout the day, a landscaper could choose to "refuel" a ZEE riding mower with interchangeable batteries to extend the run time to complete a day's worth of mowing jobs. Note that it may not be possible to refuel a SORE riding mower immediately after stopping the engine. It is not safe to add fuel to a fuel tank while an engine is running or hot. SORE must be completely cool before fuel is added for safety purposes.[153,154,155,156,157] ISOR chapter I.E.2a.ii. compares the performance characteristics of professional grade ZEE and SORE and explains that some ZEE riding mowers have batteries that can be exchanged. As described in Chapter VII of the ISOR, ZEE riding mowers often have a higher purchase price than SORE riding mowers.

In response to the statement, "The last issue with cost that we want to address is labor. ZEE lacks the same performance capabilities detailed above and requires frequent battery changes both of which reduce the productivity and efficiency of a landscape crews in the field," and similar statements: The commenters do not provide evidence that battery changes will take more time or be more frequent than filling fuel tanks with gasoline or mixing gasoline and oil and filling fuel tanks with the mixture of gasoline and oil. The commenters do not demonstrate that ZEE lacks the capabilities of SORE equipment. The commenter does not demonstrate that the use of ZEE will result in reduced productivity or efficiency. CARB does not have information to support the commenters' conclusions.

In response to comments regarding maintenance of ZEE, including the ability of dealers and repair shops to perform maintenance: The commenters do not demonstrate that dealers are better equipped to perform maintenance on SORE equipment than on ZEE. Manufacturers provide training and other resources to dealers to service equipment. The commenters provide examples of users having challenges with maintenance of ZEE but do not demonstrate

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[153] John Deere. 2021h. Operator's Manual View, Service Intervals. 2021. (Web link: https://techinfo-omview.apps-prod-vpn.us.e06.c01.johndeerecloud.com/omview/omuc15151. Last accessed May 26, 2021).

[154] John Deere. 2021i. Operator's Manual View, Service Intervals. 2021. (Web link: https://techinfo-omview.apps-prod-vpn.us.e06.c01.johndeerecloud.com/omview/omuc17903. Last accessed May 26, 2021).

[155] Champion Power Equipment. 2022. Champion Global Power Equipment Owner's Manual & Operating Instructions: 3400 Starting watts / 3100 Running watts Portable Inverter Generator, model Number 100233. Available at https://www.championpowerequipment.com/wp-content/uploads/2017/08/100233-om-english.pdf. Last accessed: April 29, 2022.

[156] Generac. 2022. Owner's Manual: GP Series Portable Generator. Models: 005625-0, 005626-0, 005680-0, 005681-0. Available at: https://prod-generacsoa.azurefd.net/ manualsweb/manuals/5644258/0G8751. Last accessed: April 29, 2022.

[157] American Honda Motor Co, Inc. 2022. American Honda Motor Co, Inc. (Honda) Owner's Manual: Generator EU2200i / EU22001 Companion. Available at: https://cdn.powerequipment.honda.com/pe/pdf/manuals/00X31Z446130.pdf. Last accessed: April 29, 2022.

that users don't have challenges with maintenance or repairs of SORE equipment or that such challenges occur more often with ZEE than with SORE equipment.

CLCA's comments include an attachment, titled, "The Charging Cycles of Lithium-ion Polymer Batteries," by Grepow Blog, dated March 25, 2020. This blog entry describes Lithium-ion Polymer batteries, charging cycles for batteries, deep and shallow charging, effects of temperature on battery life, the charge-discharge cycle, a lithium battery cycle specified by a national standard, and the authors' batteries.

In response to comments regarding battery lifespan or number of charge cycles a battery can sustain: These comments are beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice and therefore CARB made no changes based on the comments. The Grepow Blog entry that is provided as support for these claims is specifically about Lithium-ion Polymer batteries. Lithium-ion Polymer batteries differ greatly from the battery chemistries that are used in ZEE. The commenters do not provide evidence that batteries used in ZEE have similar degradation to those in the article, nor do they provide evidence that degradation of batteries used in ZEE prevents ZEE from being technologically feasible. The commenters do not provide evidence that degradation of batteries used in ZEE would cause CARB's economic analysis to be insufficient or inappropriate. Stihl states that a battery will retain up to 80 percent of its original capacity, even after 1,200 charging cycles [Stihl, 2022[158]]. Husqvarna states that a battery can sustain up to 1,500 charges [Husqvarna, 2022 [159]], significantly more than the 300 or 500 charges that are stated in the article or other comments.

A reference in the ISOR, "Better Batteries" by Chris Martin [Martin, 2019[160]], is attached to CLCA's comments. CLCA offered commentary on a statement in the ISOR that refers to "Better Batteries." In response to the statement, "CARB staff omitted an important point: in reading the actual article, the overwhelming drop in battery prices has already taken place by 2021 as shown in the graph": This comment does not request a change to the Proposed Amendments. CARB made no changes based on this comment. This comment seems to suggest that CARB overestimated the decrease in the price of batteries in the economic analysis. CARB relied on price decreases as described in the cited article for the years after the Proposed Amendments would be effective. CARB conservatively applied the decrease in cost of batteries to the future cost of batteries by only reducing battery price in proportion to a battery's energy storage.

In response to the statement, "In an October 13, 2021 meeting with CARB staff, a San Fernando valley landscape maintenance contractor shared that his ZEE riding mower had been in the repair shop for three months due to the lack of expertise and applicable repair materials. As of the date of this letter, it still has not been repaired,": This comment includes a description of a landscape maintenance contractor's experience with a ZEE riding mower and

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[158] Stihl. 2022. AP 300 Lithium-Ion Battery. (Redesign). Available at: https://www.stihlusa.com/products/batteries-chargers/batteries/ap300redesign/. Last accessed: February 10, 2022.

[159] Husqvarna. 2022. Husqvarna BLi950X. Available at: https://www.husqvarna.com/us/battery-series-accessories/bli950x/. Last accessed: February 9, 2022.

[160] Martin, Chris. 2019. Better Batteries. Bloomberg. October 11, 2019.

does not request a change to the Proposed Amendments. CARB made no change based on this comment. CARB understands that waiting for a piece of equipment to be repaired, whether that is SORE equipment or ZEE, can cause inconvenience.

In response to the statement, "given the functional limitations that exist with ZEE, such as battery life, local agencies and other commercial operators may need to procure more equipment or back-up batteries at an additional cost to complete jobs in a timely manner. We urge the Economic Analysis to include these additional consequences in its calculations,": CARB's economic analysis assumed users would purchase enough batteries to complete a day of work with fully charged batteries at the start of the day, as described on page 39 of the SRIA. The commenter provides no support for the claim that agencies will need to purchase more ZEE than the amount of SORE equipment they might replace. CARB does not have any evidence to support the commenter's statement.

In response to the comment from Gardenland Power Equipment, "Other things that are critical are the lack of affordable commercial quality ZEE equipment. The reality is there's less than a dozen manufacturers out there. … the number isn't 42 ZEE manufacturers,": to clarify, at the time of the release of the ISOR, there were 12 manufacturers of professional-grade ZEE and 8 manufacturers that make professional-grade zero-emission lawn mowers (ISOR pages 11, 27, and 152).

In response to the comments from Gardenland Power Equipment and the foothills homeowner about the higher cost of ZEE: As described in pages 97-108 of the ISOR, ZEE can have higher upfront purchasing costs than SORE equipment. However, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. As described on page 67 of Appendix I to the ISOR (SRIA), a sole-proprietor landscaper could see net cost-savings between two and three years after purchasing ZEE. As described on page 71 of the SRIA, a typical residential user who has purchased a lawn mower, leaf blower, and string trimmer could break even in 7 years. CARB's economic analysis assumed users would purchase enough batteries to complete a day of work with fully charged batteries at the start of the day, as described on page 39 of the SRIA.

In response to the statement, "I ask that you consider exempting zero-turn mowers 17 horsepower and above from the regulations under AB 1346,": The Proposed Amendments are not AB 1346 and are not a bill to be considered by the Legislature. The Legislature passed AB 1346, and the Governor signed it. The Proposed Amendments meet the requirements of AB 1346. Certain new small off-road engines are not subject to CARB's SORE regulations. Section 209, subsection (e)(1), of the Clean Air Act provides that new engines less than 175 horsepower which are used in farm or construction equipment or vehicles are preempt from CARB's emission standards and only subject to emission standards from U.S. EPA. CARB generally refers to engines which are not subject to California's emission standards in this fashion as "preempt." Zero turn-radius riding mowers are not preempt. The scope of the rulemaking described in the October 2021 45-Day Notice does not include making zero turn-radius riding mowers no longer subject to the SORE regulations.

In response to the statement, "No I don't think they should be banned, you would still need to use a gas generator to charge batteries on electric equipment," and similar statements: These comments do not request a change to the Proposed Amendments. CARB made no changes based on these comments. The current SORE regulations and the Proposed Amendments do not specify the purposes for which users may use SORE generators or motor vehicles. The commenters raise the possibility of using a SORE generator or a motor vehicle to charge

batteries for ZEE. Such use of a SORE generator or a motor vehicle is not the goal of the Proposed Amendments and could result in avoidable emissions. The commenters do not demonstrate that such use would be prevalent or would significantly impact the emission reduction benefits of the Proposed Amendments. The comments imply that any use of a SORE generator that might be avoidable or use of a motor vehicle to charge batteries for ZEE would indicate the Proposed Amendments were ineffective and should therefore be abandoned. CARB disagrees with that conclusion. A significant amount of SORE emissions are created by activities that are often recreational or discretionary, such as the use of an RV or landscape maintenance. The SORE regulations do not limit users' ability to engage in these activities. CARB's economic analysis assumed users would purchase enough batteries to complete a day of work with fully charged batteries at the start of the day, as described on page 39 of the SRIA. The comments do not demonstrate that the Proposed Amendments are not technologically feasible.

In response to the statement, "If the model is correct, the proposed rule significantly underestimates the cost needed for landscaper tools by thousands of dollars. On the other hand, if the impact assessment is correct, the model overestimates the base line product emissions by 70 to 200 percent," and similar statements: These comments are similar to other comments related to the battery needs of landscapers and the cost for those batteries, which are addressed in this Agency Response. CARB disagrees with the commenter's conclusions. An increase in adoption of ZEE by landscapers after the SORE2020 model was finalized could not be incorporated when the model was developed because the increase had not occurred yet. The model was developed using the best available data. Please refer to the Agency Responses in section IV.A.14 for additional discussion of comments related to the SORE emissions inventory.

Please refer to the Agency Response in IV.A.6.2 for discussion of comments regarding the disposal of batteries.

### *A.35.2. EMA, Stihl, Briggs & Stratton, and similar technological feasibility and cost-effectiveness comments*

Comment: STIHL is also concerned that no true feasibility study has been conducted, which could objectively assess the limits of application of professional battery products and that, the studies and modeling that have been conducted to date often appear to be based on unreliable or overstated data.[2] [Footnote 2: See OPEI comments November 29th, 2021] (509-Docket)

Comment: No Feasibility Study has been conducted to objectively assess the limits of application of professional battery products:
A Feasibility study was planned in 2017[8] with several battery products (see Figure 5), however the study was never performed. This study was supposed to show the feasibility but also the limits of battery products and the batteries themselves in order to obtain a realistic assessment of the application possibilities of these products that are currently on the market, to provide valuable quantitative results and to focus further development needs together with the manufacturers. Unfortunately, this study was never carried out. Current battery technology (state of the art: 100 up to 170 W-hr/kg for a whole battery package) with an optimistic energy density up to 280 W-hr/kg in the next 8 to 10 years cannot compete with liquid fuel (11,600 W-hr/kg) with more than 40 times higher energy density. Especially for handheld equipment, the weight of the equipment is essential for professional use where the equipment has to be carried by the user during operation. Whereas for ground-supported equipment, the weight is not relevant because the operator has not to carry the

equipment during operation.[8] [Footnote 8: Testing to Establish Up-to-Date Exhaust Emission and Deterioration Factors for Small Off-Road Engines Using E10 Fuel (CARB Draft); Emissions Compliance, Automotive Regulations and Science Division Monitoring and Laboratory Division; 10/04/2017] (509-Docket)

For professional use, in remote areas, under extreme climate conditions and for high power/energy applications, internal combustion engines will still be needed in the future (see comparison of professional battery vs combustion product in Figure 6). (509-Docket)

Comment: Figure 5: List or Zero Emission Test Equipment out of "Testing to Establish Up-to-Date Exhaust Emission and Deterioration Factors for Small Off-Road Engines Using E10 Fuel (CARB Draft); Emissions Compliance, Automotive Regulations and Science Division Monitoring and Laboratory Division; 10/04/2017" (509-Docket)

Attachment V: List of Zero Emission Test Equipment (TBD)

| NUMBER | TYPE | BRAND | MODEL | MODEL YEAR | SERIAL # | Engine Model # | ENG MFR | Required Durability Period | Governor (Y/N) | Power | Equivalent DISP (CC) | CARB PROP # | SPECIAL FEATURES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ZEE-1 | BRUSHCUTTER | | | | | | | 300 | | < 5 hp | ≤ 80 | | |
| ZEE-2 | CHAINSAW | | | | | | | 300 | | < 5 hp | ≤ 80 | | |
| ZEE-3 | EDGER | | | | | | | 300 | | < 5 hp | ≤ 80 | | |
| ZEE-4 | BLOWER (HANDHELD) | | | | | | | 300 | | < 5 hp | ≤ 80 | | |
| ZEE-5 | BLOWER (BACKPACK) | | | | | | | 300 | | < 5 hp | ≤ 80 | | |
| ZEE-6 | HEDGE CLIPPER | | | | | | | 300 | | < 5 hp | ≤ 80 | | |
| ZEE-7 | SPLIT BOOM SYSTEM | | | | | | | 300 | | < 5 hp | ≤ 80 | | |
| ZEE-8 | WALK-BEHIND LAWNMOWER | | | | | | | 500 | | < 5 hp | 81-224 | | |
| ZEE-9 | WALK-BEHIND LAWNMOWER | | | | | | | 500 | | < 5 hp | 81-224 | | |
| ZEE-10 | RIDING LAWNMOWER | | | | | | | 1000 | | <25 hp | ≥ 225 | | |

(509-Docket)

Comment: Figure 6: Comparison of professional battery vs combustion product (509-Docket)

**Comparison of professional battery vs. combustion product:**
A typical professional handheld products operating an eight-hour workday such as a typical gasoline driven backpack blower (BR 800) used in fire line clearing or an equivalent battery driven backpack blower (BGA MAX; no comparable product on the market so far, not even from competitors).

**BR 800:**
Power output 3.3 kW; fuel consumption eight-hour workday: 12 liter per 8 hrs or 9 kg per 8 hrs

**BGA MAX:**
Power output 3.3 kW; mechanical energy demand 8 hrs per day: 22.5 kW-hr
electric energy demand 8 hrs per day: 26.4 kW-hr (85 % efficiency) STIHL AR 3000 L battery: 1.52 kW-hr per battery; weight of the battery 9.5 kg
**→ 18 units of AR 3000 L batteries with a total weight of approx. 170 kg per 8 hrs per day (w/o possibility of recharging)**

**CONCLUSION:**
Battery products are not a viable alternative in this case.
Therefore for professional mobile applications (EDP 300 hrs), the high energy density of liquid fuels is essential to operate in e.g. remote areas, during power outage or emergency cases.

(509-Docket)

Comment: The Proposed SORE Amendments as applied to non-handheld products are infeasible and, as confirmed by independent expert analyses, fall well short of any reasonable cost-effective thresholds. CARB has grossly underestimated the costs associated with nearly all aspects of the far-reaching Proposed Amendments, and has materially overestimated their potential benefits. (521-Docket)

Comment: In addition, CARB's technical feasibility demonstrations for non-handheld products engines and equipment are wholly inadequate. As an initial matter, CARB has ignored the actual production timelines for transitioning non-handheld products to ZEE - - a process that takes more than two years per product-line. In that regard, CARB's purported feasibility demonstration is largely non-existent, relying on market research of ZEE availability without an actual evaluation of the wide array of small spark-ignition ("SSI") non-handheld products not yet suitable for a transition to ZEE, or of the actual user performance requirements that must be, but as of yet cannot be, met for those products to compete effectively in the market. CARB also has failed to acknowledge the multiple issues impacting the cost and readiness of battery power for non- handheld SORE. Consequently, unless the infeasible Proposed SORE Amendments are further revised as EMA suggests in these comments, SORE engine and equipment manufacturers will be compelled to exit the California market in 2024, with the result that new lower-emission product will become unavailable in many non-handheld product categories. (521-Docket)

EMA's members have invested substantially in developing both low-emission and ZEE products and, as documented in the survey conducted by the California State University – Fullerton, there has been significant market penetration of ZEE in specific types of residential lawn and garden products, more specifically, residential handheld products and residential walk- behind mowers, power washers, air compressors and small pumps. The same cannot be said for commercial non-handheld products. Accordingly, CARB's adoption of aggressive, almost all- encompassing ZEE mandates for non-handheld and commercial products as well, without first demonstrating the feasibility and availability of comparable ZEE alternatives, and without earmarking the substantial financial incentives that will be required to assist small businesses in the mandated transition, is not implementable, and therefore not a pathway to success. In fact, CARB staff acknowledge that such financial incentive programs will be integral to the feasibility of the Proposed Amendments: "The upfront cost is a significant barrier to transforming the population of lawn and garden equipment in the professional market to ZEE, even with lower total cost of ownership over a product's lifetime." (SRIA p. 11.) (521-Docket)

Comment: Indeed, the fundamental problem with the ISOR is that it ignores the breadth of the SORE market in its analysis. Because the array of products in the SORE segment is so broad, both in terms of what they do and how much they cost, a realistic analysis requires that the SORE market first be divided into handheld and non-handheld categories, and then further sub-divided and evaluated based on whether the products are for residential or for professional/commercial use. The market availability, cost and performance requirements vary substantially among those differing market segments. (521-Docket)

While CARB staff purport to have conducted such a market-segment analysis, a critical review shows that not to be the case. For example, the "Utility Analysis" prepared by Trinity Consultants ("Trinity"), discussed further infra, shows that there is still a wide-ranging absence in the market of comparable ZEE products, with the exception of residential walk-behind mowers, corded pressure washers, and small pumps. Manufacturers' data underscore the same conclusion. CARB staff have simply tried to gloss over the reality of what is and is not available in the SORE ZEE market. That cannot sustain this administrative rulemaking. (521-Docket)

Comment: All of those clearly foreseeable consequences will cause material adverse impacts, including foregone opportunities for additional cost-effective reductions of ROG and $NO_x$ emissions. This is explained in greater detail in the attached independent expert analyses and reports prepared by NERA Economic Consulting ("NERA"), Trinity, and Air Improvement Resources (AIR), copies of which reports are attached and incorporated by reference in these comments. (See discussion, infra.) (521-Docket)

Comment: The Proposed SORE Amendments are cost-prohibitive, infeasible, unenforceable, and invalid. (521-Docket)

Comment: The Proposed SORE Amendments are infeasible because they broadly require new zero emission technology beginning in 2024 that in many cases does not yet even exist, and so cannot be deployed in time, which is directly at odds with California's primary environmental objective to reduce ROG and $NO_x$ emissions as quickly as possible. In addition, CARB has not demonstrated the viability of the assumed zero-emission technology in the wide array of equipment encompassed by the proposed mandatory ZEE transition, especially with respect to non-handheld professional/commercial equipment, a fact admitted in the SRIA. CARB staff concede that ZEE is still a developing technology, however they postulate (without evidence) that there will be near- term advancements over time that will improve power, performance and run-time. Aspirational assumptions, however, are not evidence. And infeasible regulations are invalid. (521-Docket)

Comment: Rather than working with stakeholders to gain a better understanding of the real stakes of this rulemaking, CARB staff have relied on internet market "research" and on a non-qualitative ZEE "Lawn and Garden Product Roadshow" to cherry-pick anecdotal information that supposedly supports a rapid transition to ZEE for all non-handheld equipment. CARB also purports to rely on a survey conducted by the California State University – Fullerton ("CSUF") to identify the key purchase criteria for both residential and commercial users, but then does not actually utilize or apply those criteria in the assessment of the proposed mandated near-term transition to ZEE across- the-board (with the sole near-term exception provided for portable generators). CARB staff make the statement that since ZE technology is already on the market in some cases, there will be "minimal" transition costs for manufacturers. CARB staff completely ignore the cost and time needed to transition current gas-powered product to ZEE even when current battery technology exists. In that regard, the actual timeline that manufacturers need to transition non-handheld products to ZEE is more than two years per product-line. Tellingly, CARB staff gathered no real- world data, and conducted no actual technical testing or data quantification, to support the proposed rapid and wholesale transition to ZEE. (521-Docket)

Comment: In addition, the Proposed Amendments are invalid since they are not supported by reasonable current technical data (including data relating to the proposed CO limit for portable generators (MY2024 – MY2027)), but instead seek to rely on outdated information that was already used to support the 2016 amendments to the evaporative regulations. CARB staff are essentially trying to "double dip" in the use of data from pre-2020 certified product. Moreover, an evaluation of the testing conducted by CARB staff of MY2020 and MY2021 product simply shows that those products meet the evaporative standards, as amended in 2016 (SRIA p. 4) - - not as they would be revised under the Proposed Amendments. Thus, there is no actual current data to support the additional proposed changes to the evaporative standards. The remainder of EMA's comments will provide additional detailed data and analysis in support of each of the foregoing points, and will highlight multiple other unworkable, cost- prohibitive, and infeasible aspects of CARB's Proposed SORE Amendments. In brief, the multiple points establishing the unreasonableness and invalidity of the Proposed SORE Amendments include the following: (521-Docket)

Comment: (iii) CARB has failed to demonstrate the technical feasibility of the proposed 2024 MY transition to ZEE for the wide array of covered non-handheld products, or of the 2028 MY transition to ZEE for portable generators. First, CARB staff admit that they did not even consider ZEE for SORE products outside the residential and commercial lawn and garden market segment. (SRIA p. 10.) CARB staff then attempt to rely on a market analysis that is not even based on the relevant and applicable performance criteria they identified in the CSUF survey as the basis for their determination

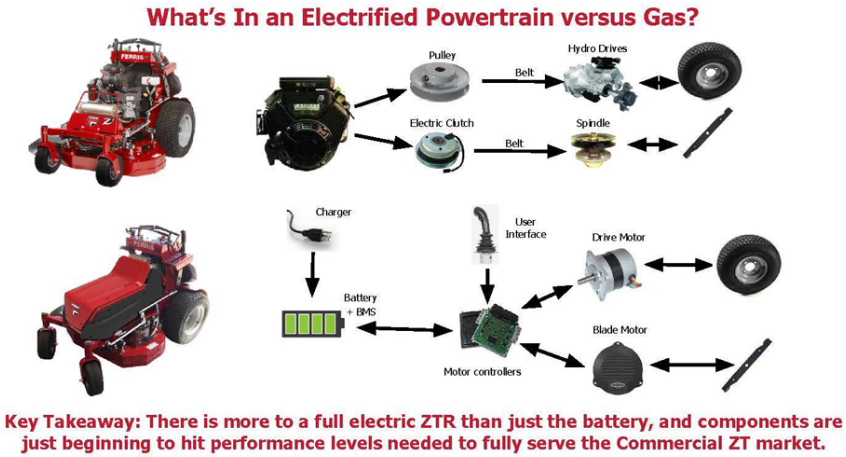
that ZEE is technically feasible. (See ISOR p. ES-7, pp. 13–21.) Staff also point to certain responses from a "ZEE Lawn and Garden Roadshow." But those responses do not provide any quantitative data. (ISOR, ES-11.) Indeed, the Staff Report concedes that "the comparison is not comprehensive and does not demonstrate that SORE equipment and ZEE have identical performance." (p.13). (521-Docket)

CARB staff nonetheless go on to portray the conversion of small spark- ignition products to zero-emission as "simple," since some ZEE technology currently exists for some residential applications. But staff's "analysis" does not account for the need for engine/power-source manufacturers to work with the equipment manufacturers in this non-integrated industry to develop, test and manufacture products utilizing a completely different power source. That is a significant omission from CARB's analysis, since the power-source technology change at issue requires the transition from products that are currently manually-controlled with belts and pulleys, to electronic systems that require completely different components and programing. Consequently, that transition is far from simple, and will take substantially more time than the one full-year of lead time that CARB's Proposed Amendments will provide. Further, staff provide no basis whatsoever for the proposed 2028 ZEE-transition date for portable generators (for which no suitable ZEE power systems currently exist), other than a broad statement that since battery and storage technology is improving, it should be available by then for all portable generators. Wishful thinking alone, however, cannot support a rulemaking of this magnitude. (521-Docket)

Comment: (v) CARB has not sufficiently assessed or validated the proposed modification to the evaporative standards, rather relying on test data gathered between 2015 – 2019 from products certified to the standards in effect prior to the 2016 amendments. (Staff Report p. 31.) All that those data show is that SORE that were certified in MY2020 and MY2021 to the 2016 amended regulations are, as expected, compliant with the current standards. In addition, there is no data justifying the expansion of evaporative emission controls to include diurnal emissions. (521-Docket)

Comment: The Proposed Amendments to the SORE Regulations are not Technologically Feasible CARB's ISOR sets forth CARB's assessment of the technical feasibility of the Proposed SORE Amendments. As detailed below, the rapid ZEE transition that CARB staff is mandating under the Proposed Amendments is infeasible, particularly for the non-handheld market segment, without significant innovation and development in battery and energy storage technology, and fails to provide adequate leadtime for the technology transition from spark-ignition engines to zero- emission battery-power in a non-integrated industry that includes well over a hundred different applications. Transitioning each of those many product applications and platforms will require separate development, design and testing, which means that a wholesale transition of all SORE to ZEE simply cannot be accomplished on the timeline that CARB staff have laid out. (521-Docket)

Transitioning a SSI-powered piece of equipment to ZEE is not a simple process. As depicted below, all elements of the product's powertrain need to be replaced and reconfigured:

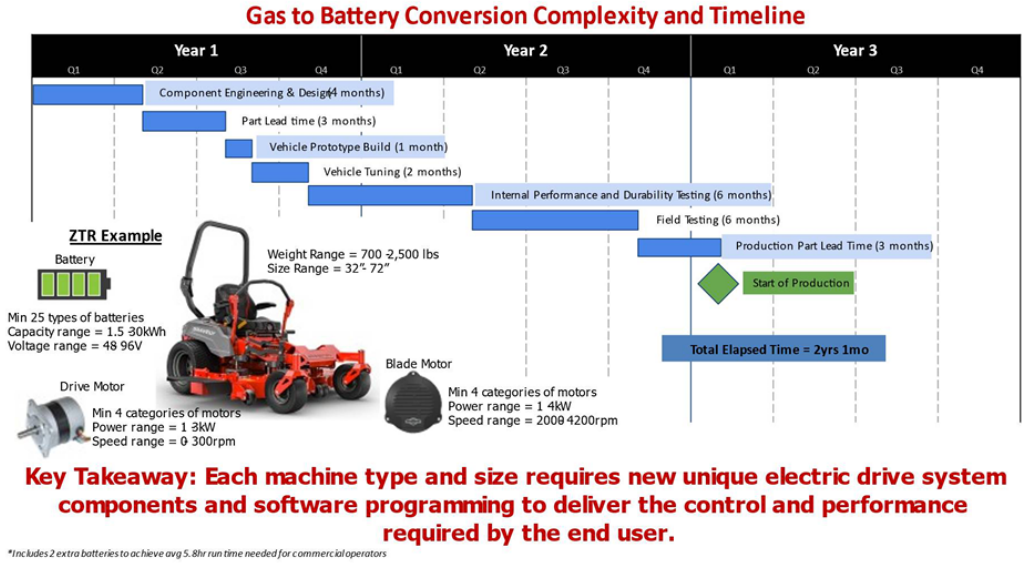



(Exhibit C, p. 1.)

(521-Docket)

In light of the foregoing, the actual timeline for transitioning a particular product line from an SSI-powered model to a ZEE model, while also ensuring that the product continues to perform in accordance with user expectations, is more than two years per product line, as depicted below: (521-Docket)

Figure: Gas to Battery Conversion Complexity and Timeline




(Exhibit C, p. 4.)

(521-Docket)

While a given manufacturer may be able to implement the SSI-to-ZEE transition for more than one product line at a time, a reasonable timeline for converting all of a manufacturers' covered product lines to ZEE is 6-8 years, not the one full model year that CARB proposes to provide. In that regard, CARB has not made any demonstration proving that ZEE are both available and capable of performing equivalently to the SSI engine-powered equipment currently on the market. As previously noted, CARB staff even admitted as much, stating that "the comparison is not comprehensive and

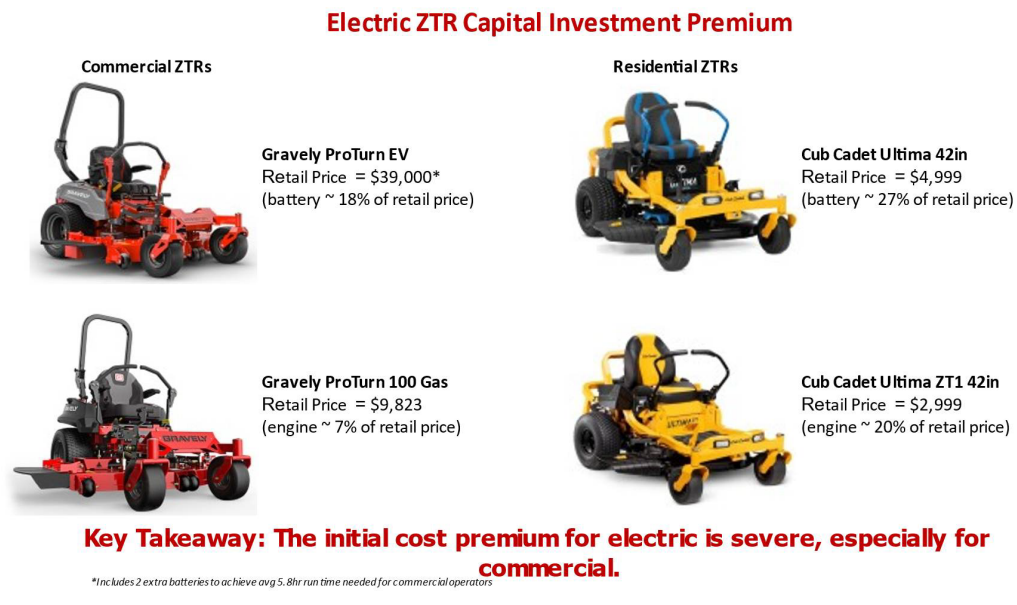
does not demonstrate that SORE equipment and ZEE have identical performance" (Staff Report p. 13). (521-Docket)

The following graphics, taken from pages 2, 5 and 7 of Exhibit "C," illustrate the key operative issues that will need to be overcome - - over the ensuing 6-8 years - - before commercial non-handheld SORE will be able to achieve ZEE penetration rates similar to residential SORE. Those key issues include the facts that commercial SORE require an order-of-magnitude more battery power than residential SORE products, have fundamentally different use cases and operational requirements, and fundamentally different price premiums. (521-Docket)

Figure: How Much Battery Do These Products Need?


(521-Docket)

Comment: Figure: Electric ZTR Capital Investment Premium




(521-Docket)

CARB's feasibility assessment for the Proposed SORE Amendments, in essence, skips over the foregoing key factors, and instead purports to rely on a market review of just nine (9) SORE equipment categories, only four (4) of which are non-handheld products. No actual testing of any

products based on any performance metrics was performed, however, nor were the SSI and ZEE products compared based on the applicable user performance criteria. (See SRIA Baseline Information, pp 11-15.) As further purported support for the alleged feasibility of the Amendments at issue, staff simply point to a CARB-sponsored "ZEE Roadshow," which focused almost exclusively on handheld equipment and walk-behind mowers, and which does not include any quantified data, but rather only anecdotal remarks solicited by CARB staff after the so-called "roadshow." CARB attempts to portray those anecdotal remarks as support for the "wide acceptance" of ZEE product. (521-Docket)

Contrary to CARB's purported "research," there is a broad power spectrum currently filled by SSI-powered products for which there currently is, nor will there be by MY2024, a ZEE alternative that can deliver consistent, reliable, durable performance over the time and under the conditions in which the equipment is typically used. Attached is a list of the wide variety of equipment that currently utilize small spark-ignition engines. That list, and the related schematic of the non-integrated SORE industry distribution system, clearly demonstrate the breadth of the SORE market that CARB seek to convert to ZEE in less than two-years' time. (See Industry Product/Application List, and Distribution System, attached as Exhibit "D.") (521-Docket)

A "Utility Analysis" that Trinity prepared for EMA (a copy of which is attached as "Exhibit E") describes in detail the manner in which CARB's SRIA fails to provide an "apples to apples" comparison between SSI and ZEE SORE. For example, CARB staff state that "ZEE equipment available today have many of the same characteristics as their SORE counterparts. Self- propelled lawn mowers with the same cutting width and adjustable deck heights as many SORE lawn mowers are available as ZEE. Riding mowers with the same cutting width and speed range as many SORE riding mowers are also available as ZEE." (Staff Report ES-7, pp. 13-21) However, those cited "characteristics" are not the actual performance criteria that residential consumers look for based on CARB's own survey data, which actual criteria include cost, power, and time to re- fuel/recharge. Nor are the "characteristics" used by CARB staff to evaluate professional/commercial equipment the performance criteria that professional/commercial consumers actually look for, which are, again based on CARB's own survey data, performance, run-time, and cost. In many cases, a comparable ZEE product (based on the factors which actually motivate purchase decisions) does not currently exist, much less is it available at a reasonable cost. CARB's rebuttal to this fact is simply an aspirational statement that "even though the adoption rates for ZEE among professional landscapers are lower than for residential users, there is substantial evidence that all new small off-road equipment can be zero emission." (Staff Report p. ES-7). But CARB presents no such "substantial evidence" in the ISOR for this rulemaking because there is none. (521-Docket)

Comment: CARB's feasibility assessment also fails to account adequately for the upfront costs of acquiring ZEE (which are substantial as depicted above), and again fail to apply the actual performance criteria to identify comparable equipment. For an example of the "analysis" provided by CARB staff, one can review the discussion regarding professional pressure washers. CARB's discussion of power washers (see SRIA, at pp 44-45) completely dismisses the relevant performance-criteria differences between ZEE and SORE-powered power washers, and simply assumes that residential and professional products are interchangeable. CARB's analysis then goes on to make broad conjectures about what professional users will do in the absence of SSI-powered products – when only corded power washers powered by portable generators are available – and then concludes that over time professional users simply will choose not to own those ZEE powerwashers, but will choose to rent them instead, so there will be a reduction in the aggregate purchase costs for this equipment population. (521-Docket)

CARB's conjecture fails to account for the underlying basic infeasibility of transitioning residential power washers to ZEE due to the price and non-availability of corded low-pressure/low- flow ZEE pressure washers. Indeed, CARB's baseless conjecture about power washers is belied by CARB's own conclusions regarding the market's likely inability to accommodate residential ZEE snow-throwers due to the same type of product limitations that apply to pressure washers. (See SRIA, p. 43.) The Proposed Amendments also fail to account for what is acknowledged in the SRIA – that there are simply no battery-electric power washers currently in the market - a gap in the market similar to that in the portable generator market, which CARB acknowledged and provided for by including interim standards and additional lead time for the transition of portable generators to ZEE. (521-Docket)

All of those shortcomings between what commercial ZEE can do currently and what the users of commercial non-handheld products need those products to do – what amounts to a fundamental "utility" gap – are fully detailed in the Trinity "Utility Analysis." (See Exhibit "E.") CARB's "analyses" do nothing to account for or bridge that gap. (521-Docket)

In the absence of data, CARB staff simply jump to the conclusion that because battery technology exists for some specific products, manufacturers will be able to flip a switch and "just- like-that" convert all spark-ignition powertrain engines and the equipment they power into battery- powered products - - two completely different powertrain technologies, as depicted previously - - and will be able to complete that transition in less than 2 years. But as shown above in the graphic that compares the different powertrain componentry at issue, that is not even remotely feasible. It is even more infeasible under the current COVID-impacted market conditions, which include widespread component-part shortages, and significant global supply-chain disruptions. (521-Docket)

CARB staff also significantly underestimate both the initial cost of acquisition and the total cost of ownership ("TCO") of ZEE. By way of example, and as discussed more fully in the OPEI Comments on the Proposed Amendments, CARB staff's assessments of TCO significantly underestimate the cost and number of batteries required, the number of chargers required, and the number of replacement batteries required given the equipment useful life at issue - - e.g., 300-500 cycles/charges over a 6-year useful life for a walk-behind mower; and 650 cycles/charges over a 6-year useful life for a riding mower. CARB's failure to account for those issues in a reasonable manner is significant, since batteries can be the most expensive components of ZEE. In addition, professional users may need to install an extra 100-amp circuit to support the required recharging, and there may be additional handling and storage requirements given the fire hazards of lithium ion batteries and the number of batteries used. (521-Docket)

Comment: Those additional costs all increase the TCO calculus and negatively impact the already lengthy payback periods for non-handheld ZEE product. (SRIA pp. 66–68.) OPEI's analysis using the CSUF data shows the upfront costs of acquisition to be approximately twice that of the CARB estimate, and three times more than CARB's estimated operational costs. (521-Docket)

Comment: CARB also asserts that ZEE generally will have a longer lifetime than equipment powered by small spark-ignition engines. But that is based on a review of limited warranty periods for select products, which again fails as an "apples to apples" comparison, since it mixes product and component warranties and, fails to utilize publicly available data showing that (as noted above) battery life is typically 300–500 cycles (charges) for the types of batteries used in small products like walk behind mowers, and 650 cycles (charges) for batteries used in larger products like riding mowers. (521-Docket)

Comment: Moreover, no data support CARB's claim that ZEE batteries can be used in several products within a manufacturer's family, off-setting cost/additional purchases. That may be true for certain *residential* users, but it completely overlooks the fact that business and professional users will likely use multiple pieces of equipment at the same time, so a battery would still be needed for each unit. That claim also overstates the interchangeability of batteries in ZEE products. Generally, interchangeability is limited to a single piece of equipment from a manufacturer's "family" of products, and in some applications, such as riding mowers, the equipment must be plugged into an outlet like an electric car in order to be re-charged. CARB also cites no data in support of its suppositions that ZEE maintenance is less intensive and required less frequently, and that ZEE are more durable and need less backup equipment and spare parts. (521-Docket)

Comment: CARB asserts that small businesses will benefit from an assumed increase in the durability and useful life of ZEE, including for portable generators. But professional/commercial products are already certified to 500/1000 hours, so the increased durability claim by CARB staff is dubious at best. (521-Docket)

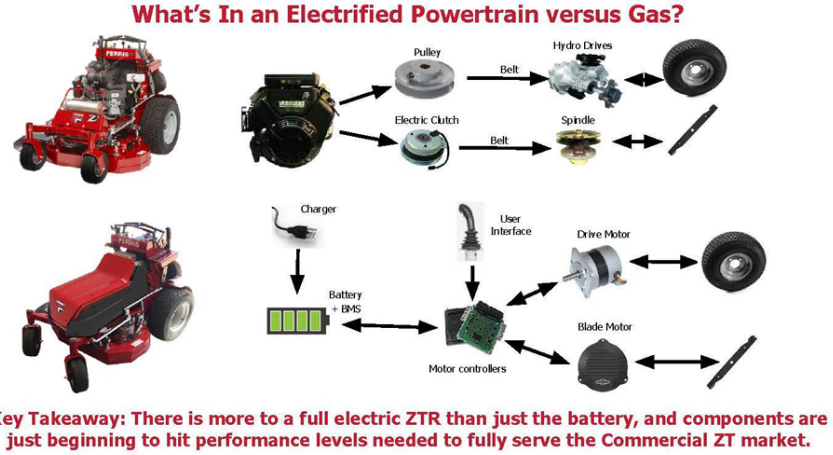
CARB attempts to buttress its fundamentally unreasonable cost assessment by claiming that ZEE purchasers would "experience savings" resulting from longer life and fewer repairs. As noted, those TCO assumptions are not supported by representative data, but rather reflect CARB staff's cherry-picking market data such as warranty periods for select products and components, and then extrapolating that product-specific information to a wide array of products across residential and commercial products and product categories. CARB's assertions are, therefore, incorrect and completely undercut by CARB's failure to compare "apples to apples." (Id.) (See Trinity "Utility Analysis," Exhibit "E.") (521-Docket)

On the benefits side of the cost-benefit calculus, CARB's postulated health benefits analysis relies on an EPA quantification of the health risks associated with exposures to PM – the same quantification methodology that CARB has attempted to use as support for CARB's ACT and Low Carbon Fuel Standards. The economic value associated with reduced premature mortality is the principal monetized benefit of the Proposed Amendments. The first step in assessing those aggregate benefits is estimating the total tons of ROG and $NO_x$ (and secondary PM2.5) that will be reduced due to the proposed regulations. As discussed above, however, CARB's estimates in that regard are incorrect due to the significant overestimation of emissions reductions from the Proposed Amendments. That has resulted in a similar significant overstatement of the putative public health benefits. (521-Docket)

Comment: Another unreasonable aspect of CARB's cost-benefit assessment methodology is that it relies on emissions-component failure rates associated with components certified to the evaporative regulations that were revised in 2016 and implemented in MY2020, and on CSUF survey data related to engine maintenance, and then "extrapolates those rates" in the emissions inventory to justify additional evaporative emission reductions. (521-Docket)

Comment: Conclusions
CARB's Proposed Amendments to the SORE Regulations are cost-prohibitive, infeasible, unenforceable and invalid. (521-Docket)

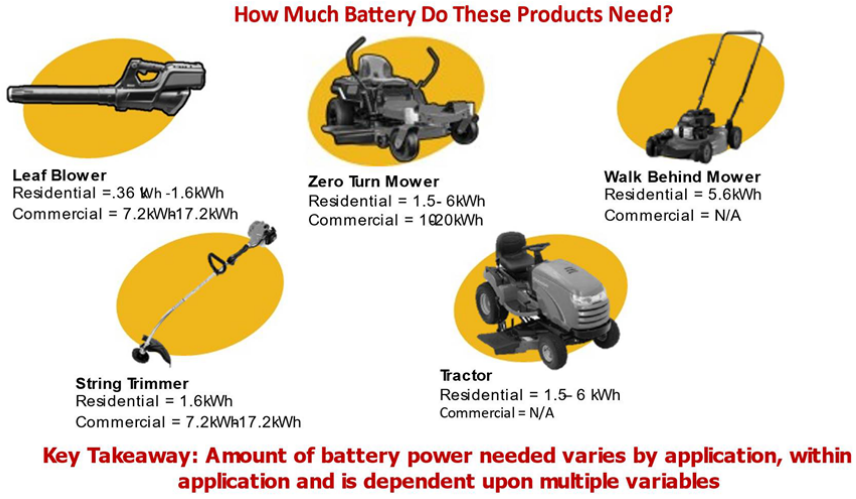
Comment: Exhibit C – Slides
Figure: What's In an Electrified Powertrain versus Gas? (521-ExhC-Docket)




(Exhibit C, p. 1.)

Key Takeaway: There is more to a full electric ZTR than just the battery, and components are just beginning to hit performance levels needed to fully serve the Commercial ZT market. (521-ExhC-Docket)

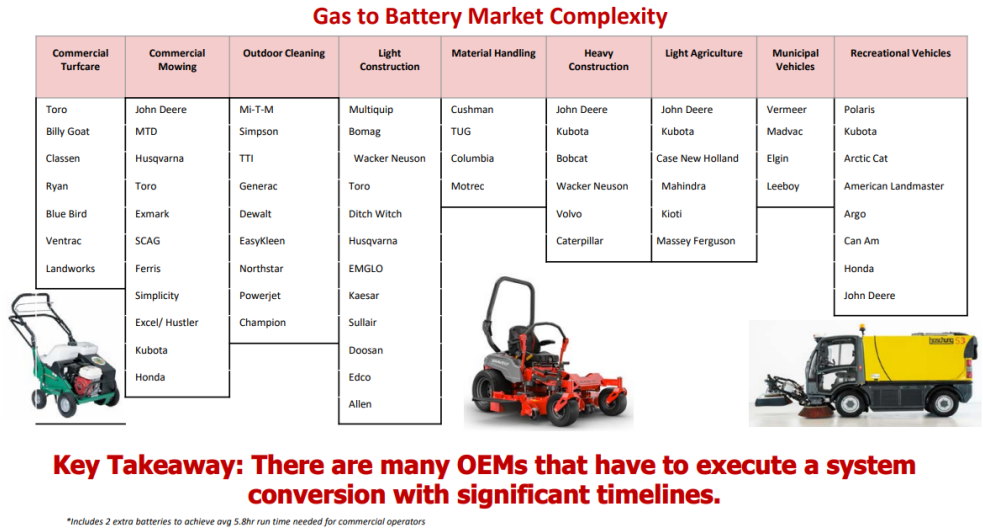
Figure: How Much Battery Do These Products Need?




(521-ExhC-Docket)

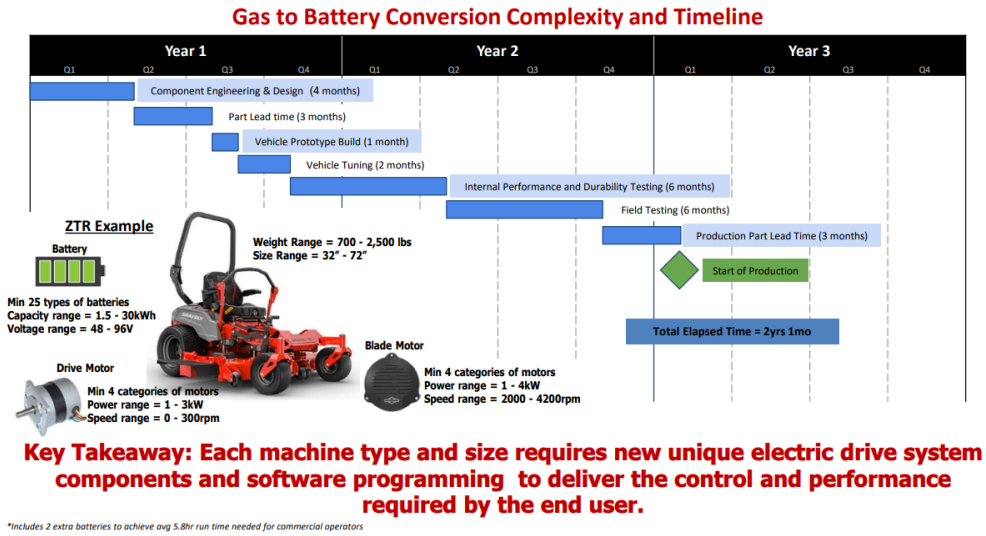
Key Takeaway: Amount of battery power needed varies by application, within application and is dependent upon multiple variables (521-ExhC-Docket)

Figure: Gas to Battery Market Complexity (521-ExhC-Docket)




Key Takeaway: There are many OEMs that have to execute a system conversion with significant timelines. (521-ExhC-Docket)

Figure: Gas to Battery Conversion Complexity and Timeline (521-ExhC-Docket)




Key Takeaway: Each machine type and size requires new unique electric drive system components and software programming to deliver the control and performance required by the end user. (521-ExhC-Docket)

Figure: Residential and Commercial Use Cases (521-ExhC-Docket)

**Residential and Commercial Use Cases**

| | Residential | Commercial | Residential | Commercial | Residential | Commercial |
|---|---|---|---|---|---|---|
| Frequency of Usage | 2 Xs per month | Daily | 1 X per week | Daily | 1 X per week | Daily |
| Length of Usage / Use | 20 min. | 4 hours | 48 min. | 4.2 hours | 54 min. | 5.8 hours |
| Replacement Cycle | ~5 years | ~6 months | ~7 years | ~1 year | ~10 years | ~3 years |

**Key Takeaway: Residential users operate equipment on a less frequent basis than commercial, which means longer replacement cycles and more available time to charge batteries compared to those operating equipment on a daily basis.**

*Sources: OPEI, 2020 Study of Commercial Lawn Mowers and Grounds Maintenance Equipment, Irwin Broh Battery Equipment Usage by Landscapers, Handheld Market Profile of Commercial Users, Power Pulse/CMT, Backyard Buzz, Infohub EFI Data*

Key Takeaway: Residential users operate equipment on a less frequent basis than commercial, which means longer replacement cycles and more available time to charge batteries compared to those operating equipment on a daily basis. (521-ExhC-Docket)

Figure: Market Share and Adoption Trends (521-ExhC-Docket)

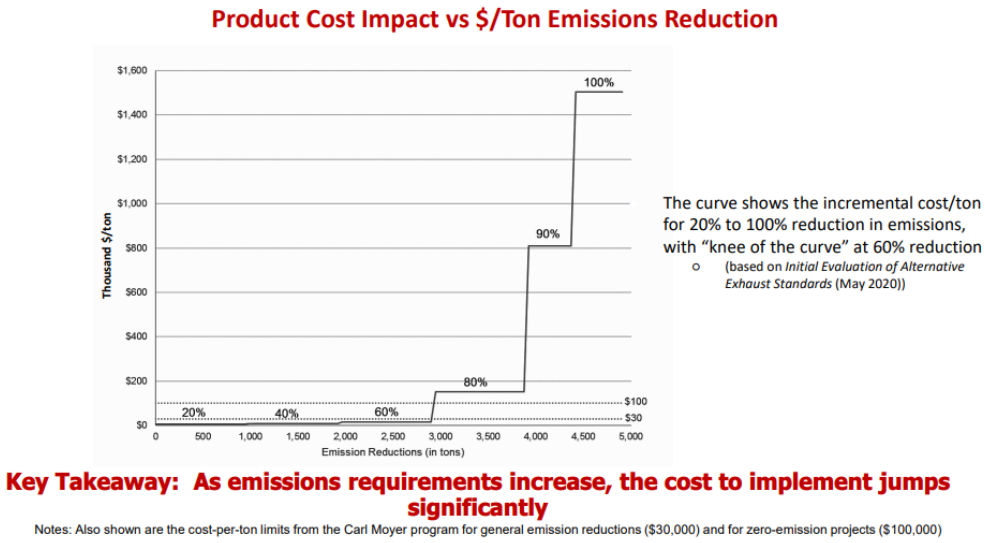
**Market Share and Adoption Trends**

| % Share Battery-Electric: | | | | | |
|---|---|---|---|---|---|
| Today | 80% | 67% | 36% | 4% | 3% |
| 5 Years Ago | 73% | 58% | 9% | 0% | 0% |
| 10 Years Ago | 65% | 54% | 6% | 0% | 0% |

Figure: Electric ZTR Capital Investment Premium (521-ExhC-Docket)

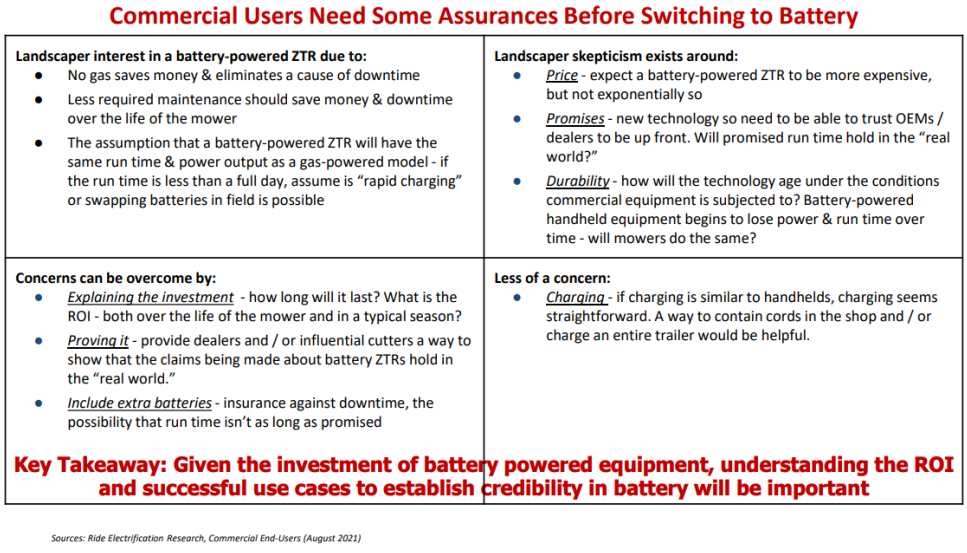

Key Takeaway: The initial cost premium for electric is severe, especially for commercial. (521-ExhC-Docket)

Figure: Product Cost Impact vs $/Ton Emissions Reduction (521-ExhC-Docket)




Key Takeaway: As emissions requirements increase, the cost to implement jumps significantly (521-ExhC-Docket)

Figure: Commercial Users Need Some Assurances Before Switching to Battery




(521-ExhC-Docket)

Key Takeaway: Given the investment of battery powered equipment, understanding the ROI and successful use cases to establish credibility in battery will be important (521-ExhC-Docket)

Comment: This is not the first time regulatory ambition for the adoption of zero emissions equipment collided with the reality of the technology available in the market. CARB first promulgated zero emission vehicle ("ZEV") requirements in 1990 regulations. See 13 CCR § 1960.1. However, we are now more than 30 years later, and battery powered vehicles are only beginning to gain significant market share. This has necessitated numerous amendments to the ZEV regulations as CARB's ZEV regulatory goals were misaligned with the reality of technology in the market. The proposed Transition to Zero Emissions amendments are another example of CARB's ambitions extending past the current technological landscape. (528-Docket)

Comment: Replacement electric-powered applications for certain gasoline-powered SORE applications simply do not exist at this time. If a commercial landscaper's zero turn radius mower (ZTR) were to irreparably fail in early 2024, after the proposed amendments are promulgated, there would be no sufficient electric replacement available. Even if a reasonably comparable electric ZTR were to come to market by 2024, the electric ZTR would likely be so much more expensive than the gasoline-powered SORE application that this replacement would present a great financial strain on the business, even relative to the already significant investment in new machinery. At that point, the only two options for the landscaper would be either to reduce the size of her business, cutting jobs in California, or to purchase a ZTR from out of state and bring it into California. The out of state ZTR brought into California would not be subject to any CARB requirements and would actually result in greater emissions in California than had the landscaper been able to replace its ZTR with a CARB-certified gasoline-powered ZTR, which would have been certified to lower emissions requirements than an out of state ZTR otherwise would. (528-Docket)

Comment: My name is Jeff Coad and I am the Vice President of Marketing and Product Management Briggs & Stratton. At Briggs & Stratton our stated position is that we are power agnostic, as today and in the future, we will market and sell both internal combustion engines and battery powered to our OEMs. The purpose of my comments today are to help the Board understand several challenges that a short timeline to zero emissions poses for the market, both manufacturers and small business owners. First, from a product development perspective, converting a product such as a large zero-turn mower from gas to lithium battery powered is not just a matter of replacing the engine with a

battery. The development time for each machine to convert from gas powered to an electrified drivetrain can take two years for each OEM for each product. Each conversion requires a significant amount of human and financial investment. There are upwards of 20 manufacturers in the commercial turf mowing and turf care product categories alone, who would have to convert their product lines by 2024, which is not practical even on expedited timelines. (3003-Oral Testimony)

**Agency Response:**

These comments include expressions of the commenters' opinions and concerns regarding CARB's determination of technological feasibility, cost-effectiveness, enforceability, and validity of the Proposed Amendments. CARB made no change based on these comments. Many of the above comments address the same issues discussed in the Agency Response in section IV.A.35.1. Please refer to the Agency Response in section IV.A.35.1 for additional discussion of the issues presented in these comments.

Several commenters quote, misquote, or imply they are quoting the ISOR by using quotation marks around certain words or phrases in their comments; the commenters state their assessments of text in the ISOR and state opinions or beliefs regarding the text and conclusions in the ISOR. Often, these comments amount to subjective statements without evidence or other support. They suggest displeasure with the Proposed Amendments and the technological feasibility assessment in the ISOR, and they complement other statements from the commenters that express general opposition to the Proposed Amendments. These comments do not demonstrate that the technological feasibility assessment in the ISOR is insufficient or inappropriate.

In response to the statement, "No Feasibility Study has been conducted to objectively assess the limits of application of professional battery products," and similar statements: CARB disagrees with the commenter's conclusion. Chapter I.E of the ISOR discusses technological feasibility of the Proposed Amendments and compares characteristics of SORE equipment and ZEE. CARB disagrees with the commenters' characterizations of and conclusions regarding a CARB test plan for exhaust emission testing of SORE and testing of ZEE. Testing of ZEE according to the test plan would determine the ability of ZEE to meet the requirements of the ZEE emission reduction credit program in section 2408.1 of the exhaust emission regulations. Information that would be provided by such testing has been provided by manufacturer certification testing of ZEE. Several equipment types and models have been certified to earn ZEE credits. Additional information regarding the technological feasibility of emission standards of zero has been obtained from other sources and is discussed in the ISOR. Much of the testing in the test plan was conducted and provided CARB with useful information during the development of the Proposed Amendments. However, manufacturer certification data comprised a larger data set. As discussed on page 165 of the ISOR, the proposed emission standards for generator engines for MYs 2024 through 2027 are based on engines already certified for sale or lease for use in California. As discussed in Chapter X.E of the ISOR, in October 2018 CARB began the ZEE Roadshow that showcases professional-grade, battery-powered landscaping equipment from eight manufacturers. The response has been overwhelmingly positive, with nearly all crews finding at least one ZEE type that they preferred over SORE equipment.

In response to the statement, “Current battery technology (state of the art: 100 up to 170 W-hr/kg for a whole battery package) with an optimistic energy density up to 280 W-hr/kg in the next 8 to 10 years cannot compete with liquid fuel (11,600 W-hr/kg) with more than 40 times higher energy density,”: A comparison of the energy density of batteries and liquid

fuel does not demonstrate an ability of ZEE to perform work that SORE equipment perform. SORE are thermodynamically inefficient as only a small portion of the energy contained in liquid fuel is used to perform work. In contrast, ZEE are able to use the majority of the energy stored in batteries to perform work. Another important consideration is the amount of torque produced by the power source for equipment. ZEE with equivalent power to SORE equipment generally have greater torque than the SORE equipment. Therefore, ZEE may not need to have the same power rating as SORE equipment to be able to perform the same work.

In response to the statement, "For professional use, in remote areas, under extreme climate conditions and for high power/energy applications, internal combustion engines will still be needed in the future (see comparison of professional battery vs combustion product in Figure 6),": The Proposed Amendments do not require anyone to stop using SORE equipment. The availability of preempt equipment will not be affected by the Proposed Amendments. Section 2403(f) of the exhaust emission regulations provides that "fire and police departments, and other entities that specialize in emergency response may purchase emergency equipment powered by a non-California certified engine only when such equipment with a California-certified engine is not available." The Proposed Amendments would not impact this existing provision.

In response to the statement, "The Proposed SORE Amendments as applied to non-handheld products are infeasible and, as confirmed by independent expert analyses, fall well short of any reasonable cost-effective thresholds. CARB has grossly underestimated the costs associated with nearly all aspects of the far-reaching Proposed Amendments, and has materially overestimated their potential benefits,": EMA's comments regarding the feasibility of the Proposed Amendments are discussed in this Agency Response and in the Agency Response in section IV.A.2.6.2. of this FSOR. Cost-effectiveness can be measured in a myriad of different ways. As described in CARB's economic analysis in Chapters VII and VIII of the ISOR and in the SRIA, the metric used to quantify cost-effectiveness of the Proposed Amendments and alternatives was the ratio of total monetized benefits divided by total monetized costs. A comparison of this type is an appropriate cost-effectiveness measure if the harm associated with increased emissions is fully captured in the estimates of monetized health impacts. For the Proposed Amendments, the benefit-cost ratio is 1.26, meaning benefits are greater than costs during the regulatory horizon. Of the alternatives considered by CARB, the Proposed Amendments had the highest benefit-cost ratio while being technologically feasible. Analysis by EMA's contractors, in Exhibits A, B, D, and E of EMA's comments, and EMA's comments on costs and benefits of the Proposed Amendments, are discussed in this Agency Response and in sections IV.A.2.6.2 and IV.A.14.

In response to the statement, "CARB's estimates in that regard are incorrect due to the significant overestimation of emissions reductions from the Proposed Amendments. That has resulted in a similar significant overstatement of the putative public health benefits": Health benefits of the Proposed Amendments are discussed in ISOR section IV.D. CARB disagrees with EMA's assessment of the SORE2020 emissions inventory and EMA's statement that public health benefits of the Proposed Amendments are overestimated. Please refer to the Agency Response in section IV.A.14 for discussion of comments regarding SORE2020 and the SORE emissions inventory.

In response to the statement, "Another unreasonable aspect of CARB's cost-benefit assessment methodology is that it relies on emissions-component failure rates associated with components certified to the evaporative regulations that were revised in 2016 and implemented in MY2020, and on CSUF survey data related to engine maintenance, and then

"extrapolates those rates" in the emissions inventory to justify additional evaporative emission reductions": This comment presents a criticism of CARB's analyses. Please refer to the Agency Response in section IV.A.14.2 for discussion of the 2016 amendments to the evaporative emission regulations. CARB staff referred to the CSUF survey data on engine maintenance in the SORE2020 report to address malmaintenance of equipment [CARB, 2020[161]]. Those data were not extrapolated for use in model calculations.

Exhibit C in EMA's comments does not request a change to the Proposed Amendments. It includes the commenter's assessments of powertrain components in SORE equipment and ZEE, energy needs for various types of residential and commercial equipment, equipment manufacturers categorized by market segment, a timeline for development of ZEE, residential and commercial use cases for various equipment types, ZEE market share and adoption trends for various equipment types, a price comparison for commercial and residential SORE and ZEE zero-turn radius mowers, product cost impact for various percent reductions in emissions, and considerations regarding a transition to ZEE among landscapers, including operational savings, prices, durability, and charging. The "Product Cost Impact vs $/Ton Emissions Reduction" figure has a note that says "The curve shows the incremental cost/ton for 20% to 100% reduction in emissions, with "knee of the curve" at 60% reduction (based on Initial Evaluation of Alternative Exhaust Standards (May 2020))." EMA did not include the reference "Initial Evaluation of Alternative Exhaust Standards (May 2020)," nor was CARB able to locate it. EMA does not explain its analysis for the data in the figure. The figure shows higher cost per ton of emission reductions as emission reductions increase.

In response to the statement, "The Proposed SORE Amendments are infeasible because they broadly require new zero emission technology beginning in 2024 that in many cases does not yet even exist," and similar statements: CARB disagrees with these statements. The Proposed Amendments set emission standards of zero, which can be met through the use of emission reduction credits. The Proposed Amendments do not prohibit the sale of CARB-certified engines in 2024 or at any date. Chapter I.E discusses the availability and technological feasibility of ZEE. The commenters do not provide evidence that the Proposed Amendments require the use of technology beginning in 2024 that does not exist. Technologies used by ZEE, including electric motors, batteries, battery management systems, and other electronics, are prevalent and are used in small off-road equipment as well as equipment that are comparable to SORE equipment, as discussed in the ISOR. The commenters do not specify which equipment types that use engines subject to the SORE regulations for which they believe CARB has not demonstrated viability. The ISOR describes the need for the zero-emission generator market to develop further to increase availability and energy storage and decrease the cost of zero-emission generators (e.g., page 160). Such market development does not necessarily require the development of new technology but could involve decreases in production cost as demand increases.

In response to the statement, "Rather than working with stakeholders to gain a better understanding of the real stakes of this rulemaking, CARB staff have relied on internet market "research" and on a non-qualitative ZEE "Lawn and Garden Product Roadshow" to cherry-pick anecdotal information that supposedly supports a rapid transition to ZEE for all non-handheld equipment,": This comment expresses an opinion about CARB's technological feasibility

[161] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

assessment of ZEE. CARB disagrees with the commenter's assessment regarding data in the ISOR. The claim that data were cherry-picked is factually incorrect. As described on page 13 of the ISOR, CARB's analysis of residential equipment focused on bestselling SORE equipment models for each equipment type, using data from major home improvement retailers regarding median price and popularity. As described on page 15 of the ISOR, professional SORE equipment and ZEE that are similar in functionality were selected for performance analysis.

The commenters state opinions regarding the ZEE Roadshow and feedback from participants but do not demonstrate CARB's description of feedback from the Roadshow was inaccurate. As described on page ES-11 of the ISOR, the response to the ZEE Roadshow has been overwhelmingly positive, with nearly all crews finding at least one ZEE type that they preferred over SORE equipment. Participants' continued use of SORE equipment does not indicate ZEE is not technologically feasible.

In response to the statement, "CARB also purports to rely on a survey conducted by the California State University – Fullerton ("CSUF") to identify the key purchase criteria for both residential and commercial users, but then does not actually utilize or apply those criteria in the assessment of the proposed mandated near-term transition to ZEE across- the-board (with the sole near-term exception provided for portable generators)," and similar statements: CARB disagrees with the commenters' characterizations of CARB's use of survey data and the commenters' conclusions. The following text appears on page 22 of the ISOR: "The CSUF survey asked participating landscapers what qualities of the equipment were most important to them, to better understand landscapers' rate of adoption of ZEE. Performance, run-time, and cost were the top three responses." Performance, runtime, and cost are all discussed in the ISOR (e.g., Chapter I.E and Chapter VII.A.2.).

In response to comments related to production timelines or the time for manufacturers to transition or convert SORE equipment to ZEE: The Proposed Amendments do not require manufacturers to convert existing models of SORE equipment to ZEE. CARB's technological feasibility determination was based in part on the existence and cost of ZEE for many types of small off-road equipment. Section I.E.2.ii includes examples of zero-emission zero turn-radius riding mowers from Gravely and Mean Green. Manufacturers may choose to convert existing models from SORE to ZEE or may introduce new models of ZEE. Manufacturers' decisions to convert models to ZEE are beyond the scope of the Proposed Amendments and do not impact the technological feasibility of the Proposed Amendments. EMA does not present any evidence substantiating the claim that manufacturers will leave the California market or that equipment will become unavailable in 2024.

Exhibit D in EMA's comments does not request a change to the Proposed Amendments. It includes the commenter's assessments of a small spark-ignition engines industry distribution system and the equipment types that use small spark-ignition engines. Small spark-ignition engines are sometimes subject to the SORE regulations. Other small spark-ignition engines are preempt and not subject to the SORE regulations or are subject to other CARB regulations. In response to the statement, "Contrary to CARB's purported "research," there is a broad power spectrum currently filled by SSI-powered products for which there currently is, nor will there be by MY2024, a ZEE alternative that can deliver consistent, reliable, durable performance over the time and under the conditions in which the equipment is typically used. Attached is a list of the wide variety of equipment that currently utilize small spark-ignition engines. That list, and the related schematic of the non-integrated SORE industry distribution system, clearly demonstrate the breadth of the SORE market that CARB seek to convert to

ZEE in less than two-years' time. (See Industry Product/Application List, and Distribution System, attached as Exhibit "D.")": The commenter does not state which of the equipment types in its list use engines the commenter believes are subject to the SORE regulations and which are not available as ZEE. Many of the equipment types in the list, such as compressors, concrete saws, and concrete vibrators, are preempt. Several other equipment types, such as all-terrain vehicles, licensed on-road vehicles, and snowmobiles, do not use engines subject to the SORE regulations. Some equipment types, such as "electric furnace" and "US Government," do not appear to be powered by engines. CARB does not have information to suggest equipment types that use engines subject to the SORE regulations cannot use zero-emission power sources.

In response to the statement, "Indeed, the fundamental problem with the ISOR is that it ignores the breadth of the SORE market in its analysis. Because the array of products in the SORE segment is so broad, both in terms of what they do and how much they cost, a realistic analysis requires that the SORE market first be divided into handheld and non-handheld categories, and then further sub-divided and evaluated based on whether the products are for residential or for professional/commercial use. The market availability, cost and performance requirements vary substantially among those differing market segments," and similar statements: These statements are expressions of the commenters' opinions and are not supported by evidence. The displacement categories used in setting emission standards do result in the division of the SORE market into handheld and nonhandheld categories, consistent with the commenters' requests. This has been the case since the first emission standards were adopted by CARB for SORE in 1990. CARB's economic analysis considers equipment for residential users and professional users separately, also consistent with the commenters' requests. The commenters do not demonstrate that CARB's analyses are insufficient or inappropriate, as further discussed in this Agency Response and others in this section IV.A.35.

Exhibit E in EMA's comments does not request a change to the Proposed Amendments. It is a report titled, "Updated SORE Utility Analysis for SRIA Comments," from Amy Gelsinger, Senior Consultant, Trinity Consultants to Patty Hanz, EMA, dated November 23, 2021. The report discusses the commenter's comparisons of nonhandheld SORE equipment and ZEE, including lawn mowers, riding tractors, zero-turn radius riding mowers, pressure washers, portable generators, and pumps. The report provides price comparisons, energy consumption, annual hours of use, and energy costs for residential and professional SORE equipment and ZEE. The report discusses residential and professional use of equipment, using data from the CSUF survey and analysis from Air Improvement Resource.

Trinity makes comparisons of residential and professional SORE and ZEE mower power and states, "As the graph shows, ZEE mowers' peak power does not meet the SORE mowers average power output." Trinity's comparison does not demonstrate that the ZEE mower cannot perform the same work the SORE mower can perform. Another important consideration is the amount of torque produced by the power source for equipment. ZEE with equivalent power to SORE equipment generally have greater torque than the SORE equipment. Therefore, ZEE may not need to have the same power rating as SORE equipment to be able to perform the same work. The report includes notes and observations about lawn mowers, some of which may be criticisms of the SRIA or the ISOR but do not demonstrate CARB's analyses were insufficient or inappropriate. The report contains similar comparisons for residential lawn tractors and professional zero-turn radius riding mowers, with similar statements about Trinity's assessment of power.

Trinity makes comparisons of pressure, flow, and power for residential SORE and ZEE pressure washers and again states, "ZEE pressure washers' peak power does not meet the SORE pressure washers' average power output." The report contains a similar comparison for professional pressure washers. Trinity discusses SORE and zero-emission generators, including the power of SORE generators and energy storage of zero-emission generators, and includes notes and observations about generators. As described in sections II.A.1.e and II.A.2.d of this FSOR, in response to stakeholder comments about technological feasibility specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers typically used by professional cleaning services, maintenance companies, other businesses to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for pressure washers using engines with displacement of 225 cc or larger that are the same as those proposed for generators and setting emission standards of zero for MY 2028 and later for these pressure washers.

The report includes a comparison of residential and professional SORE and ZEE pumps and states, "As the graph shows, ZEE pumps' peak power does not meet the SORE pumps average power output."

In response to the statement, "While the availability and capability of ZEE lawn and garden equipment has improved, even over the last year, it still does not meet the performance of SORE equipment, particularly for professional users,": This statement appears to be based on the commenter's assessment of equipment power, which does not provide a suitable comparison of SORE equipment and ZEE on its own. The commenter does not demonstrate CARB's assessment was insufficient or inappropriate.

A section of the report titled, "SRIA Claims" includes the commenter's impressions and assessments of the SRIA. Subsections including "ZEE is More Durable than SORE Equipment," "ZEE Batteries Outlive ZEE," "ZEE Batteries are Interchangeable," "Snow Blower Usage," "Pressure Washer Usage," "Generator Usage," contain expressions of doubt and opinions regarding text in the SRIA and ISOR. Trinity discusses the possibility of ZEE being more durable than SORE equipment, batteries lasting longer than ZEE do, the ability of equipment owners to swap batteries between different handheld and nonhandheld equipment types, use of snow blowers, use of pressure washers, and use of generators, including for backup power. These subsections provide commentary on the SRIA and various equipment types, including Trinity's opinions and suppositions.

The final section of the report, titled, "Appendix A" contains tables similar to those in section G of the SRIA, listing equipment Trinity included in its analysis. Some of the equipment, such as the Dewalt DXGMW33382R lawn mower, Cub Cadet ULTIMA ZT2-60 riding mower, and Simpson 95004 pressure washer, appear to not use CARB-certified engines and are not available in California.

In response to the statement, "A "Utility Analysis" that Trinity prepared for EMA (a copy of which is attached as "Exhibit E") describes in detail the manner in which CARB's SRIA fails to provide an "apples to apples" comparison between SSI and ZEE SORE,": Trinity's analysis does not demonstrate that the economic analysis in the SRIA and the ISOR is insufficient or inappropriate, as discussed in this Agency Response.

In response to the statement, "Indeed, CARB's baseless conjecture about power washers is belied by CARB's own conclusions regarding the market's likely inability to accommodate residential ZEE snow-throwers due to the same type of product limitations that apply to

pressure washers. (See SRIA, p. 43.)": CARB disagrees with the commenter's conclusions. The following sentence appears on page 66 of the SRIA: "It is likely that a typical professional user of a pressure washer would have a more economically favorable outcome if they were to rent a pressure washer when needed as opposed to purchasing one." That statement in the SRIA does not amount to an assumption that professional users will rent pressure washers. CARB makes no connection between the statement about pressure washers and a transition of snow blowers to ZEE. CARB does not state that the market is likely to be unable to accommodate residential ZEE snow blowers. Rather, the economic analysis assumes snow blowers will transition to ZEE for economic reasons.

In response to the statement, "CARB asserts that small businesses will benefit from an assumed increase in the durability and useful life of ZEE, including for portable generators. But professional/commercial products are already certified to 500/1000 hours, so the increased durability claim by CARB staff is dubious at best": This comment includes expressions of the commenter's opinions regarding zero-emission generators. The comment does not request a change to the Proposed Amendments. CARB made no change based on this comment. The commenter does not provide specific information about the assertion it believes CARB made regarding benefits to small businesses. It is true that some SORE are certified to emissions durability periods of 500 or 1,000 hours. As described on pages 40-43 of the ISOR, the Proposed Amendments require all engine families to meet the longest emissions durability periods of the current options for each displacement category. Therefore, some engines purchased by small businesses may have a longer emissions durability period under the Proposed Amendments than engines produced currently. As described in Chapter VII of the ISOR, maintenance costs are expected to be lower for ZEE than for SORE equipment. As described on pages 201-206 of the ISOR, the durability period for zero-emission generators certified to earn credits is 500 hours to incentivize manufacturers to develop zero-emission generators that address the public's need for reliable power supply.

Comments related to charging infrastructure and electrical service address the same concerns as other comments submitted by these commenters and others. Please refer to the Agency Response in section IV.A.6.1 for discussion of those comments.

In response to comments about comparisons of SORE equipment and ZEE lifetime and warranty periods: Equipment lifetimes are discussed on pages 18-21 of the ISOR. Commenters present criticisms of the discussion in the ISOR but do not provide information contrary to the ISOR discussion. Please refer to the Agency Response in section IV.A.35.1 for discussion of the number of charge cycles batteries can sustain.

In response to comments about the use of one type of battery for more than one equipment type from the same manufacturer and scheduled maintenance of ZEE and SORE equipment: As described on page 68 of the ISOR, ZEE batteries can often be used in several products within a manufacturer's family of ZEE. This is true of the batteries used for the EGO LM2102SP lawn mower and EGO LB6500 listed on page 118 of the SRIA. It is also true for the batteries used for the Husqvarna 536 LiLx trimmer (page 120 of the SRIA) and the Husqvarna W520i

lawn mower [Husqvarna, 2020 and 2022a[162,163]]. CARB disagrees with commenters' statements that CARB did not cite data to support the statement, "Maintenance is also much less intensive and required less frequently on ZEE," on page 68 of the ISOR. An example of the differences in scheduled maintenance between SORE and ZEE lawn mowers is provided on pages 68 and 69 of the ISOR. Scheduled maintenance costs are further discussed in "Technical Support Document: Evaluation of Maintenance Frequencies and Costs for Small Off-Road Engines in California" [CARB, 2021[164]].

In response to the statement, "This is not the first time regulatory ambition for the adoption of zero emissions equipment collided with the reality of the technology available in the market…": The commenter states its opinion and compares the Proposed Amendments to zero-emission vehicle regulations. This comment does not request a change to the Proposed Amendments. CARB made no change based on this comment. CARB disagrees with the commenter's conclusions. The Proposed Amendments take into consideration available technology and reflect that technology, as described in Chapter I.E of the ISOR.

In response to the statement, "Replacement electric-powered applications for certain gasoline-powered SORE applications simply do not exist at this time. If a commercial landscaper's zero turn radius mower (ZTR) were to irreparably fail in early 2024, after the proposed amendments are promulgated, there would be no sufficient electric replacement available," and similar statements: These comments state the commenter's opinions and do not request a change to the Proposed Amendments. CARB made no changes based on the comments. As described in Chapter I.E.2.a.ii. of the ISOR, ZEE riding mowers, including zero turn-radius mowers, are available and have similar characteristics to SORE riding mowers. An additional example of a ZEE riding mower is the EGO POWER+ 42" Z6 Zero Turn Riding Mower, which is currently available for purchase in California [EGO, 2022[165]]. The commenter does not provide evidence to support its claims.

In response to the comments about the higher upfront cost of zero emission riding mowers and other professional-level ZEE, CARB's economic analysis recognizes the higher upfront costs for landscapers and other SORE equipment users associated with professional-grade ZEE. CARB does not agree with the comment, "…the only two options for the landscaper would be either to reduce the size of her business, cutting jobs in California, or to purchase a ZTR from out of state and bring it into California," To clarify, the Proposed Amendments would not require businesses and residents to stop using their current SORE equipment.

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[162] Husqvarna. 2020. Husqvarna Battery BLi300. https://www.husqvarna.com. 2020; archived at Wayback Machine: http://web.archive.org/web/20200921141137/https://www.husqvarna.com/us/accessories/battery/battery-bli300/967071901/; citing a capture dated September 21, 2020.

[163] Husqvarna. 2022a. Husqvarna W520i Push Walk-Behind Mower. (Web link: https://www.husqvarna.com/us/walk-behind-mowers/w520i/. Last accessed: February 10, 2022.

[164] CARB. 2021. Technical Support Document: Evaluation of Maintenance Frequencies and Costs for Small Off-Road Engines in California. Microsoft Excel workbook compiled by staff of the Monitoring and Laboratory Division. October 2021.

[165] EGO. 2022. POWER+ 42" Z6 Zero Turn Riding Mower (ZT4204L). Available at: https://egopowerplus.com/zero-turn-riding-mower-zt4204l/. Last accessed: February 9, 2022.

People can continue to use and repair their SORE equipment until the end of its life. A landscaping business would not need to purchase a full suite of ZEE at once, thereby avoiding a significant one-time cost to transition to ZEE. Rather, landscaping and other businesses can gradually purchase ZEE to replace SORE equipment as it breaks or for other business reasons, such as upgrading equipment. In addition, CARB's economic analysis identifies the savings that can occur from reduced costs for fuel and maintenance and other benefits. A landscaping business could raise its rates to make up for the higher upfront cost for ZEE. CARB further notes that the out-of-state sale of SORE equipment that is not certified by CARB when the retail seller knows of the purchaser's intention of using it for operation in California or, regardless of seller's awareness of purchaser's use, the purchaser intends to introduce the equipment into commerce in California would be considered a violation of the SORE regulation. For additional discussion of ZEE feasibility and costs, please see the Agency Response in section IV.A.35.1.

In response to the statement, "the Proposed Amendments are invalid since they are not supported by reasonable current technical data (including data relating to the proposed CO limit for portable generators (MY2024 – MY2027)), but instead seek to rely on outdated information that was already used to support the 2016 amendments to the evaporative regulations" and similar statements: The commenter mischaracterizes the data on which CARB relied. CARB disagrees with the commenter's statements and conclusions. Data for MY 2020 and MY 2021 engine and evaporative families were not available in 2016 and were not used to support rulemaking related to SORE in 2016. Comments on the 2016 SORE rulemaking are beyond the scope of this rulemaking. As described on page 165 of the ISOR, "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" [CARB, 2022[166]] lists eight MY 2020 engine families with CO certification test emissions lower than the proposed MY 2024-2027 generator engine emission standards listed in Table IX-3. The commenter does not explain its assertions that the CO data are not "reasonable current technical data" or that the Proposed Amendments "double dip" in the use of data.

In response to the statement, "an evaluation of the testing conducted by CARB staff of MY2020 and MY2021 product simply shows that those products meet the evaporative standards, as amended in 2016 (SRIA p. 4) - - not as they would be revised under the Proposed Amendments. Thus, there is no actual current data to support the additional proposed changes to the evaporative standards," and similar statements: CARB disagrees with the commenter's conclusions. The commenter mischaracterizes the data on which CARB relied. "Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data" lists 27 evaporative families with certification test emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR. It is true that the proposed evaporative emission standards are more stringent than the current evaporative emission standards. CARB's evaluation compared the certification test results for MY 2020 and MY 2021 evaporative families to the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR, not to the current emission standards. CARB does not have evidence, and the commenter does not provide evidence, that the amendments to TP-902 would significantly affect the test results for

[166] CARB. 2022. Technical Support Document: Compilation and Evaluation of Small Off-Road Engine Certification and Research Test Data. Microsoft Excel workbook prepared by staff of the Monitoring and Laboratory Division. October 2021, revised March 2022.

the MY 2020 and MY 2021 engines with hot soak plus diurnal emissions lower than the MY 2024-2027 generator engine emission levels with credit use listed in Table III-3 of the ISOR. The commenter does not explain its statement regarding the expansion of evaporative emission controls to include diurnal emissions. The current emission standards are diurnal emission standards. Chapters II.A and XI.B of the ISOR explain the necessity of and justification for including hot soak emissions in the evaporative emission standards.

Comments related to the enforceability of the Proposed Amendments, e.g., claims about potential out-of-state sales of SORE, or "leakage," are discussed in Agency Responses in sections IV.A.14.1 and IV.A.15. Comments related to the validity of the Proposed Amendments are discussed in Agency Responses throughout this section IV.A; the Agency Response in section IV.A.10 discusses comments related to CAA requirements.

### *A.35.3. PGMA and WPGA comments about technological feasibility and cost-effectiveness*

Comment: "The wide availability of ZEE equivalents for SORE equipment suggests that replacing SORE equipment with ZEE is feasible."[10] [Footnote 10: Id. at p. ES-7.] This is not true for ZEE generators. There is not current wide availability of ZEE equivalents to SORE equipment today. For that reason, this statement cannot support a finding that replacing spark-ignited generators with ZEE is feasible. (515-Docket)

Comment: **A. The ISOR Ignores the Three Most Important Characteristics of a Portable Generator When Determining Technological Feasibility**
Under Health and Safety Code section 39602.5(b), CARB must only adopt measures if they are technologically feasible and cost-effective. A key component of technological feasibility is establishing what the baseline technology can do today under the existing regulations and then determining whether the technology that can meet the new standards can also function in substantially the same manner. In the ISOR, staff claimed that "[c]haracteristics that establish functionality of a spark-ignited or zero-emission generator include the types and number of receptacles available on the generator and the power rating."[22] [Footnote 22: ISOR, at p. 14.] (515-Docket) While these two characteristics are part of what makes up the functionality of a generator, two key characteristics are even more important: (1) initial runtime and (2) the ability to easily recharge to extend that runtime even further. The ISOR glosses over these important characteristics and simply states that "[t]he runtime of a zero-emission generator that does not have solar or wind attachments is determined by the energy storage and the load on the generator. Therefore, if a longer runtime is required under the same load, a larger energy storage zero-emission generator must be purchased."[23] [Footnote 23: ISOR, at p. 14.] In fact, CARB's own data highlighted that "[p]erformance, run-time, and cost were the top three reasons" people haven't adopted ZEE equipment. The ISOR fails to critically examine any of these three reasons when comparing spark-ignited generators with ZEE generators. (515-Docket)

1. A Spark-Ignited Generator Can Provide Home Backup Power for an Extended Period of Time; A ZEE Generator Can Not
As described above in Section I.A, a majority of consumers use portable generators for emergency home backup power and generator sales spike during periods of high fire danger. Thus, a fundamental use of a portable generator is providing home backup power during PSPS events in California. The California Public Utilities Commission tracks every PSPS event and publishes data associated with each PSPS event including the outage duration.[24] [Footnote 24: See CPUC PSPS Event Rollup October 2013 through June 23, 2021, available at: https://www.cpuc.ca.gov/consumer-

support/psps/utility-company-psps-post-event-reports.] Since 2013, there have been almost 5,000 PSPS events, with an average duration of 34.86 hours and a median duration of 33.4 hours. If you limit the data to those PSPS events impacting the largest number of customers (4,000+), the average duration of the outage is 55.5 hours, reflecting that PSPS events that threaten large numbers of homes are longer duration events. (515-Docket)

Thus, when determining whether a zero emissions replacement product will have similar functionality as a spark-ignited generator, one key characteristic is its ability to run for extended periods of time without grid power. It is therefore important to compare the runtimes of the same models of generators that the ISOR used as a comparison to establish similar functionality, the Briggs & Stratton #030744 and the Goal Zero Yeti 1500. The Briggs & Stratton is a 5,500-Watt portable generator that can run for 12.5 hours on a 50% load (i.e., if the items plugged in total 2,750-Watts, the generator will run for 12.5 hours before needing refilling with gasoline). The Goal Zero Yeti 1500 is a 2000-Watt power station that cannot run for any time with 2,750-watts plugged in because its max load is 2000-Watts. But if we compare the max runtime of the Goal Zero Yeti with 50% max load or 1000-Watts of 1.5 hours to that of the Briggs & Stratton running the same load, approximately 16 hours, it is clear that the spark-ignited generator can last much longer on a single tank of fuel than the ZEE generator can last on an initial charge. It is also clear that the ZEE generator is not an appropriate generator in an extended power outage during a PSPS event. (515-Docket)

2. Spark-Ignited Generators Can Power More Equipment than ZEE Generators
While the ISOR claims it compared the "power ratings" of spark-ignited generators and ZEE generators, it really just included a conclusory statement that "[m]ost SORE and zero-emission generators are equipped with 120-volt power output, but both are available with 240-volt output as well."[23] [Footnote 23: ISOR, at p. 14.] This of course is only one aspect of "power rating." While the availability of 120-and 240-volt power output is common across all generators, what is not the same between ZEE generators and spark-ignited generators is the total power output available for running and surges. Again comparing the same generators the ISOR uses, the Briggs & Stratton spark-ignited generator can supply up to 5500 watts continuously and 6250 watts during startup or a surge. By comparison, the Goal Zero Yeti 1500X can only supply up to 2000 watts continuously and 3500 watts during a surge. In other words, the Briggs & Stratton is able to power 2.75X as much equipment as the Goal Zero Yeti. Even the "professional" ZEE generator the ISOR cites, the Goal Zero Yeti 3000x, can only supply up to 2000 watts continuously and 3500 watts during a surge.

By comparison, there are multiple spark-ignited generators on the market at price points lower than the Goal Zero Yeti 1500X that can supply up to more than 10,000 watts continuously. In other words, the ZEE generators on the market today are five times less powerful than less expensive spark-ignited generators. (515-Docket)

The ISOR also provides other examples of ZEE generators and suggests that they "can serve the needs of users."[26] [Footnote 26: ISOR, at p. 24.] But each of these other ZEE generators cited come at extremely high costs and still do not provide the same power as spark-ignited generators priced at a fraction of the cost. For example, the ISOR cites the Goal Zero Yeti 6000X. The Goal Zero Yeti 6000X cannot provide more continuous power than Goal Zero's other generators, 2000 watts continuously and 3500 watts during a surge. It simply has a larger battery so it can power the same devices for a longer period of time. It costs $5,400. The ISOR also cites the Onyx Rhino portable power system. The Onyx Rhino costs $12,500 and can provide 4000 watts continuously and 7000 watts during a surge. The Mobi Gen is the only ZEE "mobile power unit" that the ISOR cites that comes close to providing similar power as a reasonably priced spark-ignited generator can. The Mobi Gen can provide 11,000 watts continuously and 20,000 watts during a surge. What the ISOR fails to disclose is

the Mobi Gen costs $65,000. A spark-ignited generator that can provide 12,000 watts continuously can be purchased at Home Depot for $2197.84.[27] [Footnote 27: https://www.homedepot.com/p/Champion-Power-Equipment-15-000-12-000-Watt-GasolinePowered-Electric-Start-Portable-Generator-100111/206840905] In other words, to get the same power as a readily available spark-ignited generator in a ZEE generator, Californians would need to spend almost 30 times the amount of money. (515-Docket)

Comment: The ISOR Does Not Establish That ZEE Generators Are Cost- Effective
As described in Section III.A.2, supra, ZEE generators are not cost-effective for most Californians. The ISOR notes that a "cost difference of [2 times the price] would be significant for most consumers.[28] [Footnote 28: ISOR, at p. 23] As noted above, to get the same power output as a roughly $2,000 spark- ignited generator, a consumer would need to spend thirty times that amount for a ZEE generator. Even generators geared towards an average consumer without large power needs would need to spend orders of magnitude more on an equivalent ZEE generator. (515-Docket)

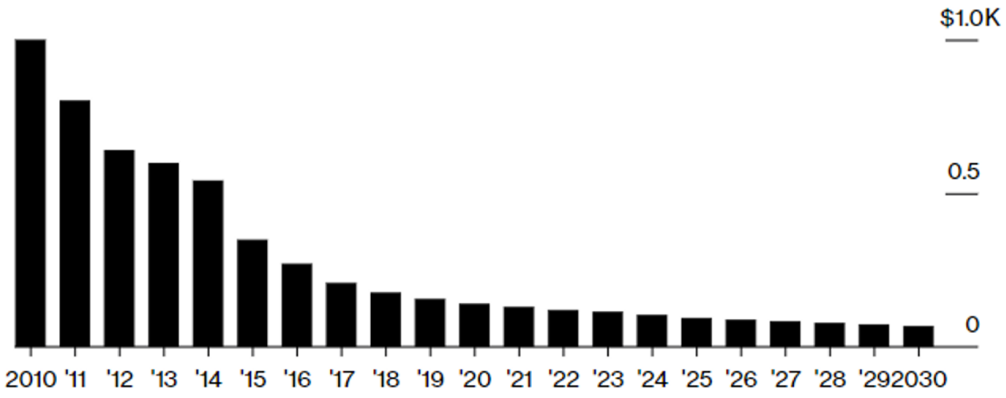
Comment: The ISOR's comparison of the Briggs & Stratton and the Goal Zero Yeti 1500X understates the cost differences between spark-ignited generators and "equivalent" ZEE generators. As noted in the ISOR, the Briggs & Stratton #030744 costs $861.49 and the Goal Zero Yeti 1500X costs $2,169.95. As discussed above, the Briggs & Stratton is almost three times as powerful as the Goal Zero Yeti 1500X, making the comparison like comparing apples to oranges. There are plenty of spark-ignited generators on the market that come closer to the Goal Zero Yeti 1500X performance that should have been used to compare prices. The Westinghouse WGen2000 spark-ignited generator is a roughly equally powerful spark-ignited generator as the Goal Zero Yeti 1500X. Its price is $309.[29] [Footnote 29: 9 https://www.homedepot.com/p/Westinghouse-WGen2000-2-500-2-000-Watt-GasolinePowered-Portable-Generator-with-Automatic-Low-Oil-Shutdown-WGen2000/301462813] In other words, the Goal Zero Yeti 1500X provides the same power output as a spark-ignited generator that is seven times less expensive. (515-Docket)

Comment: The ISOR recognizes that even the cost difference between the Briggs & Stratton spark-ignited generator and the Goal Zero Yeti 1500X "would be difficult to recoup without significantly increased use."[30] [Footnote 30: ISOR, at p. 25] Still, the ISOR concludes that "CARB staff expects that generator manufacturers will be able to offer zero-emission generators at a price and capability comparable to existing spark-ignited generators by MY 2028 and that, as the market matures, the overall supply of zero-emission generators will increase to meet the demand."[31] [Footnote 31: ISOR, at p. 26] The only evidence CARB staff has to support this assertion is that "[t]he price of zero-emission generators per unit of energy storage will likely decrease over time as the cost of batteries decreases. Projections suggest that, from 2010 to 2030, the price of a battery holding a kilowatt-hour of energy will decrease by over 90 percent (Martin, 2019)."[32] [Footnote 32: Id.] (515-Docket)

Comment: The "Martin, 2019" reference is to a Bloomberg article written by Chris Martin in 2019 titled, "Better Batteries."[33] [Footnote 33: Martin, Chris. 2019. Better Batteries. Bloomberg. October 11, 2019, available at: https://www.bloomberg.com/quicktake/batteries.] As a threshold issue, it appears that the article is predicting the price of a kilowatt hour of energy for utility scale and electric vehicle batteries. Therefore, any trends it predicts may not be applicable to batteries used in ZEE Generators. Additionally, Martin notes that "[t]he price of a lithium-ion battery pack holding a kilowatt hour of energy **has already plunged** and is expected to fall by more than 90 percent from 2010 to 2030." The ISOR conveniently ignores the first part of the sentence that battery prices have "already plunged" and instead focuses on the second part of the sentence that battery prices will decrease by more than 90 percent from 2010 to 2030. The ISOR cites that precise point five times and never reveals that the price of batteries has "already plunged." This obfuscation to support the

contention that ZEE generators will be priced comparably to spark-ignited generators by 2028 is either intentionally misleading or a complete failure of due diligence.[34] [Footnote 34: Additionally, a recent article from Bloomberg notes that "battery prices are forecast to bounce ***up*** in 2022 after years of declines" and "rising prices in China add weight to expectations that the trend of year-on-year declines seen over the past decade may stall." Lee, Annie. The Commodity Boom is Starting to Push Battery Prices Higher. November 4, 2021, available at: https://www.bloomberg.com/news/articles/2021-11-04/the-commodity-boom-is-starting-to-push-battery-prices-higher (emphasis added).] (515-Docket)

The very same article includes a graphical depiction of the cost of storing a kilowatt-hour of electricity between 2010 and 2030.[35] [Footnote 35: Additionally, a recent article from Bloomberg notes that "battery prices are forecast to bounce ***up*** in 2022 after years of declines" and "rising prices in China add weight to expectations that the trend of year-on-year declines seen over the past decade may stall." Lee, Annie. The Commodity Boom is Starting to Push Battery Prices Higher. November 4, 2021, available at: https://www.bloomberg.com/news/articles/2021-11-04/the-commodity-boom-is-starting-to-push- battery-prices-higher (emphasis added).] (515-Docket)




Source: BNEF
Note: Figures for 2018 and beyond are projections

(515-Docket)

In 2010, the price of storing a kilowatt-hour of electricity was $1,000. In 2021, it was projected to be $131 and in 2030 it is projected to be $70. Thus, the cost to store a kilowatt-hour of electricity is anticipated to drop by $930 between 2010 and 2030. But the cost to store a kilowatt-hour of electricity **has already dropped $869 or 93% of the total expected drop in price**. Therefore, while there may be some incremental cost reductions to store electricity over the next nine years, the overwhelming majority of cost reductions has already occurred. Thus, the ISOR's conclusion that "manufacturers will be able to offer zero-emission generators at a price and capability comparable to existing SORE generators by MY 2028" is unfounded. As described above, spark-ignited generators are anywhere from seven to thirty times less expensive than comparably capable ZEE generators. (515-Docket)

The Goal Zero Yeti 1500X has a 1.516 kWh battery pack. Thus, according to the Bloomberg article, the cost of just the battery portion of the product is about $198.60 ($131/kWh x 1.516 kWh = $198.60). Assuming the trend continues and the cost of storing a kilowatt-hour of electricity decreases between now and 2028 as expected in the Bloomberg article, the cost of storing the same amount of energy will decrease to $119.76 ($79/kWh x 1.516 kWh=$119.76). It can therefore be reasonably expected that the price of the Goal Zero Yeti 1500X, which currently costs $1,999, would decrease by about $79, to about $1,900 in 2028. The price drop in batteries alone will not drive the

costs of ZEE generators down to the price of similarly capable spark- ignited generators by 2028. (515-Docket)

In summation, CARB's reliance on the Bloomberg article for the contention that ZEE generator prices will drop is unfounded. First, the Bloomberg article is focused on prices of utility-scale and electric vehicle batteries and the trends predicted for those market segments may not be the same for batteries in portable generators. Second, the Bloomberg article's conclusions may be outdated and recent evidence points to battery prices increasing. Third, the vast majority of the 90% drop in battery prices cited by the ISOR has already occurred. Thus, there is no evidence that the remaining 7% drop from 2010 levels will translate into significantly less expensive ZEE generators. Fourth, even accepting the Bloomberg article's predicted price drops, the total cost of a ZEE generator would not substantially decrease. Therefore, CARB's failure to establish that the Proposed Amendments are technologically feasible and cost-effective render them arbitrary and capricious and contrary to law. (515-Docket)

Comment: For purposes of a finding that ZEE portable generators are "technologically feasible". CARB must establish that the utility of ZEE portable generators equals conventional gasoline units, including, but not necessarily limited to, (i) 8-12 hours of run time with at least 2000-watt power output before recharging is necessary and (ii) a recharging time of 15 minutes, assuming there is infrastructure available to support portable generator recharging even during a power outage, such as at vehicle recharging stations. With these changes to the Proposed Amendments, California consumers will be assured that when they find themselves in an emergency situation, there will be affordable products on the market that will meet their urgent emergency needs. (515-Docket)

Comment: Consideration should also be given to the fact that current ZE generators have limited peak power, making them unsuitable for operating certain household equipment. Unfortunately, ZE generators often cannot currently be used to provide backup power during a significant electric utility power outage, due to the short run time and charging requirements. In such cases propane (inclusive of renewable propane) provides energy security. (539-Docket)

Comment: *[WPGA respectfully asks that CARB:]* Ensure both technological and cost feasibility for any recommended proposal; (539-Docket)

**Agency Response:**

These comments describe the commenter's opinions and conclusions regarding the discussion of technological feasibility for portable generators in the ISOR. The comments do not request a change to the Proposed Amendments but are related to the commenter's other comments that suggest an alternative to the Proposed Amendments. Please refer to the Agency Responses in section IV.A.2.3. for additional discussion of comments suggesting alternatives for portable generators. Many of the above comments address the same issues discussed in the Agency Responses in sections IV.A.35.1 and IV.A.35.2. Please refer to the Agency Responses in sections IV.A.35.1 and IV.A.35.2 for additional discussion of the issues presented in these comments. CARB made no change based on these comments.

CARB Resolution 21-28, dated December 9, 2021, states, in part, "Be it further resolved that the Board directs CARB staff to review annually the status of the implementation of the proposed amendments and to conduct a technological review in the 2025 to 2026 timeframe to assess the progress towards the MY 2028 zero-emission standards for portable generators and any other engine or equipment category that may be newly subject to the MY 2028 zero-emission standards." Such technological review is beyond the scope of the Proposed

Amendments to the SORE regulations for this rulemaking. However, it will be an important component of implementing the Proposed Amendments.

In response to the statement, "This is not true for ZEE generators. There is not current wide availability of ZEE equivalents to SORE equipment today. For that reason, this statement cannot support a finding that replacing spark-ignited generators with ZEE is feasible": CARB disagrees with the commenter's conclusion. The Proposed Amendments allow more time for generators to meet emission standards of zero to allow the zero-emission generator market to develop further, as discussed in Chapter I.E.3.b. As described on page 163 of the ISOR, while zero-emission generators are available to meet users' demand, there is still a need to allow manufacturers more time to continue to innovate and grow to meet the future demands of the zero-emission generator market. As discussed on page 24 of the ISOR, a zero-emission generator can be used to power a refrigerator for several days.

The commenter quotes text in the ISOR out of context. For example, text on page 23, "The price of this diesel generator is approximately 4 times the price of the residential SORE generator and 2 times the price of the zero-emission generator. This cost difference would be significant for most consumers," compares the price of a diesel generator to the prices of SORE and zero-emission generators.

In response to the statements, "While these two characteristics are part of what makes up the functionality of a generator, two key characteristics are even more important: (1) initial runtime and (2) the ability to easily recharge to extend that runtime even further. The ISOR glosses over these important characteristics," and, "In fact, CARB's own data highlighted that "[p]erformance, run-time, and cost were the top three reasons" people haven't adopted ZEE equipment. The ISOR fails to critically examine any of these three reasons when comparing spark-ignited generators with ZEE generators," and similar statements: CARB disagrees with the statements that the ISOR glosses over or otherwise fails to examine runtime, recharging, performance and cost of zero-emission generators. Limitations on runtime and power output and the relatively high cost of zero-emission generators are among the reasons the Proposed Amendments allow more time for portable generators to meet emission standards of zero. As described on page 40 of the ISOR, the proposed zero-emission generator credit program incentivizes manufacturers to develop zero-emission generators in the least developed sector of the market (i.e., zero-emission generators with the greatest energy storage and highest power output). The commenter may have misquoted the ISOR and taken a statement out of context. The following text appears on page 22 of the ISOR: "The CSUF survey asked participating landscapers what qualities of the equipment were most important to them, to better understand landscapers' rate of adoption of ZEE. Performance, run-time, and cost were the top three responses." Responses from landscapers about the qualities of equipment that are most important to them do not indicate reasons people haven't adopted ZEE. CARB disagrees with the commenter's conclusion regarding the text on page 22 of the ISOR. As described on page 25 of the ISOR, the price of zero-emission generators is expected to decrease as the cost of batteries decreases. Please refer to the Agency Response in section IV.A.27. for additional discussion of the use of generators for backup power.

In response to the statement, "Since 2013, there have been almost 5,000 PSPS events, with an average duration of 34.86 hours and a median duration of 33.4 hours. If you limit the data to those PSPS events impacting the largest number of customers (4,000+), the average duration of the outage is 55.5 hours, reflecting that PSPS events that threaten large numbers of homes are longer duration events." and similar statements: PSPS are discussed on pages 26, 32, 54-55, 68, and 125 of the ISOR. The additional four-year period (MYs 2024 through 2027)

allowing sale of SORE generators that meet more stringent emission standards in the Proposed Amendments would ease concerns about the need for generators due to PSPS. As discussed on page 24 of the ISOR, a zero-emission generator can be used to power a refrigerator for several days. A person who used a SORE generator during a 55.5-hour PSPS event could use a zero-emission generator instead for certain devices, such as a refrigerator.

In response to comments regarding the comparison of a SORE generator and a zero-emission generator in Chapter I.E of the ISOR: It is true that the SORE generator has higher power output and longer runtime at certain loads than the zero-emission generator. Limitations on runtime and power output and the relatively high cost of zero-emission generators are among the reasons the Proposed Amendments allow more time for portable generators to meet emission standards of zero. The commenter states its opinion that a different SORE generator should have been used for comparison with a zero-emission generator. The Briggs & Stratton generator was selected using the method described on page 39 of the SRIA. Although a different generator with equivalent characteristics could have been used, selecting a different generator would not have changed conclusions regarding the need to maximize emission reductions from SORE or the need to allow more time for generators to meet emission standards of zero.

In response to the statement, “For purposes of a finding that ZEE portable generators are “technologically feasible”. CARB must establish that the utility of ZEE portable generators equals conventional gasoline units, including, but not necessarily limited to, (i) 8-12 hours of run time with at least 2000-watt power output before recharging is necessary and (ii) a recharging time of 15 minutes, assuming there is infrastructure available to support portable generator recharging even during a power outage, such as at vehicle recharging stations,”: This comment seems to suggest an alternative analysis of technological feasibility for a transition to ZEE to the analysis presented in the ISOR. CARB made no changes based on the comment. CARB disagrees with the commenter's suggestion. In response to the statement, "CARB must establish that the utility of ZEE portable generators equals conventional gasoline units, including, but not necessarily limited to, (i) 8-12 hours of run time with at least 2000-watt power output before recharging is necessary and (ii) a recharging time of 15 minutes, assuming there is infrastructure available to support portable generator recharging even during a power outage, such as at vehicle recharging stations,": The commenter does not provide information supporting its conclusions regarding the need to provide 2000 watts of power continuously for 8 to 12 hours or the need to recharge within 15 minutes. Portable generator users will use their generators for a variety of purposes, with a range of run times and power demands. For those who do not use zero-emission generators, the Proposed Amendments allow more time for generators to meet emission standards of zero and do not require anyone to stop using their SORE generator. The commenter suggests a zero-emission generator must have a recharging time of 15 minutes to have utility equal to a SORE generator. Note that it may not be possible to refuel a SORE generator within 15 minutes of stopping the engine. It is not safe to add fuel to a fuel tank while the engine is running or hot. The engine must be completely cool before fuel is added in order to safely add fuel, as

described in user's manuals [Champion, 2022[167]; Generac, 2022[168]; Honda, 2022[169]]. These user's manuals include the statements, "Do not fill fuel tank when the engine is running or hot," "Do not refuel during operation. Allow the engine to cool if it has been in operation," and "Never add fuel while unit is running or hot. Allow engine to cool completely before adding fuel." Cooling an engine that has been running may take hours. It may not be possible to travel to a gas station, fill a portable fuel container with gasoline, and travel back to the location of the generator within 15 minutes, either, if the operator does not have fuel at the location of the generator when it runs out of fuel.

In response to the statement, "While the availability of 120-and 240-volt power output is common across all generators, what is not the same between ZEE generators and spark-ignited generators is the total power output available for running and surges,": CARB recognizes that the voltage output of a zero-emission generator is not the only characteristic to consider when comparing a zero-emission generator and a SORE generator. Chapter I.E.3.b. of the ISOR discusses the need for more time for generators to transition to ZEE.

In response to comments regarding potential decreases in the cost of batteries: These comments are similar to comments discussed in the Agency Response in section IV.A.35.1. CARB disagrees with the commenter's conclusions and assertions regarding CARB's use of the projections in the article by Chris Martin. CARB used the modeled price per kilowatt-hour from the article to project the price of the batteries in ZEE going forward starting in 2020. The article PGMA cites, "Lee, Annie. The Commodity Boom is Starting to Push Battery Prices Higher. November 4, 2021, available at: https://www.bloomberg.com/news/articles/2021-11-04/the-commodity-boom-is-starting-to-push- battery-prices-higher", does not project battery prices into the future. The proposed emission standards will not go into effect until MY 2024, and the economic analysis does not include cost changes until 2024. A December 2021 article from Green Car Reports states that the current rise in battery prices is only temporary, and they are expected to continue to decrease by 2024 [Edelstein, 2021[170]]. The commenter's statement, "CARB's failure to establish that the Proposed Amendments are technologically feasible and cost-effective render them arbitrary and capricious and contrary to law," is conclusory. The commenter does not demonstrate that the Proposed Amendments are not technologically feasible or cost-effective. The commenter does not provide evidence that the Proposed Amendments are arbitrary, capricious, or contrary to law. Please refer to the Agency

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[167] Champion Power Equipment. 2022. Champion Global Power Equipment Owner's Manual & Operating Instructions: 3400 Starting watts / 3100 Running watts Portable Inverter Generator, model Number 100233. Available at https://www.championpowerequipment.com/wp-content/uploads/2017/08/100233-om-english.pdf. Last accessed: April 29, 2022.

[168] Generac. 2022. Owner's Manual: GP Series Portable Generator. Models: 005625-0, 005626-0, 005680-0, 005681-0. Available at: https://prod-generacsoa.azurefd.net/manualsweb/manuals/5644258/0G8751. Last accessed: April 29, 2022.

[169] American Honda Motor Co, Inc. 2022. American Honda Motor Co, Inc. (Honda) Owner's Manual: Generator EU2200i / EU22001 Companion. Available at: https://cdn.powerequipment.honda.com/pe/pdf/manuals/00X31Z446130.pdf. Last accessed: April 29, 2022.

[170] Edelstein, Stephen. 2021. Report: EV battery costs hit another low in 2021, but they might rise in 2022. Green Car Reports. December 1, 2021.

Response in section IV.A.35.1. for additional discussion of the issues presented in these comments.

In response to the statement, "Consideration should also be given to the fact that current ZE generators have limited peak power, making them unsuitable for operating certain household equipment. Unfortunately, ZE generators often cannot currently be used to provide backup power during a significant electric utility power outage, due to the short run time and charging requirements. In such cases propane (inclusive of renewable propane) provides energy security" and similar statements: These comments include expressions of commenters' opinions regarding the use of zero-emission generators for backup power but do not provide evidence to support the commenters' claims. The Proposed Amendments provide more time for generators to meet emission standards of zero to allow the zero-emission generator market to develop further. The Proposed Amendments do not require anyone to stop using a SORE generator, including one fueled with renewable or nonrenewable propane.

## A.36. Test procedures

### *A.36.1. Definitions and terms*

Comment: Second, the Proposed Rule includes a new definition for "handheld engines" that is not harmonized with EPA 40 C.F.R. Part 1054. The impact of the definition change is significant because engine test cycles are determined by the product definition – products that EPA consider "handheld" would be subject to one exhaust test cycle, while CARB would consider the same products "non-handheld" and subject to different a different exhaust test cycle. (524-Docket)

(OPEI also is concerned that based on the product category and engine classes, this could be an issue even with today's regulations.) (524-Docket)

**Agency Response:**

In response to OPEI's first comment, CARB made a modification to § 2401(a)(32), which now reads, ""Handheld" means relating to off-road equipment using an engine with displacement less than or equal to 80 cc," as described in the March 2022 15-Day Notice and in section II.A.1 of this FSOR. The current California definition in Part 1054 similarly reads "Handheld means equipment that contains an engine with a displacement of less than 80cc." The modification removes criteria included in the ISOR Proposed Amendments beyond engine displacement for equipment to be considered handheld. The modification effectively harmonizes the definition of "handheld" in the SORE regulations with the definition of "handheld" in federal regulations since federal 40 CFR Part 1054 also specifies in section 1054.101(e), in part, "For purposes of the requirements of this part, engines at or below 80 cc are considered handheld engines, but may be installed in either handheld or nonhandheld equipment."

In response to OPEI's parenthetical comment, "OPEI also is concerned that based on the product category and engine classes, this could be an issue even with today's regulations," This comment is an expression of the commenter's concern regarding the current SORE regulations and is beyond the scope of this rulemaking. CARB made no change based on this comment.

### *A.36.2. Fuel cap and tether spill test*

Comment: CARB proposes to modify the tether requirements. However, the modifications actually will create a larger problem than what CARB is allegedly trying to resolve. In the end, this amounts to a phantom issue created by CARB staff in the testing of products. (521-Docket)

**Agency Response:**

This comment contains vague statements and the commenter's opinions and conclusions. CARB disagrees with the commenter's statement that adding the fuel cap tether durability requirements will create problems. As described on pages 44-45, 244, 258-259, and 272-273 of the ISOR, tethers and fuel caps may cause users of SORE equipment to spill or drip fuel when removing a cap from the fuel tank, thereby creating excess emissions neither captured in current test procedures nor reflected in CARB's emissions inventory. This comment is similar to those addressed in Agency Response 48 in Attachment A to this FSOR.

### *A.36.3. Model Year 2022 and 2023 certification*

Comment: Transfer Flow, Inc. is pleased to offer our comments to the California Air Resources Board (CARB) regarding potential amendments to small off-road engine (SORE) regulations. Transfer Flow, Inc. appreciates CARBs positive response to our previous public comment submitted April 9th, 2021. Transfer Flow has been in business since 1983 and is a manufacturer of California legal aftermarket fuel tanks. As the industries' leading California legal aftermarket fuel tank manufacturer, Transfer Flow is a knowledgeable and proficient voice within the industry. Transfer Flow has been issued numerous executive orders throughout the years and has and will continue to participate in the rulemaking process. Our comments are as follows: (487-Docket)

**I. The Proposed Revisions to TP-902 and CP-902 Should Be Last and Final Revisions**
When Transfer Flow, Inc. went to renew our SORE E.O. U-U-123-0019, in 2020, we learned we had to conduct all new testing due to changes made to TP-902 and CP-902. By this time, additional rulemaking activities to subsequently amend TP-902 and CP-902 yet again had already been initiated meaning that even if Transfer Flow did retest our SORE system, we would immediately have to turn around and test again as soon as the newest certification and test procedures are adopted. These tests are very expensive and as such, it did not make business sense to pay for certification testing if we were immediately going to be required to turn around and re-conduct the same test we just finished paying for. Even though our previous SHED data showed emission levels below the sensitivity tolerances of the measurement equipment, regardless, we are required to test again for each iteration of the test and certification procedures. Since SORE systems are scheduled to be phased out, the current revision of TP- 902 and CP-902 should be the final iteration and we should not need to revisit these certifications and testing procedures for the remainder of the time small off-road engines will be available for sale in California. (487-Docket)

**Agency Response:**

These comments describe the commenter, decisions made by the commenter, and the commenter's opinions regarding evaporative emission certification. The comments do not request a change to the Proposed Amendments. Potential future amendments to the SORE regulations are beyond the scope of this rulemaking. CARB made no changes based on these comments. As described in § 2753(a), for MYs 2022 and 2023, an applicant may follow the certification procedures outlined in CP-902, adopted July 26, 2004, and last amended [insert

amended date], in lieu of those in CP-901, adopted July 26, 2004, and amended September 18, 2017, or CP-902, adopted July 26, 2004, and amended September 18, 2017, as applicable. Therefore, an applicant may follow the previous certification and test procedures for MYs 2022 and 2023.

### *A.36.4. Pressure test*

Comment: CARB proposes to modify the pressure testing procedure for gas tanks, which is not warranted based on more recent test data. In addition, the revisions create gaps in the procedure and do not address the issue stemming from CARB staff's differing and inconsistent interpretation and application of the requirements, which has resulted in differing and inconsistent instructions to manufacturers to modify their certification applications. (521-Docket)

**Agency Response:**

This comment includes vague statements about manufacturers' certification experience and expressions of the commenter's opinions. The commenter does not provide specific information regarding its conclusion that Proposed Amendments to TP-901 and TP-902 are not warranted. The commenter does not provide specific information regarding its statement regarding "inconsistent instructions to manufacturers." CARB disagrees with the commenters' statements and conclusions. As described on pages 255-257 of the ISOR, the additional instructions for determining the fuel tank system's design pressure and vacuum limits increase clarity to ensure different testers use a consistent approach. This ensures fuel tanks are compliant with TP-901 and do not result in excess emissions. Therefore, CARB made no changes based on this comment.

### *A.36.5. Submitting test results*

Comment: CARB's proposed amendments (Appendices E, F and G) are over-reaching in that they require manufacturers to submit test results for tests not intended to be used for certification purposes, and also call for the submission of information that is likely to include proprietary information from component manufacturers that is not available to engine and equipment manufacturers. (521-Docket)

**Agency Response:**

This comment is similar to other comments submitted by EMA and OPEI. Please refer to Agency Responses 97, 98, and 106 in Attachment A to this FSOR. CARB made no changes based on the comment.

## A.37. Two-stroke engines

Comment: I'm a landscape contractor who feels that two stroke engines should be quickly phased out. They are super polluters, are often poorly maintained, and I would assert not safely used by the majority of operators. All in all the cost of operating these machines is inexpensive only in the short run. I would urge you all to phase them out quickly and consider any programs in your power to create to help those who cannot afford safer and cleaner equipment. (401-Docket)

**Agency Response:**

The commenter's suggestion is beyond the scope of the Proposed Amendments as described in the October 2021 45-Day Notice and therefore CARB made no changes based on the comment. The commenter suggests that CARB should phase out two-stroke engines. The Proposed Amendments do not require anyone to stop using two-stroke engines.

## A.38. Variances

Comment: CARB proposes to eliminate the availability of the evaporative emission variance procedure, allegedly due to the creation of "inequality" among manufacturers. However, CARB fails to acknowledge the underlying conditions for which the variance procedure was developed – component development leadtime and supply chain delays. Those conditions not only continue to exist today, but have gotten worse due to the multiple COVID- related disruptions. In addition, CARB has only granted a variance twice since the provision was adopted, and then only after an extended hearing process. CARB staff are, in effect, throwing the baby out with the bathwater, rather than simply addressing any alleged inequities in the variance procedure. (521-Docket)

**Agency Response:**

This comment recommends retaining the variance provision that was removed by the Proposed Amendments. As described on pages 45-46 and 250-251 of the ISOR, the variance procedures create inequitable results, rewarding some manufacturers who qualify for the process while providing no relief for others who may need relief but do not meet the threshold criteria. In turn, manufacturers that do not qualify for the variance process may choose to try to certify their engines even though they may not meet all the requirements for certification, which could result in unmitigated excess emissions. CARB disagrees with the commenter's conclusion that the variance provision should be retained as a measure for extraordinary circumstances because in spite of numerous extraordinary circumstances in recent years—a two-year pandemic and associated supply shortages, wildfires, and flood—only two manufacturers have been granted variances since 2004. As noted on ISOR page 46, the addition of evaporative emission credit trading would alleviate the need for variances, which would enable all manufacturers to certify their engines in a manner consistent with the SORE evaporative emission standards; manufacturers who could not meet the emission standards could acquire credits to offset emissions above the emission standards. Therefore, CARB made no changes based on this comment.

## A.39. Workforce training

Comment: The only concern I have is that this transition to electric motors be directed at minority communities as well. Many small landscaping businesses don't always have the best English skills so they would need this information in their language of preference. (37-Docket)

Comment: The generous timeline to eliminate gas-operated equipment could be used to train all the well-meaning maintenance personnel and their employers in healthier maintenance techniques. Many of the people unhappy about the ban cannot imagine another way to accomplish their work. (48-Docket)

Comment: Perhaps training is a positive step the State of California can help implement. The person that helps me with my office and home landscape maintenance received free bi-lingual water-efficient

landscape maintenance training sponsored by the City of Santa Barbara and City College many years ago. This resulted in greater pride in his work, along with saving water. (48-Docket)

Comment: While I may not be in CA, I work for a landscape contracting company that services a large portion of the state. Also many legislative items that CA does affects and tends to influence other states. With that said, we at BrightView and frankly most landscape contracting industry do care about the environment and are constantly finding ways to lower our impact. Many of us, including BrightView have already embraced alternative fuel machinery and electric. However given the entire industry has been using combustion engines that run of diesel, unleaded, and mix for well over a 100 years it will take time to retool our fleets, crews, business models, pricing to customers and vendors, and train our employees. The landscape contracting industry is open to moving to electric power sources. However we have to change how we setup our trucks in trailers in order to be able to store batteries, charging stations, solar panels, and buy all new equipment. We also have to stock new spare parts, tools, and re train mechanics. This is a very large investment to make. (395-Docket)

Comment: I agree that we should find a better solution than Gas powered small "Landscape" equipment to execute our work. However, I believe that in order for the execution to be successful more time will be needed to educate, train and implement across the Landscape Industry. The communication from State and local officials is poor in regards to explaining what the regulation actually means and how each individual and/or company can make sure to be compliant and prepare when the deadline rolls around. (491-Docket)

Comment: For commercial electric equipment implementations, we would like to stress that our successful projects of converting entire cities, universities, and school districts to mostly electric operations were not solely a result of equipment improving. It involved building trust, including everyone as stakeholders, and providing critical outreach, education, and workforce training our industry needs as much as other industries who are helping to mitigate air pollution and combat climate change. (3050-Oral Testimony)

Comment: Within the implementation, outreach to small landscapers should be a priority action for CARB to ensure small companies are supported in understanding what the policy is and what funding is available to accelerate the transition, and to ease the burden on them. RAMP joins with many health and medical organizations in calling for CARB to approve the proposal today and implement the program without delay. (3053-Oral Testimony)

**Agency Response:**

These comments include commenters' assessments of the need for training for landscapers and others. The requests from many of these commenters are beyond the scope of the Proposed Amendments and therefore CARB made no changes based on the comments. The scope of the rulemaking described in the October 2021 45-Day Notice does not include providing training for landscapers.

Some of the commenters imply or suggest an alternative to the Proposed Amendments that would allow more time for a transition to ZEE. Please refer to the Agency Response in section IV.A.2.4.3 for discussion of comments that request more time.

The comments request the State of California to provide training for using ZEE as a replacement to SORE while also focusing on specific communities and providing training in multiple languages. Another comment describes the amount of training that the commenter believes will be necessary to transition to ZEE and the investment the commenter believes will

be required to do so. Other comments explain the importance of education, training, and outreach for the success of the regulation amendment implementation. The following response provides clarification and context for several points within the above comments.

ISOR chapter X.D. discusses CARB's Stakeholder Meetings throughout the rulemaking process. CARB agrees that additional outreach to affected parties will be important to the successful implementation of the Proposed Amendments and is committed to conducting additional outreach to landscapers, among other stakeholders.

Please refer to the Agency Responses in sections IV.A.2.4.2, IV.A.6.1, and IV.A.12 for discussion of comments related to costs for landscapers and charging infrastructure.

## A.40. ZEE certification

Comment: **Comment 4: ZEE certified products**
STIHL has gone to great lengths to certify many professional ZEE products under CARB Final Regulation Order[6]. For MY 2022, STIHL is certifying 12 ZEE products according to section §2408.1. Certification of ZEE products involves significant investment in technology and time - an investment that does not appear to be made by other manufacturers as it relates to professional use.
[Footnote 6: CARB Final Regulation Order, SORE, Title 13, CCR section §2400 - §2409 (2010)].
(509-Docket)

**Agency Response:**

This comment describes the commenter's experience with the ZEE credit program. The commenter and one other manufacturer have certified zero-emission small off-road equipment to earn ZEE credits. As described on pages 193-199 of the ISOR, the Proposed Amendments to section 2408.1 are intended to encourage more participation in the ZEE credit program, which is voluntary. CARB made no change based on this comment.

# B. Comments Received during the March 2022 15-Day Comment Period

This section of the FSOR provides the text or a summary of each comment submitted during the 15-day public comment period for the March 2022 15-Day Notice that was available for public comment from March 30, 2022, through April 14, 2022. Comment letters and emails were submitted by 22 individuals or organizations during the 15-day public comment period for the March 2022 15-Day Notice. Agency responses are provided for all comments that give objections or recommendations specifically directed at the 15-day regulatory modifications or additional documents described in the March 2022 15-Day Notice. To facilitate the use of this document, comments are categorized into topic-specific sections and are grouped by responses wherever possible. Table 4, which is provided before section IV.A, lists the commenters that provided written comments during the 15-day public comment period for the March 2022 15-Day Notice. The table includes the commenter codes assigned to each to help identify commenters in the comments/responses which follow. Note, one stakeholder—American Honda Motor Co., Inc. (Honda)—provided detailed comments tabulated in Microsoft Excel spreadsheets in addition to their general comments. Honda's general comments are provided in this section. Their comment spreadsheets, together with agency responses, are presented as a table in Attachment C to this FSOR.

## B.1. Comments not specific to the 15-Day changes

Comment: Please enact policy that supports clean air! (4001-Docket)

Comment: I have had enough of the Socialists and Liberals taking away are state government. Newsome and CARB need to go away permanently. I hope someone files a Lawsuit against CARB & Newsome for unfair restraints on our business. Any other State entity that feels they have full control over peoples business and livelyhood should be shut down so all the employees have a feeling for what all of us small OPE businesses will feel like if you go ahead with this farse. 100 miles away in Mexico they are still burning old tires and used oil for heat so what is this really going to do other than hurt many of us small OPE dealers. The Declaration of Independence calls for the people to take back their government when they lose faith sand trust in them, that's already happened not long ago with the run on the Capitol, how long before it happens again? (4002-Docket)

UNFAIR, SOCIALIST MENTALITY (4002-Docket)

I am very disappointed and angry with State Government and the foolishness that they feel does good. This is not good. (4002-Docket)

Comment: I am Trung Pham, owner of Single Cylinder Repair, Inc. I have been doing business as outdoor power equipment sale and repair for more than 23 years. I build my company out of sweat, dedication of hard work. The California has gone too extreme by banning all gas powered equipment. We need equipment to keep our garden, lots, parks and forest clean and prevent fire each year. I am not against technology but we are not getting there yet. The California decision has been driving businesses out from California. Even though California goes zero emission, China, India and other countries freely use coals and petroleum products and it will make no difference. I agree wholeheartedly that we need to protect the environment and keep our planet a place can be enjoyable for everyone but banning all the gas powered equipment is too extreme. (4003-Docket)

Comment: I am totally against this amendment. Puts the small guy out of business especially the mow and blow guys. Mowers and small hand equipment's prices are going to be totally over-board. We need to wait until manufacturers have a better replacement in place as far as battery operated hand-held equipment. At this time...we don't. (4004-Docket)

Comment: I would like to know, what the government are going to do?? Per example with fire department, police department, marines and more, that will be (a must) of needing the two and four cycle equipment! Battery and electrical equipment can't not be useful in most cases!! (4005-Docket)

Comment: The approach to ban SORE by 2024 is very aggressive, for industries and a public who is not prepared. The process will happen organically in time as the technology improves and costs reduce. By removing emission credits in CA, engines above CARB's emission standard would no longer be allowed. This would reduce emissions while still giving the public clean equipment while manufacturers continue to develop ZEE. The current supply chain has delayed the availability to develop ZEE products. The current timeline is unobtainable for manufacturers to develop ZEE by 2024 and current ZEE products will not meet demand due supply chain issues. We ask CARB to take gradual steps toward ZEE over 10 years. (4007-Docket)

Comment: I would like to express my concern and disappointment with the upcoming ban on small gas powered equipment. The sale and repair of this equipment make up 15% of my business and will have a very negative effect on my business financially. Although battery powered equipment is

becoming more powerful each year, it still has a long way to go to match and the power of gas equipment. I would like to see a delay to this ban until the industry has the equipment strong enough to do the jobs my customers need to do. The technology is not there yet. Don't handicap a industry while we wait for the technology to catch up. (4008-Docket)

Comment: As a lawn and garden business owner and home owner in the city of Santa Rosa, CA I can tell you first hand of the implications that the laws you propose will have on fire danger and the countless people that may die in the next major fire from the decisions you will make. I have seen the devastation that a massive wildfire causes. I have had countless customers in my store crying as they think of the homes or family members that they lost due to fire. I do not oppose transitioning to cleaner outdoor power equipment but as a business owner I know that supply chain issues will guarentee that we will not have sufficient "green" equipment prior to Jan 1, 2024. Given the current global position I beg you to postpone implementation until supply chain issues subside. We live in an area with large open fields, acres and acres of trees and dry underbrush, a lack of water and no current battery powered solution to combat these conditions. Please consider that we don't all live in cities with concrete and asphalt surrounding us. If we can't properly maintain our open spaces then you the board may have to live with the lives lost based on your decision. Please understand that I want a clean environment for my children and I support a transition, I just know that during a global pandemic these goals are not realistic. (4009-Docket)

Comment: Was this really thought out?? It is the livelyhood of many of my customers and they would not be able to transition to the more expensive battery operated units.. Not to mention those units don't last a full day's work. Also. How much more electricity would be used for everybody to keep those batteries charged?. Just doesn't make sense.. How bout a filter on the muffler instead?? (4012-Docket)

Comment: I am writing today as a small business owner in opposition to AB1346. We are 29 years established in the lawn and garden business and currently have 3 locations servicing all over CA. We are a full service shop and carry many brands of equipment servicing homeowners, landscapers and many government municipals and cemeteries. We currently sell gas and electric branded equipment. With the ban on these gas powered equipment we feel that our technology is not ready for this to come to a head in 2024. We will see an increase in unemployment due to some customers saying they will not make the change as needed, along with the consumers who are willing to make the change but not having the funds to do so. There will be more overhead all together; customers will need multiple batteries, reconfiguration of electrical outlets to withstand charging multiple batteries, solar panels being needed in some cases. There will be a need for greater and more extensive training for mechanics and consumers to learn this new expansion. All units with integrated batteries are viewed as disposable and unrepairable and in turn will create more waste in our landfills. More waste means more emissions in other ways. Where is it going to stop? We strongly need to reconsider this ban and think about other impacts this will have on the economy. We are putting out one fire to end up with many more. We deeply care for the environment and going green, but again making this transition happen in less than two years is not enough time to get customers or ourselves ready. (4014-Docket)

Comment: From a seasoned landscaper's perspective; Overlooking the fact that the current technological status of battery operated landscape equipment is not yet satisfactory (to say the least), and is most definitely incomparable to the far superior gas powered equipment, the implementation timeline that is currently set is most definitely inappropriate. Here are a few reasons why; (4017-Docket)

- The massive demand for battery powered equipment that will be caused by this legislation will tax an already stressed supply chain network that will leave tradesmen without the necessary equipment that we need to get the job done. (4017-Docket)
- Heavy labor demand and limited supply have left our industry (and many others) in need of hard working men and women. Reducing efficiency during a time of labor shortages will only increase the demand for labor when there is already a problem with job vacancies. (4017-Docket)
- In an already unprecedented time of large-scale inflation, why does it make sense to rapidly force feed legislation that decreases efficiency and therefore heavily raises cost for goods and services to the residents of California? (4017-Docket)
- There is also the concern of the amount of infrastructure & training that will need to be upgraded in order to accommodate the storage, charging, and maintenance of the alternative equipment. This takes time to do. (4017-Docket)

In summary, professionals in the landscape industry strive to do the right thing and we certainly understand that carbon emissions need to be reduced, but the alternative technology's are not yet there to substitute out the high quality gas equipment. The industry needs a much more extended timeline in order to execute this without failures that will be felt state wide, by ALL. (4017-Docket)

Comment: The industry from Manufactures to End Users are not ready for this drastic deadline. In the Bay Area most of the employees who work for a Commercial Landscape Company 5 days a week, work for themselves on the weekend. We are not going to be able to pass on the cost of battery equipment estimated at a realistic 300% increase to our customers. The subsidies are not going to be there forever. In the end a maintenance worker will lose their weekend job to homeowners who will decide to maintain their property on their own. Which happens in every economic downturn, which is looming around the corner. I'd like to know how the electric grid is going to be able to store enough energy to power all the batteries from this equipment to cars, when last I knew California **pays** Arizona to take the solar energy it cannot store on the current grid. Not to mention what will happen with the abundance of dead batteries from all this equipment. The state should maintain some sort of balance of gas, electric and battery equipment. Not excluding gas altogether. (4018-Docket)

Comment: The state of California holds the fate of thousands of small businesses in the palm of their hands with this zero emission plan. Business owners rely heavily on the sale, repair and use of small engine equipment. This state cares deeply about pollution, which is abnorable, however the idea of a drastic zero emission plan on small engine equipment across the state is irresponsible. By doing so, it will crush retail and repair shops and small landscape businesses and affect the way cities, counties and the state will continue to tend to our parks and national forests. Have you considered how the ever growing wildfires in California will be fought against with a measly battery powered unit? Impossible. With the livelihoods of so many individuals and families at stake please, please think through your decision and consider those who will be forced to close their business. I beg you to ease into the zero emission future and consider all aspects. Please agree upon a transition that is appropriate and accommodating to all those involved. (4019-Docket)

**Agency Response:**

These comments do not provide any objections or recommendations specifically directed at CARB staff's proposed modifications to the original ISOR Proposed Amendments and additional supporting documents described in the March 2022 15-Day Notice. The first comment requests CARB to "enact policy that supports clean air" and does not request any changes to the Proposed Amendments. CARB made no changes based on this comment. As

described in ISOR sections I.B, I.D, II, and IV, the Proposed Amendments are designed to reduce emissions from SORE in order to improve air quality. Emissions of $NO_x$ and ROG from SORE contribute to three criteria air pollutants: ozone, PM, and $NO_2$. All of these criteria air pollutants have adverse health effects. Please refer to section IV.A.2.2.1. in this FSOR and to chapters III and IV in the ISOR for descriptions of how this rulemaking supports accomplishing the attainment of ambient air quality standards for ozone and PM at the earliest practicable date and associated health benefits for California communities.

Several of the comments request or imply alternatives to the Proposed Amendments that would delay implementation of the emission standard of zero for SORE handheld equipment, commercial SORE equipment, or all SORE equipment. One of the comments seems to request CARB to discontinue this rulemaking. Another seems to request CARB to consider an alternative rulemaking to the current rulemaking that would instead eliminate the emission reduction credit program, and states that the elimination of the emission reduction credit program would result in engines that exceed the emission standards being eliminated from the market. The commenters describe a number of concerns to support their requests, including concerns about the higher costs of ZEE; restraints and impacts to landscapers, retail and repair shops, and other businesses; emissions from sources in other countries; the need for SORE for emergency services, to keep garden, lots, parks and forests clean, and to prevent fire; supply chain issues; labor shortages; inflation; availability of long term subsidies; ZEE power compared to SORE equipment; the need for multiple batteries and charging outlets; battery disposal issues; and the need for training for mechanics and consumers.

To clarify, the Proposed Amendments would not prohibit the sale of CARB-certified SORE, nor would they require retail sales of a certain model year to be completed by any deadline. For example, MY 2023 engines could be sold by a retailer after 2023. Emission reduction credit programs may enable manufacturers to continue producing SORE after MY 2023. The Proposed Amendments do not require businesses and other SORE users to retire their equipment when the Proposed Amendments are implemented. Instead, landscapers and others will be able to use their SORE equipment until the end of its life.

As described in sections II.A.1.e and II.A.2.d of this FSOR, in response to 45-day and hearing stakeholder comments and information described in the ISOR about technological feasibility specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers used by professional cleaning services to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for pressure washers using engines with displacement of 225 cubic centimeters (cc) or larger that are the same as those proposed for generators and setting emission standards of zero for MY 2028 and later for these pressure washers. Please refer to section II.A.1. and II.A.2. and the Agency Response in section IV.A.2.4.1. for additional discussion about these modifications.

While the scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice includes delaying the implementation date of the emission standard of zero for higher-power pressure washer engines, the scope does not include changing implementation dates for other types of SORE equipment used by landscapers and other businesses. The scope of the 15-day modifications also does not include modifications to the emission reduction credit program or any other overarching changes to the ISOR Proposed Amendments for handheld equipment or other SORE equipment. The commenters' requests are not directly related to the modifications in the March 2022 15-day Notice, nor the additional documents specified in the March 2022 15-Day

Notice. Therefore, the commenters' requests to delay implementation of the proposed emission standard of zero, to instead eliminate the emission reduction credit program, or to discontinue the rulemaking are beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on these comments.

These comments are similar to comments submitted during the 45-day and hearing comment periods, which are discussed earlier in this FSOR chapter.

For an explanation of the necessity of the current rulemaking, its benefits for the people of California that would occur regardless of emissions from other countries, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1. and ISOR sections I.B, I.D, II, and IV.

Please refer to the Agency Responses in sections IV.A.35, IV.A.2.4.2, and IV.A.13., for discussion of the current technological feasibility of ZEE, why more time is not needed to begin implementation of the proposed emission standards of zero, and potential impacts to businesses.

For an explanation of why CARB does not anticipate that the availability of suitable chainsaws and other equipment necessary for fuel mitigation, firefighting, and other emergency use applications will be adversely affected by this rulemaking, please see sections IV.A.2.5.1, IV.A.2.5.2, IV.A.29.1.2, and IV.A.33.

For discussion of 45-day and hearing comments about battery disposal, charging infrastructure, California electricity sources, and statewide electricity demand for ZEE, please refer to the Agency Responses in section IV.A.6.

## B.2. Furber Saw, Inc.

Comment: There are so many issues the way the ban of gas engines in discussion is being implemented. The OPE dealers in CA have been left out of the process. **I invite our Bay Area Board Member to visit our store, please.** All board members please visit a store near you. We welcome you. We have more knowledge and direct access to the affected Commercial Landscaper whether big or small all day long. That is our customer, we are not a Big Box Store. Staff have not given the Board the full picture with industry knowledge. **For example the battery manufactured unit they are using for Commercial Mower comparison for pricing is NOT the unit the end user in California will be buying.** We are now so low on inventory going into our high season for weed abatement and wild fire defense season which is March-July. All dealers in CA have a wait list for equipment, we received a call from So Cal looking for a specific model just yesterday. This leaves CA in a dire situation whether we are experiencing a drought or raining season. Supply will not be there with battery units when this time comes in 2024, I am very confident in that. Please start with residential rated units. This user can go to the Big Box Store and purchase an inexpensive throw away battery unit that will last a few years. Ease us into this regulation, give us a chance to change our business plan. Then implement one type of unit at a time for the commercial industry. It involves more than you realize. This gives us a chance to give feedback to manufactures on performance and changes needed per unit on this new product. We've had engineers from Japan out regarding gas units so they can see why the unit is not holding up under use and to make changes needed. We will need this process for the Commercial Industry. There is also a Tech. Service Department at each store that will be effected. Thank you for your consideration. (4006-Docket )

**Agency Response:**

This comment does not provide any objections or recommendations specifically directed at CARB staff's proposed modifications to the original ISOR Proposed Amendments and additional supporting documents described in the March 2022 15-Day Notice. CARB made no changes based on this comment. The following provides responses to and clarification for the comment.

In response to the statement, "For example the battery manufactured unit they are using for Commercial Mower comparison for pricing is NOT the unit the end user in California will be buying,": This commenter provides no support or clarification for this claim. CARB has no evidence that suggests that the Husqvarna W520i lawn mower described in the March 2022 15-Day Notice is not available in California. For discussion of supply chain concerns, please see the Agency Response in section IV.A.28.2.

The comment, "Ease us into this regulation, give us a chance to change our business plan. Then implement one type of unit at a time for the commercial industry. It involves more than you realize," seems to request CARB to consider an alternative rulemaking to the current rulemaking that would allow more compliance time for commercial SORE equipment. This request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on the comment. Please see the Agency Response in section IV.A.2.4.2 for discussion of similar comments submitted during the 45-day and hearing comment periods that requested delayed implementation of emission standards of zero for commercial SORE equipment.

The commenter provides no support or clarification for the claim that dealers will not be able to sell SORE in 2024. The proposed emission standards would be implemented beginning with MY 2024. Dealers may still sell MY 2023 or earlier equipment after 2023.

## B.3. Outdoor Power Equipment Institute

Comment: The Outdoor Power Equipment Institute (OPEI) respectfully submits the following comments regarding the California Air Resources Board (CARBs) *Notice of Public Availability of Modified Text and Availability of Additional Documents - Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions* ("15-Day Changes"). (4010-Docket)

OPEI is an international trade association representing more than 100 manufacturers and their suppliers of gas and electric-powered outdoor power equipment, golf cars, and personal transport and utility vehicles, who are directly affected by the December approved for adoption Small Off-Road Engine (SORE) rule amendments. Representing the industry, OPEI submitted comments on November 29, 2021, opposing the amendments. (4010-Docket )

OPEI appreciates CARB's 15-day changes to address stakeholder regulation order, test procedure and certification procedure concerns, including many concerns outlined in OPEI's November 29, 2021, comments. However, many significant administrative procedure, lead time, and handheld evaporative emission concerns outlined remain unresolved by the 15-day changes. Several of these concerns are included again in the following comments. Given the unresolved and the following comments, OPEI opposes the amendments. (4010-Docket )

**Comment 1 – The 15-Day Changes do not Address OPEI Administrative Concerns**

The December 9, 2021 approved for adoption Small Off-Road Engine (SORE) rule amendments set zero-emissions limits for most SORE starting in Model Year 2024. The amendments rely on unsupported and unproven data and assumptions and lack sufficient evidence of technical feasibility (the term "technical feasibility" as used throughout these comments includes cost-effectiveness). The amendment rulemaking package overestimates benchmark/baseline emissions and emission reductions expected from the amendments based on the aforementioned unreliable data. (4010-Docket)

Rulemaking benefits, including emissions, cost and health related benefits, are directly proportional to the difference (delta) between benchmark/baseline emissions versus reductions modeled from the amendments. As a result, overestimates in benchmark/baseline emissions result in overestimates of all benefits outlined in the amendments. Please see OPEI's November 29, 2021 comments. (4010-Docket)

OPEI supports ZEE as one key emission reduction strategy where technology feasibility has been demonstrated. **However, there is currently no one-size-fits-all ZEE approach to satisfy the full range of SORE powered equipment and use cases.** The SORE amendments pose numerous technical feasibility, economic, and implementation challenges for many industry stakeholders. The ability to work all day, and in some cases days on end, without recharging and/or needing dozens of expensive batteries, as well as the cost of battery maintenance over the life the product will continue to be a technology barrier for many user categories and applications which the amendments do not consider. Collectively these challenges are currently insurmountable and will result in significant and unnecessary hardships for manufacturers, retailers and end-users, culminating in an early market shortfall of products with high consumer need and demand. (4010-Docket)

**Agency Response:**

This comment does not request changes to the modifications in the March 2022 15-Day Notice and is not related to the additional documents specified in the March 2022 15-Day Notice. This comment is similar to comments OPEI submitted on November 29, 2021. The comment discusses users' battery needs and seems to ask CARB to change the SORE2020 emissions inventory model. The SORE2020 emissions inventory model was developed based on the best available data. OPEI provided no substantive data demonstrating that the inventory overestimates emissions. Please refer to the Agency Responses in sections IV.A.2, IV.A.14 and IV.A.35.1 for discussion of OPEI's November 29, 2021, comments. CARB made no changes based on this comment.

Comment: **Comment 2 – The Approved for Adoption Rule and 15-Day Changes Fail to Provide the Lead Time Required by the Clean Air Act**

The lead time provided by the amendments is fundamentally inconsistent with the requirements of the Federal Clean Air Act. As a result, OPEI requests that the implementation dates for the amendments be revised accordingly, shifting the implementation of the requirements from model year 2024 to model year 2026. In addition to providing stakeholders the federally required lead time, a revised implementation date will allow for CARB to apply for and obtain a waiver of Federal preemption from the U.S. Environmental Protection Agency (EPA), as required under Section 209 of the Clean Air Act. (4010-Docket)

In the Initial Statement of Reasons (ISoR) for the amendments to the SORE rules, CARB staff notes:

> "New emission standards for all SORE would apply beginning with MY 2024 to provide the lead time required by the federal Clean Air Act § 209 in U.S. Code § 7543. That section requires that, "California … adopt such standards at least 2 years before commencement of the period for which the standards take effect." The two-year lead time provides manufacturers with lead time to develop and manufacture equipment to meet the new emission standards in the Proposed Amendments."[1] [Footnote 1: Public Hearing to Consider Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions. Staff Report: Initial Statement of Reasons, October 12, 2021, at 163.] (4010-Docket)

Additionally, during the March 24, 2021 workshop, CARB Senior Attorney Matthew Christen noted:

> "The Clean Air Act requires a two-year lead time for new standards adopted by California, so that's generally the reason why we selected the 2024 as the earliest date, because its two years from the potential effective date of the upcoming regs."[2] [Footnote 2: Public Workshop to Discuss Potential Changes to the Small Off-Road Engine Regulations, at 59:59 (March 24, 2021), available at: https://www.youtube.com/watch?v=K6xYWyZRrvQ.]; and (4010-Docket)
>
> "I just wanted to clarify, I meant the date of adoption on Greg Knott's question. Its two years from the date of adoption, which would put us at January 1, 2024, considering the Board will be considering this in the fall. So, I just wanted to make that clarification.[3] [Footnote 3: Public Workshop to Discuss Potential Changes to the Small Off-Road Engine Regulations, at 1:03:11 (March 24, 2021).] (4010-Docket)

Importantly, the amendments to the SORE regulations have not yet been adopted. In fact, the amendments cannot be adopted until all changes, including these 15-day changes, are finalized and CARB staff completes the Final Statement of Reasons (FSoR). Stakeholders must have certainty before proceeding to test, change product designs, and seek certification for products to new regulations. Considering it is already mid-April 2022 and staff must consider comments submitted in response to these 15-day changes, it is doubtful that the FSoR will be completed for submission to the Office of Administrative Law (OAL) before this summer. This timing does not provide the two-year lead time required by the Clean Air Act, as described by the ISoR and CARB Senior Attorney Christen. (4010-Docket)

Additionally, implementation of the new SORE amendments less than two calendar years after those standards are adopted does not provide the lead time needed for manufacturers to comply with the substantive changes of the amendments. Practically speaking, enforcement of new standards commences with the certification stage when CARB staff makes compliance determinations for the upcoming model year when evaluating Executive Order applications from manufacturers. This process may start as early as March or April of the year prior to the commencement of the model year for some manufacturers (e.g., March or April 2023) and extends through the end of the prior year. A strict two-year lead time based on calendar years does not account for this certification process and timing (when enforcement truly beings), which happens well-before the actual implementation date. (4010-Docket)

**Agency Response:**

This comment reiterates comments OPEI submitted on November 29, 2021, and includes a discussion of the commenter's assessment of lead time required by the Clean Air Act. This comment did not request a change specific to the proposed modifications in the March 2022 15-Day Notice. Please refer to the Agency Response in section IV.A.10 for discussion of

comments related to the lead time required by the Clean Air Act for California's adoption of requirements for off-road engines. CARB made no changes based on this comment.

Comment: **Comment 3 – The Approved for Adoption Rule and 15-Day Changes Fail to Provide a Reasonable Path for Handheld Engines to Generate Evaporative Credits Needed to allow Manufacturers to use Fairly Banked Exhaust Credits** (4010-Docket)

The current Regulation Order does not include an Averaging, Banking and Trading (ABT) program by which handheld manufacturers can bank evaporative emission credits. Evaporative ABT will be necessary for manufacturers to use fairly earned exhaust credits starting in model year 2024. Absent a fair strategy, manufacturers will be unable to utilize exhaust credits they earned as part of current regulations. OPEI approached CARB rulemaking and Executive Staff this winter to discuss several fair solutions that would allow manufacturers to use banked credits. Unfortunately, industry remains concerned CARB staff's 15-day proposal will not resolve the issue due to insufficient lead time to implement new testing requirements needed to generate credits, and ultimately lack of time to generate evaporative credits to match current 5-year exhaust credit banks. (4010-Docket)

Handheld equipment, such as trimmers / chain saws cannot bank evaporative credits under current ABT strategies. The 15-day amendment proposal will allow manufacturers to generate evaporative credits based on diurnal testing starting in 2023 – However, today there is no regulation that allows handheld manufacturers to certify by diurnal testing. As a result, the current evaporative emission regulations have no strategy for handheld manufacturers to generate evaporative credits to use with earned exhaust credits. (4010-Docket)

In accordance with the approved for adoption amendments, evaporative emission limits will go to zero in 2024. In order for manufacturers to use banked exhaust credits they must have some bank of evaporative credits (which there is currently no strategy for and no "handheld" credit bank exists) or must buy or trade for existing credits. In CARB rulemaking materials staff assumed all limited evaporative credits would be used by generator manufacturers. It is unclear to OPEI why this assumption was made. Nevertheless, due to the limited number of evaporative credits, OPEI believes it is unlikely manufacturers will be willing to sell or trade credits to handheld manufacturers – As a result, handheld manufacturers will be forced out of the market without being allowed to use earned exhaust credits. (4010-Docket)

The 15-day changes propose a new "diurnal" test allowance for manufacturers. However, there is no handheld test experience with this procedure or limits, and conditioning + testing + certification may take up to a year per family. As a result, manufacturers may have only a few months (July 2023 – December 2023) to generate evaporative credits for families which they can complete testing on, in order to use their earned exhaust credits. OPEI is concerned this is insufficient time to generate the amount of EVAP credits needed to be able to use banked exhaust credits. (4010-Docket)

As an alternative, OPEI has proposed several options to allow manufacturers to use fairly earned exhaust credits beyond model year 2023: (4010-Docket)

1) Retain the current evaporative limits and "permeation" test requirements beyond 2024 for "handheld" equipment. This strategy is identical to the one already included in the SORE amendments for CO where CARB retained current (non- zero) CO exhaust emission limits beyond 2024 for the same reason – A lack of an existing or proposed CO credit scheme. This situation is

the same as already approved by the Board. Additionally, limited CARB data suggests handheld equipment certified under current "permeation" requirements would comply with equivalent diurnal standards. (4010-Docket)

2) Retain the current "permeation" test requirements beyond 2023 for "handheld" equipment. Additionally: (4010-Docket)

   a. Allow manufacturers to generate evaporative credits based on the existing "permeation" (tank) limits of 2.0 g/m^2/day retroactively or as soon as the regulation is effective; and (4010-Docket)

   b. Allow manufacturers to generate evaporative credits based on the existing fuel line limits of 15 g/m^2/day retroactively or as soon as the regulation is effective; and (4010-Docket)

   c. Eliminate the diurnal test requirement and limits for MY 2024+; and (4010-Docket)

   d. Set "permeation" and fuel line evaporative limits to zero for MY 2024 with the use of credits earned in 2023 (as described in a. and b. above) permitted; and (4010-Docket)

   e. Allow the use of exhaust HC credits banked under the current strategy to be used for evaporative emissions (see 3 below). (4010-Docket)

3) Include an optional provision that allows manufacturers to convert exhaust emission credits earned through model year 2023 into evaporative emission credits (in lieu of the hot soak plus diurnal emission standard set forth in sections 2754(a)(3) table 2). Additionally, OPEI proposes a conservative credit calculation method which will neither negatively influence the emission reduction in the ISOR nor change the expected emission reductions of $NO_x$ and ROG in the 2016 State SIP Strategy measure for SORE of 4 and 36 tons per day (tpd), respectively, in 2031, as compared to the Baseline Scenario emissions described in the ISOR. OPEI proposes the following credit calculation method to calculate "evaporative emissions over median life" based on diurnal emission standard (0.95 + 0.056 x nominal capacity [liters]) set forth in sections 2754(a)(1) table 1. With model year 2024 the hot soak plus diurnal emission standard set forth in sections 2754(a)(3) table 2 will be zero. Thus "evaporative emissions over median life" will be negative and can be offset by banked positive exhaust emission credits. In addition, an "Uncertainty Factor" UF of 1,5 is proposed as a factor to include hot soak emissions, as no measurements are to be carried out for this. (4010-Docket)

   For each evaporative family OPEI proposes, evaporative emission credits (negative) are to be calculated according to the following equation and rounded to the nearest hundredth of gram. Consistent units with two significant digits are to be used throughout the equations. (4010-Docket)

   Credits = -EFELD x production volume x ML x UF (4010-Docket)

   (Credits = -(0.95 + 0.056 x nominal capacity [liters]) x production volume x ML x UF) (4010-Docket)

   Where:

   EFELD = Diurnal emission standard set forth in section 2754 (a)(1) – EMEL (4010-Docket)

   EMEL = 0.00 gram (4010-Docket)

ML = Median Life [days]: 1095 days corresponds to 3 years (according enclosures figure 4: Table 16. Median Life (years) Lawn & Garden and Light Commercial Categories (SORE2020 Model))

UF = Uncertainty Factor of 1,5* [Footnote *: Consideration of hot soak emissions not included in section 2753 (c) and 2754(a)(1) table 1. Determination based on Table 20 of CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020 final report.] (4010-Docket)

4) Per OPEI's February 2, 2022 conference call with Ms. Dunwoody and Ms. Chang, allow conditional diurnal EO approval while manufacturers complete diurnal testing, which would allow manufacturers to generate credits based on the conditional approval date when successful diurnal testing is completed. (4010-Docket)

OPEI believes these strategies are consistent with options already included in the amendments, and/or consistent with the spirit of driving to zero-emissions starting with MY 2024 while minimizing the hardships on manufacturers and consumers and eliminating unnecessary new certification work for CARB. OPEI requests CARB reconsider these alternatives before finalizing the rule. (4010-Docket)

**Agency Response:**

This comment mentions 15-day modifications related to the March 2022 15-Day Notice and includes statements of the commenter's opinions regarding those modifications and the ISOR Proposed Amendments. This comment reiterates comments OPEI submitted on November 29, 2021.

CARB disagrees with the statement, "handheld manufacturers will be forced out of the market without being allowed to use earned exhaust credits." As described in the March 2022 15-Day Notice and in sections II.A.2.c and II.A.2.h of this FSOR, CARB made modifications to §§ 2753(c), 2754(a), and 2755 to allow an applicant to certify an evaporative emission control system for engines with displacement less than or equal to 80 cc to the diurnal emission standards in § 2754 in lieu of the permeation emission standards in § 2755 and follow the certification procedures outlined in CP-902, adopted July 26, 2004, and amended September 18, 2017. These modifications will enable manufacturers to earn more evaporative emission credits. The commenter does not provide evidence to support its claims.

In response to the statement, "manufacturers may have only a few months (July 2023 – December 2023) to generate evaporative credits for families which they can complete testing on, in order to use their earned exhaust credits. OPEI is concerned this is insufficient time to generate the amount of EVAP credits needed to be able to use banked exhaust credits": The commenter does not provide evidence to support its claims. CARB does not have information to suggest that a manufacturer of engines with displacement less than or equal to 80 cc could not earn or trade for a sufficient amount of evaporative emission credits to enable the manufacturer to use its banked exhaust emission credits.

The March 2022 15-Day Notice did not include any changes to the regulatory alternatives already identified in the rulemaking documents included in the October 2021 45-Day Notice. Therefore, commenter's suggested alternatives are beyond the scope of the modifications in the March 2022 15-Day Notice and are similar to the commenter's November 29, 2021, comments. The commenter did not provide evidence to support its suggested alternatives or claims. CARB made no changes based on this comment.

Please refer to the Agency Responses throughout section IV.A for discussion of OPEI's November 29, 2021, comments, which are identified by commenter codes 524 and 560. The index in section VI.A identifies the pages where OPEI comments occur.

Comment: **Comment 4 – The Approved for Adoption Rule and 15-Day Changes Force Tilt Test Requirements for Many Engines and Applications that Contradict Manufacturer Operating and Handling Limits** (4010-Docket)

Amended TP 902 will require engines and equipment to be tested in orientations that are inconsistent with manufacturer's designed and recommended operating angles. The regulations should be consistent with manufacturer recommendation, not mis-use or unrecommended conditions. OPEI requests CARB staff modify this language to limit tilt test angles to the manufacturer's recommendations and not an arbitrary value of 90 degrees. Engine and equipment manufacturers can supply CARB installation instructions, application models, and operator manual instructions that provide the maximum operating angles of the engine / equipment as part of the application process to support the test data collected under this requirement. (4010-Docket)

**Agency Response:**

This comment suggests that CARB modify the tilt sequence in TP-902 § 5.2 of the Proposed Amendments to limit the tilting angle based on a manufacturer's recommendations. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice does not include modifications to TP-902 § 5.2 in regards to the tilt sequence, except to make measuring and recording the mass of the carbon canister after purging and after performing the tilt sequence optional. This commenter's request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on the comment. Please refer to Agency Response 80 in Attachment A to this FSOR for discussion of a similar comment.

Comment: **Comment 5 – The Approved for Adoption Rule and 15-Day Changes Result in Unclear Requirements for Large Spark-Ignited Engines** (4010-Docket)

OPEI is seeking additional clarification regarding the applicability of the amendments to Large Spark Ignited Engines (LSI) greater than 19 kW, less than 1 liter. Section 2754(a)(1) has been amended to confirm that LSI engines must meet the evaporative requirements in Table 1 for 225cc displacement from 2013 – A diurnal standard of 1.20 + 0.56 x nominal capacity, or design-based requirements of fuel line limits of 15 g/m^2/day plus fuel tank limits of 1.5 g/m^2/day plus carbon canister requirements outline in TP-902. OPEI appreciates this clarification, however several questions remain. (4010-Docket)

First, OPEI is seeking clarification that design-based certification will be permitted in accordance with the limits of Table 1. (4010-Docket)

Second, OPEI is seeking clarification of the applicability of other amendments to the Regulation Order that could apply to LSI engines. Final Regulation Order Chapter 9, Division 3, Title 13, Article 4.5, Section 2433(b)(4)(B), 2008 revisions, requires that LSI engines less than 1 liter must meet the SORE evaporative requirements of Title 13, Chapter 15, Article 1. This reference does not specify a dated edition. This may imply that applicable SORE Regulation Order requirements amended since 2008 also apply. (4010-Docket)

Third, OPEI is seeking clarification that TP-902, adopted July 26, 2004 and CP- 902, adopted July 26, 2004 will continue to apply for purposes of certification of LSI engines less than 1 liter. Final Regulation Order Chapter 9, Division 3, Title 13, Article 4.5, Section 2433(d)(2), 2008 revisions, requires that LSI engines be certified to TP-902 and CP-902 *adopted July 26, 2004*. A LSI rulemaking is needed if CARB seeks to require that manufacturers comply with 2016 or 2021 amendments of TP-902 and CP-902 moving forward. (4010-Docket)

**Agency Response:**

This comment requests clarification of applicability of the Proposed Amendments to LSI engines. This commenter's request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice because the Notice did not include modifications to regulatory provisions applicable to, or documents related to LSI engines. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on the comment. To clarify, the Proposed Amendments apply to LSI engines with displacement less than or equal to one liter. Design certification will continue to be available for LSI engines with displacement less than or equal to one liter after MY 2023.

Section 2433(d) of Title 13 of the California Code of Regulations provides,

(d)(1) The test procedures for determining certification and compliance with the standards for exhaust emissions from new LSI engines with an engine displacement less than or equal to 1.0 liter sold in the state are set forth in "California Exhaust Emission Standards and Test Procedures for 1995-2004 Small Off-Road Engines," as last amended July 26, 2004; "California Exhaust Emission Standards and Test Procedures for 2005-2012 Small Off-Road Engines," adopted July 26, 2004, and as last amended October 25, 2012; and, the collective "California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1054)," adopted October 25, 2012; and, the "California Exhaust Emission Standards and Test Procedures for New 2013 and Later Small Off-Road Engines; Engine-Testing Procedures (Part 1065)," adopted October 25, 2012.

(2) The test procedures for determining certification and compliance with the standards for evaporative emissions from new model year 2011 and subsequent LSI engines with an engine displacement less than or equal to 1.0 liter are set forth in "Test Procedure for Determining Permeation Emissions from Small Off-Road Engines and Equipment Fuel Tanks (TP-901)," adopted July 26, 2004, "Test Procedure for Determining Diurnal Evaporative Emissions from Small Off-Road Engines and Equipment (TP-902)," adopted July 26, 2004, "Certification and Approval Procedure for Small Off-Road Engine Fuel Tanks (CP-901)", adopted July 26, 2004, and "Certification and Approval Procedures for Evaporative Emission Control Systems (CP-902)", adopted July 26, 2004.

The Proposed Amendments do not affect the provisions of section 2433(d).

Comment: **Comment 6 – The Regulation Order is Unclear Regarding "Replacement Engines" Less than 225cc Beyond MY 2023** (4010-Docket)

Replacement engines less than 225cc have historically not been an issue, because certified engines were usually available. However, starting in model year 2024, it is likely that most less than 225c engines will be unavailable for the California market. A clear replacement engine strategy is therefore required for this category of engine. (4010-Docket)

The regulation order prohibits replacement of less than 225cc engines produced before 1995. The regulation order does not specifically address replacement engines produced after 1995. In the absence of any specific language addressing replacement engines less than 225cc for units manufactured after 1995, it is OPEI's understanding that less than 225cc replacement engines are unconditionally permitted, and will continue to be permitted beyond January 1, 2024 as long as the engines at least met the regulations of the original equipment. (4010-Docket)

If this understanding is not correct, OPEI request CARB add provisions for allowing less than 225cc replacement engines in the same way greater than 225cc displacement replacement engines are permitted by Section 2403(g)(2). Absent such a provision, manufacturers will be unable to meet warranty requirements included in the regulation. (4010-Docket)

**Agency Response:**

This comment requests that CARB modify the replacement engine requirements in section 2403(g) of the exhaust emission regulations to include new provisions for engines with displacement less than 225 cc. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice does not include modifications to replacement engine requirements for engines with displacement less than 225 cc. This commenter's request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-day Notice, and CARB made no changes based on the comment. CARB disagrees with the commenter's assessment of the replacement engine requirements and the commenter's conclusions. The Proposed Amendments do not prohibit the sale of CARB-certified SORE, nor do they require retail sales of a certain model year to be completed by any deadline. For example, MY 2023 engines could be sold by a retailer after 2023.

Comment: **Comment 7 – The Rational for Additional Supporting Documents Added to the Record is Unclear. Without Discussions in the Record Supporting these Documents Stakeholders Cannot Confidently Understand the Meaning and Intent of these Documents or Respond with the Certainty Needed for Rulemaking Purposes.** (4010-Docket)

The 15-day changes include the addition of dozens of new documents to the record not referenced in the original rulemaking documents or in these 15-day changes. The intent of these documents is unclear which makes it difficult for stakeholders to provide comments. OPEI may supplement these comments later if additional information about these documents is provided. Nevertheless, OPEI has the following comments regarding documents added to the record. Due to time constraints and uncertainty regarding the additional documents, these comments are not exhaustive of all documents added to the record. (4010-Docket)

**Agency Response:**

This comment discusses the commenter's assessment of and opinions regarding the additional documents added to the record. The March 2022 15-Day Notice complied with APA requirements for adding documents to the record for this rulemaking. The additional documents have been used in responses to comments in this FSOR.

Comment: **Comment 7a – Document 2 DTSC_2021 "How is California Doing with Recycling Rechargeable Batteries"** (4010-Docket)

The applicability of the document and California Rechargeable Battery Recycling Act to this rulemaking is unclear. It is OPEI's understanding that in-use application of the Act is for "small" batteries less than 100 W-hr. To that point, outdoor power equipment batteries, despite their wide use, are not included in the list of any of the Battery Type and Their Common Application examples. Many outdoor power equipment batteries, especially those for commercial grade outdoor power equipment are much larger than 100 W-hr. (4010-Docket)

Recycling and transportation challenges are ongoing concerns with "large format" batteries greater than 300 W-hr. There are many reports of lithium-ion batteries igniting during transportation. In fact, a lithium-ion battery fire is believed to be a significant contributor to the sinking of the Felicity Ace transport ship in the Atlantic this year. Large format batteries, like those found in many outdoor power equipment applications need special handling consideration for storage and transportation, including recycling, which has yet to be resolved. (4010-Docket)

Finally, while the number of lithium-ion batteries in service has grown significantly in recent year, Table "Rechargeable Batteries Collected by Weight" suggests a year- over-year *decrease* in battery recycling. Based on this table, it can be reasonably concluded that additional support and consideration for recycling lithium-ion batteries is needed to support the millions of batteries anticipated to be added to the fleet each year in response to this rule. (4010-Docket)

**Agency Response:**

This comment requests no change to the 15-day modifications. CARB made no changes based on this comment. In response to the statement, "The applicability of the document and California Rechargeable Battery Recycling Act to this rulemaking is unclear. It is OPEI's understanding that in-use application of the Act is for "small" batteries less than 100 W-hr. To that point, outdoor power equipment batteries, despite their wide use, are not included in the list of any of the Battery Type and Their Common Application examples. Many outdoor power equipment batteries, especially those for commercial grade outdoor power equipment are much larger than 100 W-hr,": OPEI includes no supporting evidence for its claim that the Rechargeable Battery Recycling Act is limited to batteries with capacity less than 100 watt-hours. The California Rechargeable Battery Recycling Act does not define the word "small". However, as noted in the document, "How is California Doing with Recycling Rechargeable Batteries," the Act defines rechargeable batteries as a "small, ***nonvehicular***, rechargeable nickel-cadmium, nickel metal hydride, lithium ion, or sealed lead-acid battery, or a battery pack containing these types of batteries" (emphasis added) [DTSC, 2021[171]].

In response to the statement, "Recycling and transportation challenges are ongoing concerns with "large format" batteries greater than 300 W-hr. There are many reports of lithium-ion batteries igniting during transportation. In fact, a lithium-ion battery fire is believed to be a significant contributor to the sinking of the Felicity Ace transport ship in the Atlantic this year. Large format batteries, like those found in many outdoor power equipment applications need special handling consideration for storage and transportation, including recycling, which has

[171] Department of Toxic Substance Control (DTSC). 2021. How is California Doing with Recycling Rechargeable Batteries? October 5, 2021

yet to be resolved,": This statement is not directed at the document CARB added to the record. The commenter does not provide evidence to support its claims. This statement is similar to statements OPEI made in its November 29, 2021, comments, which are discussed in the Agency Response in section IV.A.6.2. of this FSOR.

In response to the statement, "Finally, while the number of lithium-ion batteries in service has grown significantly in recent year, Table "Rechargeable Batteries Collected by Weight" suggests a year- over-year decrease in battery recycling. Based on this table, it can be reasonably concluded that additional support and consideration for recycling lithium-ion batteries is needed to support the millions of batteries anticipated to be added to the fleet each year in response to this rule,": This additional document discusses battery recycling program and tracking that is already in place. The commenter does not provide evidence to support its claims. CARB disagrees with the commenter's assertions.

Comment: **Comment 7b – Document 14 CARB 2018 "2012 California Survey of Residential Lawn and Garden Equipment Owners: Population and Activity"** (4010-Docket)

The applicability of the document to this rulemaking is unclear. First, the document is based on nearly three times the number of survey participants yet suggests significantly lower annual use numbers of residential equipment than finalized in CARB's SORE2020 emissions model. Annual Use is directly proportional to emissions, and as a result, increases in Annual Use in SORE2020 (based on significantly less survey participants) results in higher emissions than if 2011 survey Annual Use averages were applied. In turn, the use of the CARB and CSU-F 2018-2019 survey data results in higher fleet emissions and a much different narrative, and cost and health impact than if the larger sample size 2011 survey Annual Use estimates were used. (4010-Docket)

| HR/YR<br>Product | 2011 Survey | SORE2020 |
|---|---|---|
| Chain Saw | 8 | 18 |
| L&G Tractor | 15 | SEE RLM |
| Leaf Blower | 12 | 15 |
| RLM | 26 | 83 |
| WBM | 15 | 19 |
| Wood Splitter | 14 | 48 |

Second, as discussed in OPEI's November 29, 2021 comments, neither the CARB CSU-F 2012 nor the most recent CARB CSU-F 2018-2019 survey normalize data for important factors that impact equipment use, such as residential lot size. (4010-Docket)

Finally, as discussed in OPEI's November 29, 2021 comments, neither the CARB CSU-F 2012 nor the most recent CARB CSU-F 2018-2019 survey provide evidence to correlate responses to real world use. There is no evidence survey participants track or know with confidence the answers to survey questions – Especially when considering specific equipment run time as part of a longer task (for example, how long is a chain saw running during the task of "cutting firewood", a task which also potentially includes splitting logs by hand or with another machine, and handling wood). OPEI studies found that landscapers overestimate riding mower run-times by 2-3 times on average. In fact, every landscaper surveyed by OPEI overestimated equipment use when comparing survey responses to equipment hour meters. (See OPEI November 29, 2020 comments.) Neither CARB nor CSU-F have tried to correlate survey responses to real- world use or accounted for this unknown. Accurate responses are required to assure survey confidence. Evidence suggests these surveys are not rooted in accurate responses. As a result, both the 2012 and 2018-2019 survey data must be studied and examined with great caution. (4010-Docket)

**Agency Response:**

This comment includes expressions of the commenter's opinions regarding the 2012 survey, the SORE2020 emissions inventory model, and the CSUF survey. The commenter reiterates comments OPEI submitted on November 29, 2021, and states its opinion, "both the 2012 and 2018-2019 survey data must be studied and examined with great caution." The commenter compares its assessment of 2012 survey use times with those used in SORE2020 in the SORE2020 technical document [CARB, 2020[172]]. CARB disagrees with the commenter's conclusions. CARB made no change based on this comment.

The 2012 survey data were added to the record because they were referenced in the SORE2020 technical document, which was discussed in 45-day comments [CARB, 2018[173]]. It is unclear how OPEI calculated substantially different use times than those calculated by CARB for some equipment types using the 2012 survey data. However, the SORE2020 technical document compares the use times calculated by CARB using the 2012 survey data to equipment use times in SORE2020 [CARB, 2020[174]].

In response to the statement, "Accurate responses are required to assure survey confidence. Evidence suggests these surveys are not rooted in accurate responses,": The commenter does not provide evidence to support its statements and conclusions. CARB disagrees with the commenter's conclusions. Surveys remain the best way to get statistically significant data about equipment population and use. The commenter does not provide evidence that another method would result in a more accurate estimation of SORE population and activity in California.

In regards to normalizing data for residential lot size, OPEI seems to be referring to the household portion of the CSUF survey. From the SORE2020 technical document (Appendix A), "staff assessed that a revised weighting method should be utilized to take into account geographical areas separated by northern, central/upper, and southern portions of the state. As a result, in the SORE2020 Model, geographical weights are used to proportionally reflect the higher concentration of households primarily in the southern and northern bay areas of the state, as compared to the rural regions of central and far northern California. The data obtained from the surveys are further aggregated by respondent dwelling: single family residence (SFR) or non-SFR (apartment/condo/town house/mobile home). In addition, single family homes are distinguished from apartment/condo dwellings as a weighting factor, due to the greater likelihood of possessing small engine equipment." [CARB, 2020[175]]. OPEI provides no evidence that the weighting used by CARB is inappropriate.

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[172] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[173] CARB. 2018. 2012 California Survey of Residential Lawn and Garden Equipment Owners: Population and Activity. Prepared by staff of the Air Quality Planning and Sciences Division. Revised October 1, 2018.

[174] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[175] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

Please refer to the Agency Responses in sections IV.A.2, IV.A.14 and IV.A.35.1 for discussion of OPEI's November 29, 2021, comments.

Comment: **Comment 7c – Document 15 Freedonia 2018 "Industry Study #3674 Power Lawn & Garden Equipment"** (4010-Docket)

The applicability of the document to this rulemaking is unclear. First, the document is based on dollar growth, which is difficult to draw conclusions about growth or trends of specific equipment or power types, including low-cost zero-emission equipment penetration. (4010-Docket)

Second, the report purchase and use trends appears based on a limited number of surveys. Figure 2-4 appears to be based on roughly 1100 surveys nation-wide. Figure 2-5 appears to be based on just 300 surveys nation-wide. (4010-Docket)

Finally, the reliability of the data and Freedonia group subject expertise is questionable. The report erroneously states "individual states may create more stringent standards". With the exception of California though the wavier process, adoption and enforcement of small engine emission regulations is prohibited by the Clean Air Act and 40 C.F.R. Part 1074. The report erroneously states "Power lawn and garden equipment (including blowers, commercial mowers, garden tractors, and trimmers) primarily use two-stroke engines, which emit more pollution than the four-stroke engines in motor vehicles…". This characterization of *commercial mowers, garden tractors*, and other implied equipment is obviously incorrect to most equipment users. The report notes "(ICE) growth will trail that for electric equipment, but engine-driven products will continue to account for the majority of sales". Again, this is not true. OPEI's Market Statistics program, where members report to OPEI monthly shipments, finds that 56% of all outdoor power lawn and garden equipment shipped in 2021 was "zero-emissions equipment". 63% of handheld products shipped were zero-emissions equipment, including approximately 80% of all handheld blowers and hedge trimmers, and 37% of all walk-behind mowers shipped were zero-emissions equipment. Finally, Figure 3-7 grossly underestimates the market share increase of electric walk-behind mowers, suggesting that the dollar percentage of electric walk-behind mowers is approximately 10-15% of gas-powered mowers in 2022. As noted above, shipments of electric mowers exceeded 35% of total units shipped in 2021. (4010-Docket)

For these reasons, the Freedonia reports are unreliable for rulemaking purposes. (4010-Docket)

**Agency Response**

This comment includes expressions of the commenter's opinions regarding the Freedonia report added to the record in the March 2022 15-Day Notice. CARB made no changes in response to this comment. The commenter discusses statements it believes are inaccurate in the report. The commenter states, "the Freedonia reports are unreliable for rulemaking purposes." CARB disagrees with the commenter's conclusion. The Freedonia report was added to the record because the SORE2020 technical document cited it. Growth rates in the Freedonia report were compared to the growth rates developed for the SORE2020 emissions

inventory model [CARB, 2020[176]; The Freedonia Group, 2018[177]]. The Freedonia report was not used as a primary source in development of growth rates. The commenter discusses its data, which it has not shared in sufficient detail with CARB to enable its use by CARB, for sales that occurred after SORE2020 was finalized. The commenter does not provide evidence that CARB's use of the Freedonia report was inappropriate or that any inaccuracies in the Freedonia report resulted in inaccuracies in the SORE2020 emissions inventory.

Comment: **Comment 7d – Documents 30 & 31 USCPSC 2015a. "Letter to Greg Knott, OPEI" and USCPSC 2015b. "Study of Fuel Leaks Associated with Outdoor Ground- Supported Gasoline-Powered Equipment".** (4010-Docket)

The applicability of these document to this rulemaking is unclear. In 2016 and 2017 the OPEI B71.10 Committee had several meetings/discussions/communications with CPSC staff regarding "fuel leaks associated with outdoor ground-supported gasoline-powered equipment". Following a February 2016 meeting with CSPC staff and an OPEI follow-up letter outlining our analysis of CPSC data CPSC responded "CPSC staff agrees with your assessment that the rate of reported stress cracks and seam splits from tanks has decreased (since before the B71.9-2013 standard)… Based on the discussion at our technical meeting in February, where OPEI members explained the changes made in the ANSI B71.10 standard and the associated reduction in reported stress cracks and same splits, CPSC staff, at this time, does not recommend modifications to the B71.10 standard regarding the stress crack performance tests (elevated temperature and cyclic pressure tests)". Additionally, in response to the draft B71.10-2018 revision, CPSC staff, as a participant on the standard consensus body responded "The list of proposed changes to the B71.10 is impressive and substantial. (4010-Docket)

CPSC staff is confident that the addition of requirements for fuel filters, vent grommets, fuel shut-off valves, impact tests, ultraviolet (UV) light exposure tests, ozone exposure tests, and test sample conditioning to cold environments will reduce the likelihood of incidents and recalls associated with outdoor ground-supported, gasoline powered equipment (OGSGPE) fuel leaks. CPSC staff believes the proposed requirements will represent the fuel system components better as they are used in the field.". See Annex A. (4010-Docket)

**Agency Response**

This comment describes the commenter's assessment of communications between the commenter and U.S. Consumer Protection Safety Commission (USCPSC) staff on fuel leaks in SORE equipment and USCPSC's report on such fuel leaks [USCPSC, 2015[178]]. The USCPSC report was cited in the SORE2020 technical report and was included in the March 2022 15-Day

[176] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

[177] The Freedonia Group. 2018. Power Lawn & Garden Equipment. Industry Study #3674. September 2018.

[178] USCPSC. 2015. Study of Fuel Leaks Associated with Outdoor Ground-Supported Gasoline-Powered Equipment. Report prepared by Han Lin, staff of the U.S. Consumer Product Safety Commission (USCPSC), Division of Combustion and Fire Sciences, Directorate for Engineering Sciences. September 2015.

Notice to add it to the rulemaking record [CARB, 2020[179]]. The USCPSC report discussed frequently found issues with SORE, including splits, stress cracks, and tank seam gaps. The commenter discusses revisions to the ANSI/OPEI B71.10 standard that are intended to reduce the frequency of fuel leaks in new engines that conform to the standard. While the documents submitted by OPEI suggest that fuel leaks in new SORE may decrease over time, the commenter does not provide evidence that the fuel leak rate of SORE in California has decreased.

Annex A in OPEI's comments, titled "OPEI CPSC "Study of Fuel Leaks Associated with Outdoor Ground-Supported Gasoline-Powered Equipment" Communications (Comment 7d)," includes two letters from USCPSC staff to Greg Knott from OPEI, dated July 11, 2016, and October 12, 2017, respectively. The letters discuss concerns OPEI expressed to USCPSC staff, USCPSC staff's concerns regarding fuel filters, grommets and moving parts contacting fuel tanks, and revisions to the ANSI/OPEI B71.10 standard. They do not request a change to the Proposed Amendments. They appear to be intended to provide context for this comment. CARB made no changes based on these letters.

Comment: **Comment 7e – Document 35 CARB-2022b "Evaluation of Data Questioned by OPEI"** (4010-Docket)

The inclusion of the CARB staff evaluation of OPEI CARB CSU-F 2018-2019 survey data is welcomed by OPEI. However, we express our concern and confusion as to why this document was not previously provided to OPEI, and/or ask why OPEI and industry experts were not invited to discuss the responses together before they were published. OPEI scheduled multiple meetings with CARB staff to discuss these concerns, and provided the ground work and initial rational to CARB for the subject analysis (after CSU-F and CARB failed to conduct the analysis they were contractually obligated to do on their own as part of the project), yet CARB did not reengage OPEI in discussion about the subject before finalizing the SORE2020 model. (4010-Docket)

First, as discussed in OPEI's November 29, 2021 comments, neither the CARB CSU-F 2012 nor the most recent CARB CSU-F 2018-2019 survey provide evidence to correlate responses to real world use. There is no evidence survey participants track or know with confidence the answers to survey questions – Especially when considering specific equipment run time as part of a longer task (for example, how long is a chain saw running during the task of "cutting firewood", a task which also potentially includes splitting by hand or with another machine, and handling wood). On the contrary, OPEI surveys (of the same questions administered by CSU-F) found that landscapers overestimated riding mower run-times by 2-3 times on average. In fact, every landscaper surveyed by OPEI overestimated equipment use when comparing survey responses to equipment hour meters. (See OPEI November 29, 2021 comments.) Neither CARB nor CSU-F have tried to correlate survey responses to real-world use or accounted for this unknown. Accurate responses are required to assure survey confidence. Evidence suggests these surveys are not rooted in accurate responses. (4010-Docket)

Second, the report confirms OPEI's comments noted in its November 29, 2021 comments, that respondents with significantly larger than average lot sizes are included and impact annual use results. In response to R594, CARB staff notes "Please note that the respondent is located in Humboldt

[179] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

County. Looking at the land use of Humboldt County you can see that almost 40% of lots in the Humboldt county have an average size of 24 acres and the rest of the 60% have an average size of 0.42 (~20,000 sqft). (4010-Docket)

This again speaks to the size of the land and usage patterns in rural areas than might be different from the urban areas." OPEI agrees land size is a likely driver of outdoor power equipment use and must be accounted for when normalizing data. According to HomeAdvisor.com,[4] [Footnote 4: https://www.homeadvisor.com/r/average-yard-size-by-state/] California has the second smallest average property and landscapable area in the U.S. – The average California lot size is 0.17 acres with a landscapable area of 0.13 acres. Including equipment use on lot sizes with 24 acres when the average California home landscapable area is approximately 0.13 acres is misleading. The data requires normalization to address this bias. CARB did not normalize any of the data for lot size to address bias. In fact, it is OPEI's understanding that CARB did not normalize any annual use or age data for any bias, even though CSU-F normalized the number of units in its report for number of residents, resident type and number of employees. (4010-Docket)

Finally, in their analysis of annual use from the equipment survey, Staff used an IQR analysis conducted in log space to identify pieces of equipment with very high annual use that were further evaluated for potential removal from the sample. In some cases, certain pieces of equipment considered outliers with this analysis were removed.[5] [Footnote 5: Staff computed the log of annual equipment use (in hours per year), then used an IRQ analysis to identify outliers.] After the removal of some of the outliers, Staff computed annual use of the remaining sample using arithmetic averages. However, very few pieces of equipment were removed from the sample, resulting in very high annual use for many equipment types. (4010-Docket)

OPEI contracted with AIR to conduct an IQR analysis as one part of its outlier analysis in April 2020. AIR believes that Staff's use of the log of annual use to identify outliers should have been accompanied by using the geometric mean to compute annual use, instead of arithmetic means. (4010-Docket)

A comparison of the two methods for different equipment types for household, business, and landscape use is shown in the tables below. There are significant differences in annual use between arithmetic averages and geometric averages. For example, for household welders, where the sample size is only 16 pieces, the arithmetic average is 178.2 hours per year, and the geometric average is 4.8 hours per year. The median use is only 2 hours per year. Welder use is hugely influenced by a welder that the respondent says is being used 2184 hours per year, which would be 8.4 hours per year, 5 days a week for the entire year. This type of use for a household is highly unlikely. Another example is landscape lawnmowers. (4010-Docket)

Other examples are shown in the tables. Any gasoline equipment with use in excess of 2000 hours per year is highly suspect, because it indicates use for about 8 hours per day, 5 days per week. While electric equipment such as pumps can experience high use, gasoline equipment where the motor is reported to be on 8+ hours per day requires so much refueling that it is simply not logical that anyone would be using the equipment his much. (4010-Docket)

| Household Gasoline Equipment Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Count | Minimum | Maximum | Average | Median | Geometric Mean |
| Chainsaw | 169 | 0 | 208 | 17.9 | 2.0 | 3.7 |
| Compressor | 15 | 0 | 2912 | 349.3 | 26.0 | 18.9 |
| Generator | 127 | 0 | 2184 | 46.2 | 3.0 | 4.8 |
| Lawn Mower | 308 | 0 | 780 | 23.4 | 10.0 | 8.5 |
| Leaf Blower/Vacuum | 100 | 0 | 156 | 14.9 | 8.0 | 7.4 |
| Pressure Washer | 68 | 0 | 624 | 29.3 | 6.0 | 6.4 |
| Pump | 7 | 0.17 | 50 | 9.8 | 2.0 | 3.5 |
| Snow Blower | 4 | 0.5 | 10 | 5.4 | 5.5 | 4.1 |
| String Trimmer | 169 | 0 | 208 | 15.8 | 5.0 | 6.0 |
| Welder | 16 | 0 | 2184 | 178.2 | 2.0 | 4.8 |

| Business Gasoline Equipment Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Count | Minimum | Maximum | Average | Median | Geometric Mean |
| Chainsaw | 91 | 0 | 192 | 21.2 | 6.0 | 7.0 |
| Compressor | 23 | 0 | 2080 | 203.2 | 8.7 | 17.4 |
| Generator | 87 | 0 | 2920 | 167.2 | 8.0 | 16.1 |
| Lawn Mower | 81 | 0 | 1092 | 106.1 | 24.0 | 26.0 |
| Leaf Blower/Vacuum | 116 | 0 | 728 | 86.1 | 26.0 | 29.9 |
| Hedge Trimmer | 12 | 3 | 192 | 55.5 | 24.0 | 26.3 |
| Riding Mower | 4 | 24 | 468 | 147.3 | 48.5 | 72.1 |
| Pressure Washer | 100 | 0 | 1040 | 78.2 | 12.0 | 16.2 |
| Pump | 30 | 0 | 3120 | 167.8 | 13.0 | 16.7 |
| Snow Blower | 3 | 6 | 150 | 58.0 | 18.0 | 26.2 |
| String Trimmer | 90 | 0 | 728 | 70.1 | 18.0 | 21.3 |
| Welder | 33 | 0 | 2184 | 118.2 | 26.0 | 17.6 |

| Landscape Gasoline Equipment Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| **Equipment** | **Count** | **Minimum** | **Maximum** | **Average** | **Median** | **Geometric Mean** |
| Chainsaw | 1825 | 0 | 1248 | 137.4 | 62.4 | 52.0 |
| Compressor | 30 | 4 | 468 | 176.3 | 92.5 | 70.2 |
| Generator | 100 | 0 | 1456 | 61.9 | 15.0 | 15.2 |
| Hedge Trimmer | 1096 | 0 | 2080 | 137.8 | 62.8 | 57.1 |
| Lawn Mower | 1174 | 0 | 4368 | 253.8 | 216.7 | 131.0 |
| Leaf Blower/Vacuum | 1616 | 0 | 4160 | 224.3 | 119.6 | 110.4 |
| Pressure Washer | 151 | 0 | 312 | 29.6 | 12.0 | 12.6 |
| Pump | 25 | 0 | 832 | 160.6 | 18.0 | 25.0 |
| Riding Mower | 135 | 0 | 2912 | 290.3 | 182.8 | 120.5 |
| Snow Blower | 31 | 52 | 390 | 379.1 | 390.0 | 365.6 |
| String Trimmer | 1596 | 0 | 2920 | 196.3 | 103.9 | 92.0 |
| Welder | 10 | 0.33 | 48 | 25.9 | 39.4 | 13.8 |

(4010-Docket)

Thank you for your consideration of OPEI's comments. Please feel free to contact me if you have any questions. (4010-Docket)

**Agency Response**

This comment discusses the commenter's assessment of the document "Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI," the CSUF survey, and the SORE2020 emissions inventory model. The commenter states opinions regarding the timing of the inclusion of this document in the record and reiterates some of its November 29, 2021, comments. The comment implies the commenter disagrees with CARB's analysis of annual activity in the SORE2020 emissions inventory model. Many of the issues raised by OPEI are addressed in the Agency Response in section IV.A.14.1. and in other Agency Responses in section IV.A.35.1 of this FSOR. The commenter does not provide evidence to support its claims and conclusions. CARB disagrees with the commenter's claims and conclusions. CARB made no change based on this comment.

Survey data are frequently used in emissions inventory development [e.g., AACOG, 2013[180]; ATB, 2017[181]; EHP&A, Inc., 1997[182]; TERI, 2022[183]]. The use of survey data in emissions inventory development is not limited to SORE, and survey data are an important tool to collect more data than would be possible through direct measurement.

The "Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI" was added to the record to respond to some 45-day comments [CARB, 2022[184]].

The IQR analysis was done by CARB staff because AIR, under contract with OPEI, used an IQR analysis. The IQR analysis performed by AIR was improperly applied to the survey data. CARB instead performed an IQR analysis on the base 10 logarithm of the data. CARB staff compared the data in the log IQR analysis with the responses OPEI claimed were outliers as identified in the IQR analysis done by AIR. The IQR analysis performed by AIR is inappropriate for the type of data in the survey on SORE population and use. For data that is not normally distributed due to a physical limitation (in this case, one cannot own fewer than zero pieces of equipment

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[180] AACOG. 2013. Commercial Lawn and Garden Emission Inventory. Technical Report. Alamo Area Council of Governments; Natural Resources/Transportation Department (AACOG). December 31, 2013. Available at: https://www.aacog.com/

[181] ATB. 2017. Challenges of Inventory Preparation: Activity Data, Emission Factors and Models. Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB). Presented by Professor Dr. Barbara Amon at the International Symposium on Emissions of Gas and Dust from Livestock, EmiLi 2017. May 22, 2017. Available at: https://colloque.inrae.fr/emili2017_eng/content/ download/4097/ 44257/version/1/ file/B_Amon_inventories_EMILI2017.pdf. Last accessed: May 2, 2022.

[182] EHP&A, Inc. 1997. Guidance for Estimating Lawn and Garden Equipment Activity Levels; Volume IV, Chapter 3. Prepared by E. H. Pechan & Assoc., Inc. (EHP&A) for U.S. Environmental Protection Agency, Mobile Source Committee Emission Inventory Improvement Program. September 1997. Available at: https://www.epa.gov/sites/ default/files/2015-08/documents/iv03.pdf. Last accessed: May 2, 2022.

[183] TERI. 2022. Catalogue of Indian Emission Inventory Reports. The Energy and Resources Institute (TERI) and Environmental Defense Fund. January 2022. Available at: https://www.globalcleanair.org/files/2022/01/ Indian-Emission-Inventory-Report_DIGITAL-FILE.pdf. Last accessed: May 2, 2022.

[184] CARB. 2022. Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI. Microsoft Excel workbook prepared by staff of the Air Quality Planning and Science Division. March 2022.

or use equipment fewer than zero hours per year), simple descriptive statistics are not the right tool to use [Hubert and Vandervieren, 2008[185]; Seo, 2006[186]].

The log IQR analysis was only used to identify potential outliers. IQR analysis cannot be used in computing the annual use hours. If the IQR analysis were used in computing annual activity, the IQR analysis would not be a screening tool but rather a tool for removal of all data above the screening value. After reviewing all the potential outliers and following the process described in "Technical Support Document: Evaluation of 2019 SORE Survey Data Questioned by OPEI," staff calculated mean values.

CARB staff used arithmetic means to calculate average activity because arithmetic means are commonly used when the data set is independent, like this survey of activity usage. Geometric mean is generally used when data are dependent on each other, which the survey data are not. The geometric mean is useful in describing changes in a data set (e.g., population growth), but is but not for describing distribution of a data set, for which arithmetic mean is appropriate [Allen, 2017[187]]. Finally, geometric mean is appropriate only when the data set spans many orders of magnitude, which the survey data do not [Costa, 2022[188]].

## B.4. Andreas Stihl AG & Co. KG

Comment: As leading manufacturer of outdoor power equipment, the worldwide STIHL Group ("STIHL") designs, manufactures and sells millions of battery, electric and combustion engine powered equipment each year. STIHL is committed to developing new technologies and innovations that support the transition to low emission technologies. As a technology front-runner, STIHL has a vital interest in moving its product portfolio to new technologies in order to fight climate change, support sustainability, foster biodiversity and respond to customers' expectations. Out core values for business strategies are leading the handheld equipment industry by innovations. Indeed, STIHL has invested more than 680 Mio USD to develop low emission products, most recently resulting in thirty-two (32) CARB certified emission families and fifty-seven (57) EPA-certified emission families. (4011-Docket)

STIHL Incorporated, the STIHL Group's U.S. headquarters and manufacturing facility manufactures over 75% of STIHL products sold in the United States, and employs almost 2,500 employees nationwide and distribute STIHL products to more than 10,000 US dealers. STIHL Inc. and Andreas STIHL AG & Co., KG (STIHL Inc.'s founding company and developer of STIHL products) are both

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[185] Hubert, Mia, and E. Vandervieren. 2008. An adjusted boxplot for skewed distributions. Computational Statistics & Data Analysis, 52(12), 5186-5201. DOI: 10.1016/j.csda.2007.11.008.

[186] Seo, Songwon. 2006. A review and comparison of methods for detecting outliers in univariate data sets. Master of Science Thesis, University of Pittsburgh.

[187] Allen. 2017. SAGE Encyclopedia of Communication Research Methods. Volume 1. Mike Allen; SAGE Publications. "Geometric Mean", pages 935-937. April 2017.

[188] Costa. 2022. Calculating Geometric Means. Dr. Joe Costa. Buzzards Bay National Estuary Program. Available on the State Water Resource Control Board, SWAMP Program website at: https://www.waterboards.ca.gov/water_issues/ programs/ swamp/docs/cwt/guidance/3413.pdf. Last accessed: May 2, 2022.

active members of the Outdoor Power Equipment Institute ("OPEI"), the industry trade group responsible for advocating for the outdoor power equipment industry that represents more than 85% of the U.S. market for all outdoor power equipment categories. STIHL has signed on to the comments filed by OPEI, and respectfully submits the following supplemental comments to CARB's proposed 15-Day Modifications to the Original Proposal published on March 30th, 2022. (the "15-Day Modifications"). (4011-Docket)

**STIHL comments to the 15-Day Modifications to the Original Proposal**
**Comment 1: Modification to SORE Evaporative Emission Regulations for SORE ≤80 cc. (Attachment B)** (4011-Docket)

CARB's 15-Day Modification to the original proposal in the ISOR adds language in section 2753 (c) and 2754(a)(1) to allow applicants to certify to the diurnal emission standards through model year 2023 for engines with displacement less than or equal to 80 cc. CARB staff justifies *"These proposed modification are necessary for manufacturer to be able to earn* more *evaporative emission credits than could occur under the proposed Amendments in the ISOR."* It should be noted, however, that under the original proposed amendment in the ISOR it was impossible to generate and/or earn evaporative emission credits. The 15-day modification tries to enable manufacturers to earn evaporative emission credits but falls short. Earning evaporative emissions is not feasible for the following reasons: (4011-Docket)

a) Diurnal emission testing set forth in section 2754 (a)(1) means a completely new test procedure for engines with displacement less than or equal to 80 cc and replaces the current design standards set forth in section 2755 (permeation emission standards for fuel tank and fuel line). It is practically impossible to meet the new diurnal requirements with the proposed lead time of less than 1 year. This proposed diurnal testing requirements increase the necessary efforts significantly (test of each individual machine representative of an engine family and no clustering as before for the fuel tank and fuel line test for several engine families). For this purpose, significantly higher testing capacities have to be organized and corresponding equipment has to be purchased, which usually has long delivery times. The latter is even more uncertain given the current global supply chain issues. (4011-Docket)

   The diurnal emission testing itself takes more than 150 working days, without taking into account the preparation time in advance, availability of the measurement laboratories, evaluation of the test results and preparation of test reports. In addition, the CARB Executive Officer needs another 120 days to issue an executive order. This does not take into account the additional lead time required by the new Mobile Source Certification and Compliance Fees Invoicing and Payment Process implemented from April 1st, 2022. In summary, it would take at least 270 days to complete the diurnal emission testing and certification for each of the 26 engine families approved by CARB. (4011-Docket)

b) If a diurnal emission testing set forth in section 2754 (a)(1) fails or if it turns out that technical or design changes have to be made to the engine / equipment, the remaining time is insufficient. This engine / equipment can therefore no longer be certified in accordance with diurnal emission testing. (4011-Docket)

c) The CARB feasibility study (DRAFT 2020 Emissions Model for Small Off-Road Engines - SORE2020) has clearly demonstrated that there is no compliance issue stemming from handheld equipment certified according to section 2755 (design based permeation emission standards) for Small off-road engines with displacements ≤ 80 cc when tested according to the diurnal emission

set forth in section 2754 (a)(1). A variety of handheld equipment from different manufacturers (chainsaws, trimmers and blower with 2- and 4-stroke engines) were tested during CARB's feasibility study. Diurnal emission values from 0.390 to 0.593 g per test were obtained (see enclosure figure 1 and 2). STIHL evaporative emission measurements on chainsaws, backpack blowers and trimmers (see enclosure figure 3) likewise confirm the CARB results from the validation and compliance testing's published in the SORE2020 model final report from September 2020, tables 20 and 25. All values are well below the standard set forth in section 2754 (a)(1) (0.95 + 0.056 x nominal capacity [liters]). (4011-Docket)

d) A CARB feasibility study has not been provided for the 4-stroke 5 HP bin gasoline equipment category (backpack blowers) that fall under the current requirements for Small off-road engines with displacements ≤ 80 cc set forth in section 2755. This 4-stroke 5 HP bin gasoline equipment category in particular is characterized by the lowest exhaust emissions. (4011-Docket)

e) Trading of evaporative emission credits from ground-supported engines towards handheld engines would not be possible. Ground-supported engine manufacturers do not offer evaporative emission credits for trading. (4011-Docket)

Enclosures:

**Table 20. Average Evaporative Emission Results (grams and g/day)**

| Technology | Equipment (Model Year > 2010) | HP Bin | Number of Tests | Evaporative Emissions Test Data* | |
|---|---|---|---|---|---|
| | | | | Hot Soak (g) | 24-hour Diurnal (g/day) |
| Gasoline 4-stroke | Blower | 2 | 9 | 0.126 | 0.529 |
| | Generator | | 3 | 0.847 | 12.366 |
| | Trimmer | | 18 | 0.078 | 0.593 |
| | Generator | 5 | 15 | 1.387 | 2.747 |
| | Lawn Mower | | 65 | 0.157 | 0.823 |
| | Pressure Washer | | 10 | 0.136 | 0.608 |
| | Trimmer | | 6 | 0.082 | 0.545 |
| | Generator (49-state) | | 1 | 0.537 | 1.881 |
| | Chipper/Stump Grinder | | 3 | 0.160 | 1.488 |
| | Compressor | 15 | 10 | 0.411 | 8.178 |
| | Generator | | 36 | 0.831 | 2.922 |
| | Lawn Mower | | 10 | 0.195 | 0.796 |
| | Pressure Washer | | 10 | 0.164 | 1.171 |
| | Riding Mower | | 6 | 0.135 | 0.965 |
| | Tiller | | 14 | 0.107 | 0.839 |
| | Chipper (49-state) | | 1 | 0.319 | 2.476 |
| | Chipper/Stump Grinder | | 5 | 0.177 | 0.896 |
| | Riding Mower | 25 | 21 | 0.379 | 2.122 |
| | Tractor | | 9 | 0.582 | 1.769 |
| Gasoline 2-stroke | Blower | All | 3 | 0.138 | 0.460 |
| | Chainsaw | | 3 | 0.129 | 0.390 |
| | Generator | | 1 | 1.031 | 1.931 |
| | Tiller | | 1 | 0.724 | 2.624 |
| | Trimmer | | 4 | 0.086 | 0.431 |

* Emissions test data for tests with E10 fuel are converted to E0 for use in the model

Figure 1: CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020 final report (4011-Docket)

Table 25. Hot Soak and Diurnal Emission Factors (SORE2020)

| Category | Equipment | Tech Type | HP | Evap Emission Factors | |
|---|---|---|---|---|---|
| | | | | Hot Soak (g/start) | 24-hr Diurnal (g/day) |
| Lawn & Garden | Chainsaws | G2-Carb | 2 | 0.129 | 0.390 |
| | | | 5 | 0.129 | 0.390 |
| | Chainsaws Preempt | G2-Carb | 2 | 0.129 | 0.390 |
| | | | 5 | 0.129 | 0.390 |
| | Chippers/Stump Grinders/Shredders | G4-Carb | 2 | 0.160 | 1.488 |
| | | | 5 | 0.160 | 1.488 |
| | | | 15 | 0.177 | 0.896 |
| | Lawn Mowers | G4-Carb | 2 | 0.157 | 0.823 |
| | | | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | | | 25 | 0.195 | 0.796 |
| | Leaf Blowers/Vacuums | G2-Carb | 2 | 0.138 | 0.460 |
| | | | 5 | 0.138 | 0.460 |
| | | G4-Carb | 2 | 0.126 | 0.529 |
| | | | 5 | 0.126 | 0.529 |
| | | | 15 | 0.378 | 3.278 |
| | | | 25 | 0.378 | 3.278 |
| | | G4-FI | 25 | 0.378 | 3.278 |
| | Other Lawn & Garden Equipment | G4-Carb | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | | | 25 | 0.195 | 0.796 |
| | Riding Mowers/Tractors | G4-Carb | 5 | 0.135 | 0.965 |
| | | | 15 | 0.135 | 0.965 |
| | | | 25 | 0.480 | 1.945 |
| | | G4-FI | 25 | 0.480 | 1.945 |
| | Snow Blowers | G4-Carb | 5 | 0.126 | 0.529 |
| | | | 15 | 0.378 | 3.278 |
| | | | 25 | 0.378 | 3.278 |
| | Tillers | G2-Carb | 2 | 0.724 | 2.624 |
| | | G4-Carb | 2 | 0.157 | 0.823 |
| | | | 5 | 0.157 | 0.823 |
| | | | 15 | 0.195 | 0.796 |
| | Trimmers/Edgers/Brush Cutters | G2-Carb | 2 | 0.086 | 0.431 |
| | | | 5 | 0.086 | 0.431 |
| | | G4-Carb | 2 | 0.078 | 0.593 |
| | | | 5 | 0.082 | 0.545 |
| | | | 15 | 0.378 | 3.278 |
| | Wood Splitters | G4-Carb | 2 | 0.160 | 1.488 |
| | | | 5 | 0.160 | 1.488 |
| | | | 15 | 0.177 | 0.896 |
| | | | 25 | 0.177 | 0.896 |

Figure 2: CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020 final report (4011-Docket)

| Technology | Equipment (Model Year > 2010) | HP Bin | Number of Test Data | Evaporative Emissions Test Data | |
|---|---|---|---|---|---|
| | | | | Hot Soak (g) | 24-hour Diurnal (g/day) |
| Gasoline 4-stroke | Blower | 5 | 5 | 0,147 | 0,548 |
| | Trimmer | 2 | 5 | 0,037 | 0,480 |
| Gasoline 2-stroke | Chainsaw | 5 | 3 | 0,087 | 0,349 |
| | Chainsaw | 2 | 2 | 0,092 | 0,224 |

Figure 3: STIHL hot soak plus 24-hr diurnal evaporative emission test results (4011-Docket)

The recent average, banking and trading (ABT) program allows manufacturers only to generate exhaust emission credits (5 years rule), but not to generate evaporative emission credits for small off-road engines with displacements ≤ 80 cc. The recent ABT program foresees several rules, inter alia a five year validity of the credits earned. As a responsible company as outlined above and reliable partner to the public, STIHL has significantly invested in the program over the last years. However, the proposed 15-Day Modification does not allow manufacturers to use up the previously earned exhaust emission credits. As demonstrated above, the remaining time through model year 2023 is far too short to collect any significant evaporative emission credits set forth in section 2753 (c) and 2754(a)(1). The majority of the earned exhaust emission credits will thus be forfeited. Past and present efforts to improve engines and make engines / equipment available on the market that comply with much higher standards than legally required would be ignored, even penalized; trust and confidence in CARBs reliability would be weakened. Manufacturers and OPEI put forward many suggestions on how to improve the recent proposal in such a way that manufacturers could use up their existing exhaust emission credits. Thus far these proposals have not been seriously taken into account. (4011-Docket)

Therefore, STIHL believes that CARB's 15-Day Modifications to the original proposal in the ISOR needs to be extended by an optional provision that may allow manufacturer to convert exhaust

emission credits earned through model year 2023 into evaporative emission credits in lieu of the hot soak plus diurnal emission standard set forth in sections 2754(a)(3) table 2. (4011-Docket)

STIHL proposes the following rather conservative credit calculation method to calculate "evaporative emissions over median life" based on diurnal emission standard (0.95 + 0.056 x nominal capacity [liters]) set forth in sections 2754(a)(1) table 1. With model year 2024 the hot soak plus diurnal emission standard set forth in sections 2754(a)(3) table 2 will be zero. Thus "evaporative emissions over median life" will be negative and can be offset by banked positive exhaust emission credits. In addition, an Uncertainty Factor UF of 1,5 is proposed as a safety factor including hot soak emissions, as no measurements are to be carried out for this. (4011-Docket)

For each evaporative family STIHL proposes, evaporative emission credits (negative) are to be calculated according to the following conservative equation and rounded to the nearest hundredth of gram. Consistent units with two significant digits are to be used throughout the equations. (4011-Docket)

Credits= -EFELD x production volume x ML x UF (4011-Docket)

(Credits= -(0.95 + 0.056 x nominal capacity [liters]) x production volume x ML x UF) (4011-Docket)

Where:

EFELD = Diurnal emission standard set forth in section 2754 (a)(1) - EMEL (4011-Docket)

EMEL = 0.00 gram (4011-Docket)

ML = Median Life [days]: 1095 days corresponds to 3 years (according enclosures figure 4: Table 16. Median Life (years) Lawn & Garden and Light Commercial Categories (SORE2020 Model)) (4011-Docket)

UF = Uncertainty Factor of 1,5* [Footnote *: Consideration of hot soak emissions not included in section 2753 (c) and 2754(a)(1) table 1. Determination based on Table 20 of CARB 2020 Emissions Model for Small Off-Road Engines - SORE2020 final report.] (4011-Docket)

STIHL is convinced that CARB could support such an approach for the following reasons: An exhaust emission credit conversion towards evaporative emission credits does not negatively influence the emission reduction in the ISOR and will not change the expected emission reductions of $NO_x$ and ROG in the 2016 State SIP Strategy measure for SORE of 4 and 36 tons per day (tpd), respectively, in 2031, as compared to the Baseline Scenario emissions described in the ISOR. On the contrary, the conversion of exhaust emission credits into evaporative emission credits within the handheld engines category prevents a trading towards ground-supported products (including high pressure washer >225cc and generators) which leads to a deterioration of the baseline scenario emissions described in the ISOR and will lead to an earlier fulfillment of the SIP. (4011-Docket)

The prerequisite for a credit conversion is that this may only be possible for equipment which is certified according to the Amended Evaporative Emission Regulation Order- Sections 2750 - 2774 (amended May 6, 2019) from model year 2020 through model year 2023. (4011-Docket)

This approach minimizes the hardship on manufacturers and consumers and eliminating unnecessary new certification work for CARB. (4011-Docket)

In principle, the proposed method for calculating the "evaporative emissions over median life" based on evaporative standard (0.95 + 0.056 x nominal capacity [liters]) and the uncertainty factor of 1.5 clearly exceeds the values from the CARB feasibility study (DRAFT 2020 Emissions Model for Small Off-Road Engines - SORE2020). However, it offers manufacturers the opportunity to avoid the time-consuming and costly diurnal emission testing set forth in sections 2753 (c) and 2754(a)(1) without a loophole to allow manufacturers the introduction of previously uncertified engines/equipment on the Californian market. (4011-Docket)

Enclosure:

**Table 16. Median Life for Lawn & Garden and Light Commercial Categories**

| Category | Gasoline Equipment | 2018 Survey Median Life (years) | | |
|---|---|---|---|---|
| | | Residential | Business | Vendor |
| Lawn & Garden | Chainsaws | 5 | 3 | 2 |
| | Lawn Mowers | 6 | 5 | 3 |
| | Leaf Blowers | 5 | 3 | 2 |
| | Other Lawn & Garden | - | 3 | 2 |
| | Riding Mowers | 8 | - | 5 |
| | Trimmers | 5 | 3 | 2 |
| Light Commercial | Compressors | 3 | 3 | 3 |
| | Generator | 7 | 5 | 4 |
| | Pressure Washers | 5 | 3 | 3 |
| | Pumps | 6 | 8 | 3 |
| | Welders | 10 | 5 | 4 |

Figure 4: Table 16 Median Life (yrs) Lawn & Garden and Light Commercial Categories (SORE2020 Model) (4011-Docket)

Comment: **Conclusion:** Sustainability is an integral part of a long tradition at STIHL, where continuity and long-term thinking have always been key elements of our business approach. We feel a special sense of obligation to our staff, the environment and society. Our sense of responsibility has evolved over a period of decades and is firmly rooted in our corporate culture, as reflected in STIHL's significant investment in ZEE and other sustainable technologies. (4011-Docket)

The 15-Day Modifications only theoretically allow manufacturers to earn evaporative emission credits. Because the lead time for implementation of the new diurnal emissions test set forth in section 2754(a)(1) for Small off-road engines with displacements ≤ 80 cc, replacing the current design standards set forth in section 2755 (fuel tank and fuel line permeation emission standards), is too short to obtain significant evaporative emission credits in real terms. Therefore, STIHL proposes a conservative credit calculation method to calculate "average life evaporative emissions". With model year 2024, the "hot soak plus diurnal emission" standard set forth in Section 2754(a)(3), Table 2 will be zero. Thus, the calculated "average lifetime evaporative emissions" will be negative and can be offset by banked positive exhaust emission credits, if available. This significantly minimizes the burden on both manufacturers and CARB. Transferring exhaust emission credits into evaporative emission credits has no impact on the emission reductions in the ISOR and does not change the expected emission reductions in the 2016 State Implementation Plan, as these have already been priced in. (4011-Docket)

Against this backdrop, we are convinced that the above-mentioned measures would guarantee the 2016 State Implementation Plan and 2031 federal air-quality standards to be met. (4011-Docket)

To be clear and transparent, STIHL wholeheartedly supports the transition towards zero-emission equipment. In order to make the transition a success, the potential underlying regulatory framework needs to be technology-neutral and the feasibility of the transition must be adequately examined and prepared to ensure market acceptance and supply chain capabilities. The optional opportunity for manufacturer will support CARB's transition to Zero emission equipment for a very limited transfer period and limited number of clean handheld Small off-road engines with displacements ≤ 80 cc by allowing a short window of flexibility to customers like professional landscapers as well as to engine / equipment manufacturers. (4011-Docket)

STIHL would be grateful if CARB would consider the above-mentioned comments. STIHL is prepared to jointly develop a regulatory plan for a transition towards ZEE that effectively reduces emissions, responds to the needs and expectations of customers and small businesses, and allows innovative solutions to be developed and businesses to implement and adapt accordingly. (4011-Docket)

**Additional Documents added to the STIHL record** (4011-Docket)

1. CARB 2020 Emissions Model for Small Off-Road Engines - SORE2020 final report. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-09/SORE2020_Technical_Documentation_2020_09_09_Final_Cleaned_ADA.pdf. Published: September 2020 (4011-Docket)

2. US EPA Code of Federal Regulations, Title 40, Chapter I, Subpart U, Part 1054. Available at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-U/part-1054?toc=1. Last amended 4/6/2022 (4011-Docket)

**Agency Response:**

These comments provide information about the commenter and its business and state that the commenter has signed on to OPEI's comments. The comments discuss the commenter's opinions and assessment of 15-day modifications to allow engines with displacement less than or equal to 80 cc to earn evaporative emission credits in MY 2023. The commenter includes three tables from the SORE2020 technical document and one table with the commenter's evaporative emission test results. A section of the comments titled "Additional Documents added to the STIHL record" lists the SORE2020 technical document and 40 CFR Part 1054. In response to the statement, "The 15-day modification tries to enable manufacturers to earn evaporative emission credits but falls short. Earning evaporative emissions is not feasible for the following reasons," and the reasons the commenter discusses: A manufacturer may choose whether or not to certify engines to earn evaporative emission credits in MY 2023 based on factors such as those the commenter discusses. The commenter does not provide evidence to support its claims. CARB does not have information to suggest that a manufacturer of engines with displacement less than or equal to 80 cc could not earn or trade for a sufficient amount of evaporative emission credits to enable the manufacturer to use its banked exhaust emission credits.

In response to the statement, "STIHL believes that CARB's 15-Day Modifications to the original proposal in the ISOR needs to be extended by an optional provision that may allow manufacturer to convert exhaust emission credits earned through MY 2023 into evaporative emission credits in lieu of the hot soak plus diurnal emission standard set forth in sections 2754(a)(3) table 2,": CARB disagrees with the commenter's conclusion. The commenter does not provide evidence to support its claim. The commenter's proposed method to convert exhaust emission credits to evaporative emission credits is beyond the

scope of the 15-day modifications and the Proposed Amendments. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice does not include changes to allow conversion of exhaust emission credits to evaporative emission credits. CARB made no changes based on this comment.

Please refer to the Agency Responses throughout section IV.A.35 for discussion of comments regarding technological neutrality and feasibility of the Proposed Amendments.

Comment: **Comment 2: Harmonization of "handheld" definitions (Attachment A)**
STIHL proposes to harmonize the "handheld" definition with federal 40 CFR Part 1054 language specified in section §1054.801. This change is necessary to avoid potential conflicts between federal and California definitions of "handheld" definitions. (4011-Docket)

**Agency Response:**

As described in the March 2022 15-Day Notice and in section II.A.1.c of this FSOR, CARB made a modification to § 2401(a)(32), which now reads, ""Handheld" means relating to off-road equipment using an engine with displacement less than or equal to 80 cc." The current California definition in Part 1054 similarly reads "Handheld means equipment that contains an engine with a displacement of less than 80cc." Although the federal definition specifies criteria that must be met for equipment to be considered handheld, federal 40 CFR Part 1054 also specifies in section 1054.101(e), in part, "For purposes of the requirements of this part, engines at or below 80 cc are considered handheld engines, but may be installed in either handheld or nonhandheld equipment." The commenter does not provide evidence to support its claim that further changes to the definition of "handheld" are necessary. CARB disagrees with the commenter's assertion and made no changes based on this comment.

## B.5. Truck & Engine Manufacturers Association

Comment: At its December 9, 2021 Public Hearing the California Air Resources Board (Board) approved for adoption certain amendments to the California Code of Regulations as recommended by the CARB staff and further directed the staff to make additional regulatory changes with additional supporting documentation. Those additional changes and documentation, which were published on March 30, 2022, are the subject of these comments. These comments are in addition to the comments the Truck and Engine Manufacturers Association (EMA) previously submitted regarding the Amendments that the Board initially considered and approved at the December 9, 2021 Public Hearing. (4013-Docket)

**I. Comments on the Modifications to SORE Exhaust Emission Regulations, Evaporative Emission Regulations, Emissions Test Procedure TP – 901, Emissions Test Procedure TP-902, Engine Testing Procedures Part 1054 and Part 1065** (4013-Docket)

While EMA appreciates the changes proposed by CARB Staff in the 15 Day Notice, which address a number of the technical issues raised in our comments, the provisions of the 15 Day Notice continue to ignore the two elephants in the room – (i) the absence of zero emission options for many of the products and applications powered by small off road engines, not just for portable generators and high power pressure washers and (ii) the complete lack of adequate lead time for transitioning to ZE technology. The proposed lead time for reducing the emissions and transition to zero emissions is not realistic, nor is it legally sufficient, for the reasons set forth in EMA's previous comments. Simply put,

the emissions reduction forecasted by CARB will not occur because the proposed requirements and timetable for the sale of ZE products cannot be met. (4013-Docket)

EMA presented an alternative emission-reduction proposal which can achieve equivalent, if not greater, emission reductions than the CARB staff Proposed Amendments at a fraction of the cost, while avoiding the enormous negative effect the Proposed Amendments will have on the thousands of small businesses that utilize outdoor power equipment. EMA's alternate proposal, which includes the creation of a new category for "Fixed Mount Generators", provides a cost effective and technologically achievable program for manufacturers and their customers that can be implemented in a manner which maintains manufacturers ability to provide products which meets customers' needs, including life cycle performance and total cost of ownership while zero emission technology continues to develop and be introduced to the category. (4013-Docket)

**Agency Response:**

This comment requests CARB to not set the emission standard for SORE equipment to zero for all equipment and states that CARB has not provided adequate lead time for the transition. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice does not include modifications to the emission standards or to their implementation schedule, other than for pressure washer engines with displacement greater than or equal to 225 cc. The Proposed Amendments do not require businesses and other SORE users to retire their equipment when the regulation is implemented. Instead, landscapers and others will be able to use their SORE powered equipment until the end of its life, allowing additional lead time for the market to transition to ZEE. This commenter's request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on the comment. Please refer to the Agency Responses in sections IV.A.2.3.5, IV.A.2.4.2, IV.A.2.6.2, IV.A.2.6.3, IV.A.10 and IV.A.35 for discussion of EMA's similar comments expressed during the 45-day comment period about the current technological feasibility of ZEE, EMA's multi-part alternative proposal, and lead time for implementation of the Proposed Amendments.

Comment: EMA is requesting additional revisions to certain technical amendments in the 15 Day Notice. Specifically, the "Tilt Test" addition to TP-902 will require engines and equipment to be tested in orientations that are inconsistent with the manufacturer's design and operating instructions on angle of operation. EMA requests CARB staff modify this language to limit tilt test angles to the manufacturer's recommendations rather than an arbitrary value of 90 degrees in a "one-size fits all approach", attempting to capture emissions from mis-use of equipment. The proposed amendment does not adequately account for the different types of small off-road non- handheld equipment engines are installed in and, in many cases, the Tilt Test as proposed is simply not practical nor realistic. Engine and equipment manufacturers can supply CARB staff with installation instructions, application models, and operator manual instructions that provide the maximum operating angles of the engine / equipment as part of the application process to support the test data collected under this requirement. (4013-Docket)

**Agency Response:**

This comment suggests that CARB modify the tilt sequence in TP-902 § 5.2 of the Proposed Amendments to limit the tilting angle based on a manufacturer's recommendations. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022

15-Day Notice does not include modifications to TP-902 § 5.2 in regards to the tilt sequence, except to make measuring and recording the mass of the carbon canister after purging and after performing the tilt sequence optional. This commenter's request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on the comment. Please refer to Agency Response 80 in Attachment A to this FSOR discussion of a similar comment.

Comment: In addition to changes to the TP-902 Tilt Test, EMA supports the revisions proposed in the comments submitted by the American Honda Motor Co. Inc. to section 2400 addressing ripple effect changes as the result of the inclusion of a CO standard, calculating emission non- compliance, aligning operator instruction manual and labeling language with EPA regulations to avoid adding unnecessary complexity to the marketplace with multiple labels and manuals or dual products. EMA also supports Honda's comments addressing CARB's proposed amendments to the evaporative certification program under 2750 (intended to clarify requirements and align with changes made to TP-902 and CP-902) and its comments on amendments made to TP-902 and CP- 902 requesting additional clarification. (4013-Docket)

**Agency Response:**

This comment addresses the same concerns as comments submitted by American Honda Motor Co. Inc. Please refer to the Agency Responses in Attachment C to this FSOR for discussion of those comments.

Comment: EMA is also requesting that the replacement engine amendments be aligned with the federal regulations for clarity and consistency in the regulation and management of those products. EMA supports the comments submitted by the Outdoor Product Equipment Institute (OPEI) on Replacement Engines and addressing the gaps created by the SORE Amendments in the regulatory scheme for Large Spark Ignition engines. (4013-Docket)

**Agency Response:**

This comment requests that CARB modify the replacement engine requirements in section 2403(g) of the exhaust emission regulations to align with federal regulations regarding replacement engines. The comment also indicates the commenter's support for OPEI's comments. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice does not include modifications to replacement engine requirements except to change the formatting of text in all capital letters to mixed case in language with which a replacement engine must be labeled. This commenter's request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on the comment. The Proposed Amendments do not prohibit the sale of CARB-certified SORE, nor do they require retail sales of a certain model year to be completed by any deadline. For example, MY 2023 engines could be sold by a retailer after 2023.

Please refer to the Agency Responses in section IV.B.3 for discussion of similar comments regarding replacement engines and LSI engines.

Comment: **II. Comments of Proposed Modifications to Emissions and Economic Analysis and Additional Documents Added to the Record** (4013-Docket)

To reflect the changes directed by the Board at the December 9, 2021 Hearing CARB staff have modified the Emissions and Economic Analysis and added 44 Additional Documents to the Record. However, no context is provided for the Additional Documents making it difficult to anticipate how they are intended to be used by CARB Staff to support the Record. (4013-Docket)

Documents 1 -3 appear to simply summarize California's current battery recycling program. However, the information provided does not appear to be applicable to the size and type of batteries powering non-handheld equipment that will need to be recycled under the proposed amended regulations. (4013-Docket)

Numerous documents also were added to the Record relating to the availability of battery powered SORE products, battery technology and costs. While it is encouraging that CARB staff are continuing to review market information, CARB staff have done NO testing of this equipment to compare it with current SSI powered equipment, instead solely relying on marketing material for their comparisons (see Documents 5 – 11). This again is a deficient attempt to buttress the record, especially when assessed against the actual test data and documentation that manufacturers must provide to CARB staff to generate credits for ZE products. The additional documents do not establish that there are comparable ZE products actually available for the wide breadth of SSI products currently on the market, especially in the non-handheld commercial equipment category. They also do not demonstrate that significant progress has been made in the development of battery power and storage capacity necessary to support the rapid transition to ZE for a number of equipment categories, including portable generators and high power pressure washers. Given the inadequate lead time provided for the transition of these products and the "market assessment" for portable generators and high power pressure washers directed by the California Air Resources Board it is likely to be too little too late to avoid significant disruption and negative impacts on California consumers and small businesses. (4013-Docket)

The proposed SORE Amendments also relied on technical data that has been used in previous rulemakings. No new technical data was developed by CARB staff to support the regulatory changes at issue nor has any new technical data been added to the record (see Documents 12, 13, 22 – 25, 28 – 31 and 44). Continuing to add documents based on old data which is not reflective of product currently in the market – or in some cases not even waiting for the most recently passed regulatory amendments to go into effect to evaluate their impact – is inherently unreasonable and has resulted in a rulemaking record that cannot support the Amendments. (4013-Docket)

Several of the Additional Documents relate to the Survey conducted by the California State University – Fullerton (CSUF), the basis for the 2020 SORE Air Emissions Inventory and Model. However, the additional documents are not sufficient to resolve the underlying issues with the data described in the comments previously submitted by OPEI and EMA (Documents 12 – 21, 23 -43). The data collected by CSUF, despite the requirements of the contract between CSUF and CARB, was not subjected to standard Quality Assurance and Quality Control (QA/QC) review prior to the publication of the Report that is the basis of the 2020 SORE Emissions Inventory and Model. The survey failed to utilize standard research tools including (1) providing interviewers with "normal ranges" for Respondent responses which were readily available from previous studies in 2001, 2011 and 2012 and which would have permitted appropriate follow up questions and standardized responses (rather than the imputation of data by CARB after-the fact), (2) performance of QA/QC on the raw data or (3) normalization of the data for usage and age of equipment in addition to the number of units.

Despite rejecting the IQR methodology employed by Air Improvement Resources (AIR) (described in the EMA November 29, 2021 comments) based on the information in Document 35 it appears that CARB staff also performed an IQR analysis of the CSUF survey data. While AIR performed its analysis using the raw data to flag outliers which were then evaluated for accuracy by triangulating with other available data, CARB staff used a logarithmic analysis to flag outliers. However, CARB staff used the arithmetic average rather than the geometric mean which resulted in the failure to properly screen outliers. A more detailed description of CARB staff's IQR analysis and its' impacts on the data is described in Attachment A, prepared by AIR. In addition, the revised IQR analysis using the geometric mean results in data which aligns much more closely with the 2012 Survey conducted by CARB (Document 14) which was a more robust survey than the CSUF Survey, including three times as many data points than the CSUF survey. Further, when one reads through the additional information provided to evaluate the flagged data it was discovered that even data that failed CARB's faulty IQR analysis was retained, that CARB staff applied rationale inconsistently from response to response and in one case the response was even changed. The result of this series of mis-steps was the inclusion of outlier data and non-normalized data which skewed the emissions inventory to levels higher than "real world", the stated objective of the 2020 update. (4013-Docket)

In short, the exercise glosses over mismanagement of the CSUF contract and misapplies accepted research and analysis principles to save a study that doesn't have enough data to statistically support the Report's findings. Document 35 was not included in the ISOR documents depriving the public of an adequate opportunity for comment on the CARB staff analysis. Two additional documents were added to the Record (documents 17 and 20) and while these documents provide additional information, they fail to address that the underlying study cannot be "fixed" after the fact. All statistical analyses have assumptions that must be met to be valid. A key component is that the underlying data has been validated using accepted QA/QC measures. Applying different tools to bad data doesn't make it good data, nor do the documents support mis- applying analysis tools. In addition, the inclusion of an unpublished graduate thesis from 2006 to support the CSUF survey and analysis is simply grasping at straws (Document 20). The 2020 SORE Emissions Inventory and Model, rather than reflect "real world" conditions is based on bad data and as a result overestimates both the emissions inventory and expected reductions forecasted by the Proposed SORE Amendments adopted by the Board. These overestimations result in material underestimation of the costs of the Proposed Amendments adopted by the Board and their impact on California consumers and businesses. (4013-Docket)

**Agency Response:**

This comment includes the commenter's assessment of documents added to the record for this rulemaking in the March 2022 15-Day Notice. The comment does not request changes to the Proposed Amendments but does criticize CARB's analyses supporting the Proposed Amendments. The commenter states opinions regarding the Proposed Amendments which are similar to its comments in response to the October 2021 45-Day Notice. The commenter does not provide evidence to support its claims. Although this comment refers to documents added to the record in the March 2022 15-Day Notice, it merely speculates on the adequacy of the documents to address the commenter's concerns and problems which the commenter perceives to exist. The substance of this comment is beyond the scope of the March 2022 15-Day Notice. CARB disagrees with the commenter's conclusions. Please refer to the Agency Responses in sections IV.A.2.4.2, IV.A.10, IV.A.14 and IV.A.35.2 for discussion of EMA's similar comments expressed during the 45-day comment period about the current technological feasibility of ZEE and lead time for implementation of the Proposed Amendments.

Comment: **III. Conclusion** (4013-Docket)

While the additional amendments proposed in the CARB Staff 15 Day Notice address certain of the technical issues identified in the previous comments submitted by EMA, OPEI and PGMA they do not address the substantive flaws described in those comments. Accordingly, EMA again requests that serious consideration be given to the alternate proposal described in our previous comments. EMA believes that the alternative proposal will provide real-world emission reductions in a cost effective and technologically achievable manner. (4013-Docket)

**Agency Response:**

This comment requests that CARB consider EMA's regulatory alternative, which proposes different emission standards, previously included in EMA's comments on the ISOR during the 45-day comment period. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice does not include changes to the proposed emission standards, except those for pressure washers using engines with displacement of 225 cc or larger. This commenter's request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on the comment. Please refer to the Agency Responses in sections IV.A.2.3.5, IV.A.2.4.2, IV.A.2.6.2 and IV.A.2.6.3 for discussion of EMA's multi-part alternative proposal described in its comments submitted during the 45-day and hearing comment periods.

Comment: **Attachment A**
**Comments on ARB's Estimates of Annual Activity for Gasoline Equipment** (4013-Docket)

In their analysis of annual use from the equipment survey, Staff used an IQR analysis conducted in log space to identify pieces of equipment with very high annual use that were further evaluated for potential removal from the sample. In some cases, certain pieces of equipment considered outliers with this analysis were removed.[1] [Footnote 1: Staff computed the log of annual equipment use (in hours per year), then used an IQR analysis to identify outliers.] After the removal of some of the outliers, Staff computed annual use of the remaining sample using arithmetic averages. However, very few pieces of equipment were removed from the sample, resulting in very high annual use for many equipment types. (4013-Docket)

AIR believes that Staff's use of the log of annual use to identify outliers should have been accompanied by using the geometric mean to compute annual use, instead of arithmetic means. (4013-Docket)

A comparison of the two methods for different equipment types for household, business, and landscape use is shown in the tables below. There are significant differences in annual use between arithmetic averages and geometric averages. For example, for household welders, where the sample size is only 16 pieces, the arithmetic average is 178.2 hours per year, and the geometric average is 4.8 hours per year. The median use is only 2 hours per year. Welder use is hugely influenced by a welder that the respondent says is being used 2184 hours per year, which would be 8.4 hours per year, 5 days a week for the entire year. This type of use for a household is highly unlikely. Another example is landscape lawnmowers. (4013-Docket)

Other examples are shown in the tables. Any gasoline equipment with use in excess of 2000 hours per year is highly suspect, because it indicates use for about 8 hours per day, 5 days per week. While

electric equipment such as pumps can experience high use, gasoline equipment where the motor is reported to be on 8+ hours per day requires so much refueling that it is simply not logical that anyone would be using the equipment his much. (4013-Docket)

| Household Gasoline Equipment Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Count | Minimum | Maximum | Average | Median | Geometric Mean |
| Chainsaw | 169 | 0 | 208 | 17.9 | 2.0 | 3.7 |
| Compressor | 15 | 0 | 2912 | 349.3 | 26.0 | 18.9 |
| Generator | 127 | 0 | 2184 | 46.2 | 3.0 | 4.8 |
| Lawn Mower | 308 | 0 | 780 | 23.4 | 10.0 | 8.5 |
| Leaf Blower/Vacuum | 100 | 0 | 156 | 14.9 | 8.0 | 7.4 |
| Pressure Washer | 68 | 0 | 624 | 29.3 | 6.0 | 6.4 |
| Pump | 7 | 0.17 | 50 | 9.8 | 2.0 | 3.5 |
| Snow Blower | 4 | 0.5 | 10 | 5.4 | 5.5 | 4.1 |
| String Trimmer | 169 | 0 | 208 | 15.8 | 5.0 | 6.0 |
| Welder | 16 | 0 | 2184 | 178.2 | 2.0 | 4.8 |

| Business Gasoline Equipment Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Count | Minimum | Maximum | Average | Median | Geometric Mean |
| Chainsaw | 91 | 0 | 192 | 21.2 | 6.0 | 7.0 |
| Compressor | 23 | 0 | 2080 | 203.2 | 8.7 | 17.4 |
| Generator | 87 | 0 | 2920 | 167.2 | 8.0 | 16.1 |
| Lawn Mower | 81 | 0 | 1092 | 106.1 | 24.0 | 26.0 |
| Leaf Blower/Vacuum | 116 | 0 | 728 | 86.1 | 26.0 | 29.9 |
| Hedge Trimmer | 12 | 3 | 192 | 55.5 | 24.0 | 26.3 |
| Riding Mower | 4 | 24 | 468 | 147.3 | 48.5 | 72.1 |
| Pressure Washer | 100 | 0 | 1040 | 78.2 | 12.0 | 16.2 |
| Pump | 30 | 0 | 3120 | 167.8 | 13.0 | 16.7 |
| Snow Blower | 3 | 6 | 150 | 58.0 | 18.0 | 26.2 |
| String Trimmer | 90 | 0 | 728 | 70.1 | 18.0 | 21.3 |
| Welder | 33 | 0 | 2184 | 118.2 | 26.0 | 17.6 |

| Landscape Gasoline Equipment Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| Equipment | Count | Minimum | Maximum | Average | Median | Geometric Mean |
| Chainsaw | 1825 | 0 | 1248 | 137.4 | 62.4 | 52.0 |
| Compressor | 30 | 4 | 468 | 176.3 | 92.5 | 70.2 |
| Generator | 100 | 0 | 1456 | 61.9 | 15.0 | 15.2 |
| Hedge Trimmer | 1096 | 0 | 2080 | 137.8 | 62.8 | 57.1 |
| Lawn Mower | 1174 | 0 | 4368 | 253.8 | 216.7 | 131.0 |
| Leaf Blower/Vacuum | 1616 | 0 | 4160 | 224.3 | 119.6 | 110.4 |
| Pressure Washer | 151 | 0 | 312 | 29.6 | 12.0 | 12.6 |
| Pump | 25 | 0 | 832 | 160.6 | 18.0 | 25.0 |
| Riding Mower | 135 | 0 | 2912 | 290.3 | 182.8 | 120.5 |
| Snow Blower | 31 | 52 | 390 | 379.1 | 390.0 | 365.6 |
| String Trimmer | 1596 | 0 | 2920 | 196.3 | 103.9 | 92.0 |
| Welder | 10 | 0.33 | 48 | 25.9 | 39.4 | 13.8 |

**Agency Response:**

This comment includes the commenter's statement of belief that CARB should have used a geometric mean instead of an arithmetic mean in calculating average annual use times when developing the SORE2020 emissions inventory model. This comment is similar to a comment submitted by OPEI. Please refer to the Agency Response in section IV.B.3 for discussion of comments regarding geometric and arithmetic means. CARB made no change based on this comment.

## B.6. Harbor Freight Tools

Comment: **Subject:** Harbor Freight Tools Comments to CARB SORE 2nd 15-Day Notice (4015-Docket)

> **Agency Response:** This comment consisted of only a subject line. CARB made no changes based on the comment.

## B.7. Cleaning Equipment Trade Association

Comment: The Cleaning Equipment Trade Association (CETA) respectfully submits the following comment regarding the California Air Resources Board's (CARB) Notice of Public Availability of Additional Documents and Information for the Proposed Amendments to the Small Off-Road Engine Regulations: Transition to Zero Emissions (15-Days Changes). (4016-Docket)

CETA is an international non-profit trade association made up of suppliers, manufacturers, distributors, cleaning contractors/end users, and associates. All these members coordinate efforts to promote public awareness, professionalism, industry-wide safety standards, and education for the advancement of the powered cleaning equipment industry. Environmental regulations and lobby efforts are not inside CETA's regular scope of work, but we strive to educate our members to promote best practices across the industry. (4016-Docket)

The last paragraph of Resolution 21-18 from December 9, 2021, states "Be it further resolved that the Board directs CARB staff to review annually the status of the implementation of the proposed amendments and to conduct a technological review in the 2025 to 2026 timeframe to access the progress towards the MY 2028 zero-emission standards for portable generators and any other engine equipment category that may be newly subject to the MY 2028 zero-emission standards." and the amendments now indicate "Generator Engines and > 225 cc Pressure Washer Engines" fall under the same requirements for MY 2024 to MY 2028. We look forward to working with CARB staff annually in 2025 to 2026 on progress towards MY 2028 zero-emission standards. (4016-Docket)

In researching the Preempt Off-Road list where "Cleaners: high pressure" has been removed to avoid confusion with pressure washers as ARB's interpretation that pressure washers have never been considered preempt equipment. The ANSI/UL industry safety standards are titled "High-Pressure Cleaning Machines" which include many types of equipment classes including pressure washers as well as power washers. We kindly request that "Cleaners: high pressure" be added back to the Preempt Off-Road list as it is the proper description for commercial/industrial equipment. (4016-Docket)

CETA respectfully requests that CARB SORE staff continue to work with stakeholders towards a proposal of mutual benefit and looks forward to a partnership resulting in a cleaner tomorrow. (4016-Docket)

> **Agency Response:**
> This comment acknowledges the proposed modifications in the March 2022 15-Day Notice to the emission standards and implementation schedule for pressure washer engines with displacement of 225 cc or larger, which are typically used by professional cleaning services and other businesses. This comment also acknowledges the Board's resolution adopted at the

December 2021 hearing that directs CARB staff to conduct a technological review before the emission standards of zero become effective for these pressure washer engines. This comment does not request any new change to the Proposed Amendments. CARB made no changes based on the comment. The comment's request regarding the "Preempt Off-Road list" refers to Section 209, subsection (e)(1), of the Clean Air Act, which provides that new engines less than 175 horsepower which are used in farm or construction equipment or vehicles are preempt from CARB's emission standards and only subject to emission standards from U.S. EPA. CARB generally refers to engines which are not subject to California's emission standards in this fashion as "preempt." The Proposed Amendments and the March 2022 15-Day Notice do not propose including provisions that identify preempt equipment; thus, the commenter's request to do so is outside of the scope of this rulemaking process. Questions and requests about preempt equipment can be addressed outside of the rulemaking process. For additional discussion of similar comments submitted during the 45-day comment period, please see the Agency Response in section IV.A.29.2.4.

## B.8. NMMA and Westerbeke Corporation

Comment: The National Marine Manufacturers Association and Westerbeke Corporation would like to thank you for taking the time to discuss the ZEE transition with us. As we discussed, the gasoline marine generator industry is very small, and has some special design constraints as well as US Coast Guard and EPA regulations that do not apply to any other SORE engines. These Federal regulations are critical as they protect boaters from immediate danger to health and human safety from CO poisoning. As you are aware the low CO requirement needs to be balanced with $NO_x$. (4020-Email)

First, NMMA and Westerbeke believe that marine gasoline generators meet the EPA definition of a stationary engine, and we look forward to supporting this definition during the technology review. These generators are not portable but are integral to the vessel. As the board has already approved the current staff recommended definition, it is critical that for the model years 2024-2027, marine gasoline generator engines would have the following CO and HC+$NO_x$ standards: (4020-Email)

225-825cc HC+$NO_x$ 3.0 g/kW-hr; CO 4.5 g/kW-hr

>825cc HC+$NO_x$ 0.8 g/kW-hr; CO 4.5 g/kW-hr (4020-Email)

However, due to the stringent CO standard and the emission useful life of marine propulsion engines, marine gasoline generators operate far less than propulsion engines and need to be appropriately subject to a durability period of 250 hours, to which Westerbeke products are currently certified. Thank you for your attention to this important matter. If you need any addition information, please contact Glenn Amber at gamber@westerbeke.com. (4020-Email)

**Agency Response:**

This comment includes expressions of the commenters' opinion that marine generator engines meet the definition for stationary engines and requests that CARB consider alternate HC + $NO_x$ standards for marine generator engines. The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice does not include changes to the proposed HC + $NO_x$ emission standards for marine generator engines. These commenters' request is not directly related to the modifications nor the additional documents specified in the March 2022 15-Day Notice. Therefore, it is beyond the scope of the March 2022 15-Day Notice, and CARB made no further changes based on the comment. Concerns

similar to those expressed in this comment were also expressed by other commenters during the 45-day comment period; please see the Agency Response in section IV.A.2.3.1. Note that, as described in section II of this FSOR, in response to other stakeholder feedback about technological feasibility specific to generators, the Proposed Amendments allow more time for generators to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for generators and setting emission standards of zero for MY 2028 and later for these generators.

## B.9. American Honda Motor Co., Inc.

Comment: **Honda Comment Overview – CARB SORE Rulemaking**
Honda supports OPEI, EMA and PGMA comments. In addition to the general comments below, detailed comments are provided in an accompanying excel file. (4021-Email)

**General Comments**

- Honda wishes to contribute towards, and shares in the common goal of improved air quality. (4021-Email)

- The Tier 4 proposal, however, represents a massive impact to stakeholders. While Honda supports the expansion of electrification into the future, we must face the reality that immediate elimination of ICE may result in many unintended consequences. (4021-Email)

- Honda believes that electrification is not suitable for all product categories at this time. Honda is convinced that California residents benefit from ICE-powered commercial products and generators (half of which are used for backup, emergency power) that require stable and sustainable output. (4021-Email)

- With concern that the proposal's wide ranging and rapid push toward electrification will disadvantage California residents, we think it would be appropriate to provide sufficient lead time to allow for the development of zero-emission alternatives of comparable performance. (4021-Email)

- At the same time, Honda thinks that a credit system for a wider range of products is necessary to promote electrification. (4021-Email)

**1. Rulemaking Schedule**

- Honda agrees with the proposed implementation plan from OPEI, EMA or PGMA to ensure adequate development time and investment recovery. (4021-Email)

**2. Evap Tilt Test (TP902 5.2)**

- Exhaust and Evap test procedures, including engine speed, load, temperature and durability period should be representative of actual market usage. Thus, fuel leakage caused by unusual accidents which are not representative of intended and reasonably expected market usage should not be included in the requirement. Limit values and test procedures (test modes) should reflect intended and reasonably expected usage. (4021-Email)

- As indicated on SRIA/ISOR, tilt during usage, maintenance, or storage should be assumed. For that purpose, the manufacturer should have the ability to propose modifications to the test

procedure consistent with the intended and reasonably expected usage of each equipment, such as in accordance with the Owner's Manual. (4021-Email)

- Although Honda fundamentally disagrees with the tilt requirement, we believe that more specific and clear defining of requirements would be necessary in order to adequately design equipment which complies with the tilt sequence. (4021-Email)

**3. Simplifying Exhaust Emission Compliance Test (§2407)**

- In the ISOR, the number of compliance tests has changed and the method of determining the average value has also changed. Thus, there is a possibility that failure will be determined from only one test result. In the Evap test method specified in §2765, however, five additional tests can be requested by the manufacturer. Honda believes that similar additional tests should be allowed for the exhaust emission compliance test. (4021-Email)

**Agency Response:**

Honda's comments do not provide any objections or recommendations specifically directed at CARB staff's proposed modifications to the original ISOR Proposed Amendments and additional supporting documents described in the March 2022 15-Day Notice. Honda's comments request or imply an alternative to the ISOR Proposed Amendments that would delay implementation of emission standards of zero for SORE equipment, and request several changes to the tilt sequence added to TP-902 in the ISOR Proposed Amendments. As described in sections II.A.1.e and II.A.2.d of this FSOR and in the March 2022 15-Day Notice, in response to 45-day and hearing stakeholder comments and information described in the ISOR about technological feasibility specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers used by professional cleaning services to comply with emission standards of zero. Please refer to sections II.A.1.e and II.A.2.d and the Agency Response in section IV.A.2.4.1. for additional discussion about these modifications.

While the scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice includes delaying the implementation date of emission standards of zero for higher-power pressure washer engines, the scope does not include changing implementation dates for other types of SORE equipment used by landscapers and other businesses. The scope of the 15-day modifications also does not include modifications to the tilt sequence included in the ISOR Proposed Amendments, except to make measuring and recording the mass of the carbon canister after purging and after performing the tilt sequence optional. The commenters' requests are not directly related to the modifications in the March 2022 15-Day Notice, nor the additional documents specified in the March 2022 15-Day Notice. Therefore, the commenters' requests are beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on these comments.

The scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice and in section II.A.2 of this FSOR includes changes to the SORE regulations so that manufacturers are able to earn more evaporative emission credits than could occur under the Proposed Amendments in the ISOR. The proposed modifications are in response to manufacturer comments submitted during the 45-day comment period that express the desire to be able to earn evaporative emission credits for engines with displacement less than or equal to 80 cc before emission standards of zero are implemented for most engines in MY 2024. Honda's comment, "Honda thinks that a credit system for a wider range of products is necessary to promote electrification," seems to be alluding to the

same issue but does not provide any request specifically directed at associated modifications described in the March 2022 15-Day Notice. Therefore, CARB made no changes based on these comments.

Honda's comments request a change to the new engine exhaust emission compliance testing provisions in a portion of the SORE regulations that was not subject to proposed modification in the March 2022 15-Day Notice. Therefore, Honda's request is beyond the scope of the March 2022 15-Day Notice, and CARB made no changes based on this comment.

Honda expresses support for the "proposed implementation plan from OPEI, EMA or PGMA." In their 45-day period comments, OPEI, EMA, and PGMA proposed several alternatives to the Proposed Amendments. Please see the Agency Responses in the following sections for discussion of their proposed alternatives:

- Section IV.A.2.3.5. Exempt or delay compliance dates for portable generators
- Section IV.A.2.3.7. Relax the HC + $NO_x$ emission standard for 225-825 cc generators and delay implementation until MY 2026
- Section IV.A.2.4.2. Delay compliance dates for SORE equipment used by landscapers and other professionals for technological and cost-based reasons
- Section IV.A.2.4.3. Delay compliance dates for some or all SORE equipment
- Section IV.A.2.6.2. Alternative emission standards
- Section IV.A.2.6.3. Alternative fuels and technologies

The beliefs and concerns stated in Honda's comments are similar to comments submitted during the 45-day and hearing comment periods, which are discussed earlier in this FSOR chapter. Please refer to the Agency Responses in sections IV.A.13.1, IV.A.13.2 and IV.A.35 for discussion of potential impacts to businesses, the current technological feasibility of ZEE and why more time is not needed to begin implementation of the proposed emission standards of zero. Please refer to the Agency Response in section IV.A.13.1.2 for discussion of concerns expressed by other manufacturers about recovering investment costs.

Honda provided detailed comments and proposed revisions in an accompanying Microsoft Excel spreadsheet attached to its email. Attachment C to this FSOR provides a transcription of Honda's spreadsheet, along with Agency Responses.

## B.10. Air Improvement Resource, Inc.

Comment: I have a question on this file; the spreadsheet where ARB decides to keep or toss survey data - For respondents with electric equipment, I notice the frequent ARB comment: "The usage of electric equipment does not impact emissions" (4022-Email)

The question is this: did ARB use electric equipment usage in hours per year to compute the average usage for both gasoline and electric equipment? For example, where a respondent said they used an electric compressor 2000 hours per year, was this usage rate used by ARB to compute average annual activity for gasoline compressors? Or was it omitted from the estimate of annual usage for a gasoline powered compressor? (4022-Email)

**Agency Response:**

This comment does not request any changes to the Proposed Amendments. CARB made no changes based on the comment. The question was answered by email and is answered here. SORE equipment and electric equipment activities were calculated separately. The activity of SORE was calculated only from SORE equipment. The use time of ZEE does not affect emissions because there are no emissions from zero-emission equipment.

# C. Comments Received during the May 2022 15-Day Comment Period

This section of the FSOR provides the text or a summary of each comment submitted during the 15-day public comment period for the May 2022 15-Day Notice that was available for public comment from May 27, 2022, through June 13, 2022. Comment letters and emails were submitted by nine individuals or organizations during the 15-day public comment period for the May 2022 15-Day Notice. Agency responses are provided for all comments that give objections or recommendations specifically directed at the 15-day additional documents described in the May 2022 15-Day Notice. To facilitate the use of this document, comments are categorized into topic-specific sections and are grouped by responses wherever possible. Table 5, which is provided before section IV.A, lists the commenters that provided written comments during the 15-day public comment period for the May 2022 15-Day Notice. The table includes the commenter codes assigned to each to help identify commenters in the comments/responses which follow.

## C.1. Comments not specific to the 15-Day changes

Comment: This is a crazy idea and the timeline to achieve this is not possible for the average business owner/operator. Small business and repair shops are going to be put out of business because they can't absorb the cost of replacing all the equipment with battery operated. Can California afford to lose more businesses? I just priced a battery operated STIHL weedeater and it was 100.00 more expensive than the gas version and it DID NOT include the charger or the batteries. I'm also curious how are we going to go about recycling lithium batteries that are going to go bad? They are extremely toxic and at this point we do not have a way to recycle them, do we just ignore the fact that most of the raw material for these batteries come from third world countries that are just being plundered for their rare earth elements. California has a hard enough time keeping the lights on and now you are suggesting we push everything towards zero emmision, how is this even feasibly possible? California is a dying state and this is only going to drive more people to leave because these laws are just insane. They make zero sense when it comes to the regular working class trying to make a living in a state thats already incredibly hard to live in if you dont make 150,000 plus a year. (5001-Docket)

Comment: Please regulate SOREs, there's no need for gas anymore! Save emissions and money while getting the job done. Go electric! (5002-Docket)

Comment: Any acceleration of a transition to zero emmision small engines is a waste of our state's resources and harmful to our economy. We should be focusing on responsible logging and healthy forest management if we are truly interested in clean healthy air. The wildfires in 2020 produced 120 times as much HC, PM, and CO as our vehicles produce in one year. (5003-Docket)

Comment: Banning small engines by 2035 is a dumb, dangerous proposition! We have had the big Creek Fire where people use gas powered generators for power; the elderly used them for the

oxygen they rely on to keep them alive. I told our neighbor's gardeners that you wanted to ban their mowers and yard equipment. They said that's dumb because the electric ones are not very powerful, plus you have to deal with the cords. It will cost them more money to replace all of their equipment. Can't wait until they wake up to how destructive this progressive ideaology can be to their way of life! (5004-Docket)

**Agency Response:**

These comments do not provide any objections or recommendations specifically directed at the additional supporting documents described in the May 2022 15-Day Notice. One of the commenters expresses general support for the proposed rulemaking and its expected emission reductions and cost savings; CARB made no changes based on this comment. One of the commenters seems to request CARB to delay implementation of the emission standards of zero for SORE or to discontinue this rulemaking. As described in the March 2022 15-Day Notice and in sections II.A.1.e and II.A.2.d of this FSOR, in response to stakeholder comments submitted during the 45-day and hearing periods and information described in the ISOR about technological feasibility specific to commercial pressure washers, CARB made several modifications to §§ 2401(a), 2403(b)(1), and 2754(a)(3) to allow more time for higher-power pressure washers used by professional cleaning services to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for pressure washers using engines with displacement of 225 cubic centimeters (cc) or larger that are the same as those proposed for portable generators and setting emission standards of zero for MY 2028 and later for these pressure washers. Please refer to section II.A.1 and II.A.2 and the Agency Response in section IV.A.2.4.1 for additional discussion about these modifications. While the scope of the modifications to the ISOR Proposed Amendments described in the March 2022 15-Day Notice includes delaying the implementation date of the emission standard of zero for higher-power pressure washer engines, the scope of the May 2022 15-Day Notice does not include changing implementation dates for any other types of SORE equipment used by landscapers and other businesses or any other regulatory modifications. The commenter's implied request is not directly related to the additional documents specified in the May 2022 15-Day Notice. Therefore, the commenter's implied request to delay implementation of the proposed emission standards of zero or to discontinue the rulemaking is beyond the scope of the May 2022 15-Day Notice, and CARB made no changes based on these comments.

The commenter describes a number of concerns to support the implied request to delay implementation or discontinue the rulemaking, regarding the feasibility of the implementation timeline and potential economic impacts under the Proposed Amendments for business owners, particularly small businesses and repair shops; ZEE costs; lithium battery recycling; the source of raw materials for ZEE batteries; California's electricity supply; and the concern that the Proposed Amendments are "going to drive more people to leave." CARB made no changes based on this comment. Regarding the comment, "Small business and repair shops are going to be put out of business because they can't absorb the cost of replacing all the equipment with battery operated,": to clarify, the Proposed Amendments would not require retail shops and other businesses to replace their SORE equipment. The Proposed Amendments would not prohibit the sale of CARB-certified SORE, nor would they require retail sales of a certain model year to be completed by any deadline. For example, MY 2023 engines could be sold by a retailer after 2023. Emission reduction credit programs may enable manufacturers to continue producing SORE after MY 2023. The Proposed Amendments do not require businesses and other SORE users to retire their equipment when the Proposed

Amendments are implemented. Instead, landscapers and others will be able to use their SORE equipment until the end of its life. The concerns expressed are similar to those submitted during the 45-day and hearing comment periods, which are discussed earlier in this FSOR chapter.

For an explanation of the necessity of the current rulemaking, its benefits for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV.

For discussion of 45-day and hearing comments that request CARB to exempt or delay implementation for some or all SORE, and discussion of the current technological feasibility of ZEE and why more time is not needed to comply with emission standards of zero, please refer to the Agency Responses in sections IV.A.2.2.4, IV.A.2.4, IV.A.35.1 and IV.A.35.2, as well as ISOR section I.E.

While ZEE can have higher upfront purchasing costs than SORE equipment, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. For discussion of 45-day and hearing comments that express concerns about the higher upfront costs of ZEE, potential loss of business or jobs, and the ability of businesses to absorb higher costs, please refer to the Agency Responses in sections IV.A.12, IV.A.13.1.1, and IV.A.13.1.2, respectively. Please refer to ISOR Appendix I SRIA sections B and C for CARB's full economic analyses of potential economic impacts and benefits for California residents under the Proposed Amendments.

For discussion of 45-day and hearing comments related to concerns about lithium battery disposal, recycling, and mining, please refer to the Agency Response in section IV.A.6.2.

For discussion of 45-day and hearing comments about statewide electricity demand for ZEE, please refer to the Agency Response in section IV.A.6.4.

Another commenter seems to request CARB to consider "responsible logging and healthy forest management" as an alternative to this rulemaking, and states as supporting rationale, "Any acceleration of a transition to zero emmision [*sic*] small engines is a waste of our state's resources and harmful to our economy" and "wildfires in 2020 produced 120 times as much HC, PM, and CO as our vehicles produce in one year." A third commenter seems to request CARB to discontinue this rulemaking, noting concerns about the Creek Fire and the need for people to use gas powered generators for power and medical uses (oxygen for elderly); asserting that CARB wants to ban gardeners' mowers and yard equipment; and noting concerns that electric equipment is "not very powerful," gardeners "have to deal with the cords," and the Proposed Amendments will "cost them more money to replace all of their equipment." Regarding the comment, "I told our neighbor's gardeners that you wanted to ban their mowers and yard equipment": to clarify, the Proposed Amendments would not require anyone to stop using SORE equipment and would not prohibit the sale of CARB-certified SORE. The current SORE regulations and Proposed Amendments apply to new engines manufactured for sale, sold, or offered for sale in California, or introduced, delivered or imported into California for introduction into commerce. Gardeners and other people can continue to use and repair their current SORE equipment until the end of its life (e.g., until the SORE equipment breaks or people decide to upgrade equipment). There is no scheduled date of elimination for SORE equipment that California residents and businesses currently own. The scope of the May 2022 15-Day Notice does not include any overarching changes to the ISOR Proposed Amendments or any other regulatory modifications. The commenters' suggested and implied alternatives are not directly related to the additional documents specified in the

May 2022 15-Day Notice. Therefore, the commenters' alternatives are beyond the scope of the May 2022 15-Day Notice, and CARB made no changes based on these comments. The commenters' alternative, general rationale, and concerns are similar to comments submitted during the 45-day and hearing comment periods, which are discussed earlier in this FSOR chapter.

For discussion of 45-day comments that express general opposition due to economic impacts, please refer to the Agency Response in section IV.A.2.2.4.

For discussion of 45-day comments that propose forest management (reduce forest fuel and grow more forests) as an alternative, please refer to the Agency Responses in sections IV.A.2.2.2 and IV.A.2.2.3.

For an explanation of the necessity of the current rulemaking, its benefits for the people of California, and why CARB cannot discontinue the rulemaking, please refer to the Agency Response in section IV.A.2.2.1 and ISOR sections I.B, I.D, II, and IV.

As explained in ISOR sections I.E and II.A, the Proposed Amendments include a longer timeframe for portable generators to comply with emission standards of zero because they are frequently used as power backup and to provide time for the zero-emission generator market to mature. For discussion of comments about portable generators, please refer to the Agency Responses in sections IV.A.2.3, IV.A.27, and IV.A.35.3.

As described in ISOR section I.E, the level of performance, number of brands, and number of equipment options among other types of ZEE for both residential and professional use have increased greatly and continue to do so today. Indeed, there are many cordless ZEE options and, as described in ISOR Appendix I section A.5 and Tables G-2 and G-4, CARB's economic analysis assumes that consumers will almost always purchase cordless ZEE. Please refer to ISOR section I.E. and Agency Responses in sections IV.A.35.1 and IV.A.35.2 for additional discussion of the current performance and technological feasibility of ZEE and why more time is not needed for equipment types other than pressure washers using engines with displacement greater than or equal to 225 cc and portable generators to comply with emission standards of zero.

For an explanation of why CARB does not anticipate that the availability of suitable chainsaws and other equipment necessary for fuel mitigation and firefighting will be adversely affected by this rulemaking, please see sections IV.A.2.5.1, IV.A.2.5.2, IV.A.29.1.2, and IV.A.33.

SORE are substantial contributors to smog-forming pollution in California. For discussion of 45-day and hearing comments that assert that SORE are small contributors to air pollution in California, please refer to the Agency Response in section IV.A.14.3.

As noted earlier in this response, while ZEE can have higher upfront purchasing costs than SORE equipment, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. For discussion of 45-day and hearing comments that express concerns about the higher upfront costs of ZEE, please refer to the Agency Response in section IV.A.12. Please refer to ISOR Appendix I SRIA sections B and C for CARB's full economic analyses of potential economic impacts and benefits for California residents under the Proposed Amendments.

## C.2. Outdoor Power Equipment Institute

Comment: The Outdoor Power Equipment Institute (OPEI) respectfully submits the following comments regarding the California Air Resources Board (CARBs) *Notice of Public Availability of Documents and Information to the Small Off-Road Engine Regulations: Transition to Zero Emissions ("15-Day Changes")*. (5005-Docket)

OPEI is an international trade association representing more than 100 manufacturers and their suppliers of gas and electric-powered outdoor power equipment, golf cars, and personal transport and utility vehicles, who are directly affected by Small Off-Road Engine (SORE) rule amendments approved for adoption by the Board in December 2021. Representing the industry, OPEI submitted comments on November 29, 2021 and April 14, 2022, opposing the amendments. (5005-Docket)

The intent and applicability of this 15-day change is unclear. For a second time, CARB has added dozens of new documents to the record unrelated to the proposed changes and without providing any context. The intent of these documents is unclear and makes it extremely difficult for stakeholders to provide meaningful comments. Furthermore, OPEI believes adding documents to the record using the "15-day change" process without any changes to the rule is prohibited by the California Administrative Procedure Act. (5005-Docket)

Nevertheless, OPEI provides the following comments. OPEI also supports the comments of the Truck and Engine Manufacturers Association (EMA). (5005-Docket)

**Agency Response:**

These comments include an introduction that describes OPEI as an organization, discusses OPEI's members and their products, and mentions OPEI's previous comments. The commenter states opinions and conclusions regarding the Proposed Amendments and the documents CARB proposed to add to the rulemaking record. The commenter argues that CARB's May 2022 15-Day Notice violated APA. CARB did not make any changes in response to this comment. The commenter does not cite any APA provisions to support its comment arguing that the May 2022 15-Day Notice is prohibited by APA. In fact, the May 2022 15-Day Notice is consistent with Government Code section 11347.1 of APA, which requires an "agency that adds any technical, theoretical, or empirical study, report or similar document to the rulemaking file after publication of the notice of proposed action and relies on the document in proposing the action shall make the document available [for]…. At least 15 calendar days before the proposed action is adopted by the agency…." CARB notified all interested parties of the availability of the May 2022 15-Day Notice and allowed these parties at least 15 calendar days to review and comment on the proposed documents to be added to the record before CARB, through delegation to the Executive Officer in resolution 21-28, formally adopts the Proposed Amendments' rulemaking package and sends the rulemaking package to OAL for review. Government code section 11347.1 does not require an agency, in a 15-Day Notice, to describe how it intends to rely on the documents proposed to be added to the record. The additional documents have been used in responses to comments in this FSOR.

**Comment: COMMENT 1 – The 15-Day Changes do not Address OPEI Administrative or Technical Concerns Outlined in Previous Comments.**

The December 9, 2021 approved for adoption Small Off-Road Engine (SORE) rule amendments set zero-emissions limits for most SORE starting in Model Year 2024. The amendments rely on unsupported and unproven data and assumptions and lack sufficient evidence of technical feasibility (the term "technical feasibility" as used throughout these comments includes cost-effectiveness). The amendment rulemaking package overestimates benchmark/baseline emissions and emission reductions expected from the amendments based on unreliable data. Rulemaking benefits, including emissions, cost and health related benefits, are directly proportional to the difference (delta) between benchmark/baseline emissions versus reductions modeled from the amendments. As a result, overestimates in benchmark/baseline emissions result in overestimates of all benefits outlined in the amendments. Please see OPEI's November 29, 2021 comments for a more detailed discussion of these points. (5005-Docket)

OPEI supports ZEE as one key emission reduction strategy where technology feasibility has been demonstrated. *However, there is currently no one-size-fits-all ZEE approach to satisfy the full range of SORE powered equipment and use cases.* The SORE amendments pose numerous technical feasibility, economic, and implementation challenges for many industry stakeholders. The ability to work all day, and in some cases days on end, without recharging and/or needing dozens of expensive batteries, as well as the cost of battery maintenance over the life the product will continue to be a technology barrier for many user categories and applications which the amendments do not consider. Collectively these challenges are currently insurmountable and will result in significant and unnecessary hardships for manufacturers, retailers and end-users, culminating in an early market shortfall of products with high consumer need and demand. (5005-Docket)

Additionally, the 15-day changes do not address lead time concerns, evaporative emission credit generation, tilt test requirements or replacement engine requirements discussed in OPEI's previous 15-day change comments. These concerns remain unresolved. Please see OPEI's April 14, 2022 comments for an in-depth discussion of these issues. (5005-Docket)

**Agency Response:**

This comment is not related to the additional documents specified in the May 2022 15-Day Notice. This comment is similar to comments OPEI submitted on November 29, 2021, and April 14, 2022. The comment discusses users' battery needs and seems to ask CARB to change the SORE2020 emissions inventory model. The SORE2020 emissions inventory model was developed based on the best available data. OPEI provided no substantive data demonstrating that the inventory overestimates emissions. Please refer to the Agency Responses in sections IV.A.2, IV.A.14 and IV.A.35.1 for discussion of OPEI's November 29, 2021, comments and section IV.B.3 for discussion of OPEI's April 14, 2022, comments. CARB made no changes based on this comment.

Comment: **COMMENT 2 – The Rational for Additional Supporting Documents Added to the Record is Unclear. Without Discussions in the Record Supporting these Documents Stakeholders Cannot Confidently Understand the Meaning and Intent of these Documents or Respond with the Certainty Needed for Rulemaking Purposes. Additionally, OPEI believes adding documents to the record after it has been closed is prohibited by the Administrative Procedures Act.**

The 15-day changes include the addition of dozens of new documents to the record not referenced in the original rulemaking documents or in these 15-day changes. The intent of these documents is

unclear which makes it difficult for stakeholders to provide comments. Furthermore, OPEI believes adding documents to the record using the "15-day change" process without any changes to the rule, and after the record has been closed is prohibited by the California Administrative Procedure Act. Nevertheless, OPEI has the following comments regarding documents added to the record. Due to time constraints and uncertainty regarding the additional documents, these comments are not exhaustive of all documents added to the record. (5005-Docket)

**Agency Response:**

This comment discusses the commenter's assessment of and opinions regarding the documents CARB proposed to add to the rulemaking record. The commenter argues that CARB's May 2022 15-Day Notice violated APA. CARB did not make any changes in response to this comment. The commenter does not cite any APA provisions to support its comment arguing that the May 2022 15-Day Notice is prohibited by APA. In fact, the May 2022 15-Day Notice is consistent with Government Code section 11347.1 of APA, which requires an "agency that adds any technical, theoretical, or empirical study, report or similar document to the rulemaking file after publication of the notice of proposed action and relies on the document in proposing the action shall make the document available [for].… At least 15 calendar days before the proposed action is adopted by the agency…." CARB notified all interested parties of the availability of the May 2022 15-Day Notice and allowed these parties at least 15 calendar days to review and comment on the proposed documents to be added to the record before CARB, through delegation to the Executive Officer in resolution 21-28, formally adopts the Proposed Amendments' rulemaking package and sends the rulemaking package to OAL for review. Government code section 11347.1 does not require an agency, in a 15-Day Notice, to describe how it intends to rely on the documents proposed to be added to the record. The additional documents have been used in responses to comments in this FSOR.

Comment: **Comment 2a – Document 9 Dr. Joe Costa 2022, "Calculating Geometric Means"**

The applicability of the document to this rulemaking is unclear. In its April 14, 2022 comments, comment 7e discussed survey data analysis, including results of applying a geometric means to the data. Document 9 supports OPEI and EMAs suggestion that geometric means may indeed be applicable to the CSU-F dataset because the data does NOT cover a narrow range but represents several orders of magnitude for almost all product activity responses. Please see OPEI's April 14, 2022 comments. (5005-Docket)

In addition to a geometric means analysis, OPEI and EMA, with our vendor Air Improvement Resource, Inc. (AIR), have conducted additional central tendency analysis of the survey data. It is necessary to conduct a review of the data distribution and consider the best metric for central tendency analysis, a step which neither CSU-F nor CARB appeared to do with either the initial dataset (first presented in March 2021 without any quality control analysis, including all outliers), or with its final model dataset published in September 2021. (5005-Docket)

OPEI, EMA and AIR recently conducted a Box Cox analysis on parts of the dataset. Much like the geometric means analysis discussed in OPEI's April 14, 2022 comments, the Box Cox analysis resulted in annual use (hours) closely correlated to the geometric means previously discussed for residential and commercial lawn mowers. See Figure 1. (5005-Docket)

| Household Gasoline Lawn Mower Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| **Dataset/ Method** | **Count** | **Minimum** | **Maximum** | **Average** | **Median** | **Geometric Mean** |
| Original | 308 | 0 | 780 | 23.4 | 10.0 | **8.5** |
| Box Cox | 308 | - | - | **8.3** | 10.0 | - |

| Landscape Gasoline Lawn Mower Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| **Dataset/ Method** | **Count** | **Minimum** | **Maximum** | **Average** | **Median** | **Geometric Mean** |
| Original | 1174 | 0 | 4368 | 253.8 | 216.7 | 162.3 |
| Box Cox | 1174 | - | - | **121.4** | 216.7 | - |

Figure 1 – Results of CSU-F survey data for residential and commercial lawn mowers using various central tendency analysis techniques. (5005-Docket)

As shown, the geometric mean and Box Cox analysis result in significantly lower annual hour use than the arithmetic average. As discussed in both OPEI comment letters, higher than normal annual use values will result in overestimates in sector emissions, in rulemaking emission reductions, and cost benefits. The method and analysis are included in further detail in Annex A (5005-Docket).

**Agency Response:**

This comment discusses the commenter's assessment of and opinions regarding a document CARB proposed to add to the rulemaking record and mentions OPEI's previous comments. This comment suggests that CARB should have used a different measure of central tendency in developing the SORE2020 emissions inventory. The commenter does not provide evidence to support its claims or conclusions. CARB disagrees with the commenter's assertions. CARB made no change based on these comments. The additional document has been used in responses to comments in this FSOR.

The commenter does not provide evidence that "Calculating Geometric Means" supports the suggestion that it would have been appropriate to use a geometric mean in analyzing the CSUF survey data during development of the SORE2020 emissions inventory. Rather, it demonstrates that an arithmetic mean is appropriate to use with data sets such as those from the CSUF survey, as CARB did when developing the SORE2020 emissions inventory. Statistical methods used in development of the SORE2020 emissions inventory model can be found in the SORE2020 emissions inventory report [CARB, 2020[189]]. Please refer to the Agency Responses in section IV.A.14 for additional discussion of comments related to the CSUF survey and the SORE emissions inventory. Please refer to the Agency Responses in sections IV.B.3 and IV.B.5 for additional discussion of comments regarding geometric and arithmetic means. Please refer to the Agency Responses in sections IV.C.3 and IV.C.4 for discussion of the AIR review of the documents proposed to be added to the record in the May 2022 15-Day Notice.

Please refer to the Agency Responses in sections IV.A.2, IV.A.14 and IV.A.35.1 for discussion of OPEI's November 29, 2021, comments and section IV.B.3 for discussion of OPEI's April 14, 2022, comments.

[189] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

**Comment 2b – Document 10 E.H. Pechan & Assoc., Inc. "Guidance for Estimating Lawn and Garden Equipment Activity Levels", September 1997.**

The applicability of the document to this rulemaking is unclear. In previous submissions to the record, OPEI provided extensive comments regarding concerns with the accuracy, comprehension and execution of the CSU-F population survey. Document 10 reaffirms these concerns. (5005-Docket)

Section 3 of Document 10 discusses "Preparing the Survey". The document outlines concerns with survey questions including "Typically, how many times per month do you use your lawnmower?" and "How long does it take you to mow the lawn?". The reports notes the first question is not specific enough if seasonal estimates are of interest, as in most of the areas of the U.S. lawn mowing frequency differs by season. The report also notes that the second question may result in respondents considering the actual time a respondent spends taking care of the lawn, including, e.g., raking clippings or using an edge trimmer. Survey comprehension uncertainty, including both seasonal and run-time per use, was raised in previous OPEI comments. (5005-Docket)

Survey comprehension uncertainty remains a serious concern for OPEI. Misunderstandings of the questions, and the fact that responders have not tracked or accurately considered equipment engine run-time have led to significant overestimates in annual use, and in-turn in sector emission overestimates. Based on the CSU-F survey data, as well as OPEI's own survey efforts, OPEI concludes that machine use and age metrics are not commonly tracked by operators for outdoor power equipment and/or that respondents do not understand the intent of the survey is to collect equipment run-time (vs. total task time), and therefore these metrics cannot be accurately assessed exclusively by a telephone survey. Based on OPEI's close analysis of the survey data, it is apparent that CSU-F survey responses were often inaccurate guesses, misleading, based on misunderstandings of the intent of questions, incorrectly recorded, or not reflective of average product age and use ("outliers"). Without an additional study to understand the correlation of survey responses to real-world use the benefits included in the Proposed Rule must be heavily discounted. (5005-Docket)

Successful execution of the subject survey required in-depth knowledge of dozens of products by data analysts at both CSU-F and CARB, and a robust real-time quality control plan to be able to evaluate the real-world likelihood of responses. The survey datasets used to develop CSU-F's *Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations* and draft SORE2020 models suggest additional product expertise and training were needed to execute the survey and develop the SORE2020 model. As discussed in previous OPEI comment letters, the original datasets used to develop the SORE2020 draft included residential responses of chainsaws and go-karts being used 24-hours at a time, residential lawnmowers and welders being used 7 days a week 365 days a year, schools and dentist offices using portable generators 40 hours per week, 52 weeks a year, and landscapers using outdoor power equipment more than 40 hours *per employee per week* – sometimes more than 100 hours *per employee per week*. These responses, and many others like them, are not reasonable responses. (5005-Docket)

In response to Industry outlier concerns, CSU-F and CARB conducted limited survey quality control investigations (years after the original survey). In July 2020 CSU- F attempted to contact *just three* of more than 3000 respondents, and more than 200 Industry-identified potential outlier respondents. CSU-F was able to discuss responses *with just one respondent*. This single follow-up resulted in CARB reporting "With the assistance of SSRC from CSUF, staff was able to clearly understand those responses with relatively high usages. For instance, SSRC discovered that respondent R555 owns a large, 3-acre farming property, which correlated with the high annual activity for the various equipment reported." Offering that CSU-F and CARB staff "clearly understand responses with

relatively high usages"[1] after publishing reports and draft models suggesting minimal product understanding and expertise is concerning. [Footnote 1: CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020, pg 112] (5005-Docket)

In August 2020 OPEI staff initiated an effort to better understand survey comprehension, responses, and real-world use correlation. To achieve this, OPEI approached landscapers in the field and asked them to participate in a brief survey about their equipment use. Staff identified itself as OPEI, noting that it was collecting product information to better understand equipment use. Respondents were given a $20 fast food gift certificate for their participation. OPEI asked landscapers the same CSU-F survey use and age questions for commercial riding and walk-behind mowers. OPEI focused exclusively on these equipment types because they are typically instrumented with hour meters. OPEI was able to follow-up with most landscapers several times and gather additional hour meter readings. Based on reported and confirmed equipment age and hour meter readings, and follow-up readings, OPEI was able to calculate and compare response age-hours and weekly use (hours) to survey responses to gauge respondents' understanding of the survey questions and real-world use correlation. The results are clear, respondents grossly overestimated equipment use. Given this, SORE2020 significantly overestimates the sectors emissions and the benefits of the Proposed Rule. (5005-Docket)

OPEI surveyed 7 landscaping crews in Grand Rapids, MI and 2 municipalities / landscapers in California. In total, OPEI surveyed 22 commercial riding and walk-behind mowers, for which OPEI was able to conduct at least one follow-up visit for 17 of these mowers. Of the 20 units surveyed for which the hour meter was operational, the survey response age-hours (frequency of use x length of use x age) exceeded the hour meter reading on 18 units. The reported age-hours exceeded the real-world hour meter readings by *thousands* of hours in many cases. In the 2 cases where the hour meter readings exceeded the reported age-hours, both operators noted the units were used less frequently before providing responses, and minimally understated the use. For the 17 units for which OPEI was able to conduct follow-up inspections, where an accurate weekly use estimate could be calculated based on hour-meter readings, OPEI calculates that on average the *respondents overestimated use by 135-150%,[2] or more than double the actual use hours*. See OPEI Survey Results in Annex D. [Footnote 2: OPEI provides a range here because 2 units were observed being used by different crews (of the same respective companies). As discussed in the comments, surveying separate users for the same units resulted in significantly different survey response. As a result, OPEI calculated the average use considering responses for the same machine in separate calculations, using the high responses to calculate the high average of 1042 hr/year, or 152% above the hour meter average of 414 hr/year, and the low response to calculate the low average or 972 hr/year, or of 135% above the hour meter average of 414 hr/year.] (5005-Docket)

It is difficult to say why use responses are so grossly overestimated. Based on the response, OPEI speculates respondents do not discern time spent between jobs, and/or on breaks, and/or time using other equipment when considering responses. In many cases, it appears they respond as if they *run* the subject piece of equipment the entire day, without consideration of breaks, yard preparation/clean up time, or time using other equipment. OPEI believes this could be true for respondents of all categories considering the responses and overall high average Annual Use factors in SORE2020. A homeowner may not discern the time a lawnmower is *running* versus the time they are working outdoors on yardwork. This conclusion could explain why several landscaper respondents in both the OPEI and CUS-F surveys reported using equipment 5-6 days/week for 6-8 hours a day. In reality, OPEI found these units were used just 5-10 hours/week. For example, survey Landscaper1 reports using a walk-behind mower 5-6 days/week for 10 hours/day, for a calculated total of *55 hours/week*. However, based on five hour meter readings between August and October 2020, the

unit averaged *20.5 hours/week* (the highest weekly average of all units tracked), overestimating use by almost triple. The landscaping crew that maintains municipal property in South Pasadena reports to use its ZEE ZTR a calculated total 17.5 hours/week, but based on four hour meter readings between August 2020 and September 2021, the unit averages at maximum 10.5 hours/week, overestimating use by almost double versus its survey responses. (5005-Docket)

The OPEI survey correlation study yielded a few additional important findings. First, when OPEI surveyed different respondents for the same units, responses were significantly different, all drastically overestimating equipment run times. For example, when OPEI surveyed a crew from Landscaper5 on September 1, the respondent reported using a walk-behind mower 6 days/week for 8-9 hours/day (51 hours/week or 1636 hours/year), but when OPEI surveyed another crew from Landscaper5 on September 22, the respondent reported using the same walk-behind mower 5 days/week for 6-7 hours/day (985 hours/year). Both respondents significantly overestimated the use based on the hour meter readings of 374 and 423 hours at the respective interview times, and based on the calculated annual use of 643 hours by extrapolation of four hour meter readings. A unit from Landscaper6 was surveyed twice with similarly inconsistent and overestimated responses. Additionally, when OPEI first surveyed Landscaper6 on September 4, the respondent offered a specific unit was "old, 2005," but his colleague interrupted offering the unit was "much newer, 2011 or 2012." These inconsistencies support OPEI's reported concerns that minutes or hours of use are not accurately tracked, and/or that the survey questions are not clear, and that as a result, the survey does not reflect real-world equipment use. Second, the responses from South Pasadena highlight concern about reported use and actual use. Specifically, the respondent stated that the ZEE riding mower (with a fixed battery system) was used 5 hours/use, but later responded that the battery lasted 3-5 hours. These responses are inconsistent and should raise questions. (For additional context, the respondent from Ojai with the same ZEE unit responded the battery lasts 2.5 hours.) This is similar to OPEI's survey outlier investigation fuel correlation which suggested insufficient fuel for the number of hours of use reported for many respondents. Third, several of the OPEI surveyed units had engine replacements. Multiple respondents offered this information without prompting, and OPEI was able to confirm several others by inspection of the emissions label. OPEI expressed this concern to CARB both before and after the survey. It is not uncommon for professional landscapers to rebuild or replace engines, especially on lawnmowers and chain saws, which in-effect resets the engine emissions to new and must be accounted for in modeling to not overestimate the sector's emissions. CARB modeling does not account for this common landscaper practice based on its survey findings. Finally, the survey questions resulted in almost every respondent providing non-specific responses at least once, including responses such as "everyday," "almost all day," or "same." This highlights OPEI's previous concern that interviewers may have been confronted by these responses frequently and may have extrapolated their own understandings of these responses. OPEI is concerned that no CARB or CSU-F training materials addressed this, and that there was no mention of non-specific responses in the survey report, despite multiple responses having unreasonable hours of use (for example residential chain saws being used 12, 16 or 24 hours per use) and many identical responses from a respondent for the same and different equipment types. Regarding OPEI surveyed units for which respondents initially responded "same," hour meter readings always resulted in significant real-world equipment usage differences. (5005-Docket)

Unfortunately, due to the COVID pandemic, OPEI was unable to conduct additional research. However, the investigation strongly supports OPEI's concerns that respondents do not accurately track equipment use in the survey terms, and consequently grossly overestimate equipment use, and in-turn equipment emissions. At a minimum CSU-F and CARB must consider additional survey correlation to understand the accuracy of survey results and the impact of survey responses on emissions modeling before proceeding with SORE rulemaking. (5005-Docket)

To OPEI's knowledge, there is no evidence of any studies to correlate survey responses to real-world equipment use – for recent or past surveys. It is OPEI's understanding that no efforts were made to visit respondents, or otherwise seek to correlate survey comprehension, or reliability of the responses, including for test surveys and a limited number of surveys conducted in-person. The responses were assumed as factual, despite dozens of responses that suggest misunderstandings of the survey questions, and/or uncertain or untruthful responses, and/or errors by the interviewer. (5005-Docket)

**Agency Response:**

This comment discusses the commenter's assessment of and opinions regarding a document CARB proposed to add to the rulemaking record and the CSUF survey. The comment also mentions OPEI's previous comments. The commenter does not provide evidence to support its claims or conclusions. CARB disagrees with the commenter's assertions. CARB made no change based on these comments. The additional document has been used in responses to comments in this FSOR.

In response to the comments on the E.H. Pechan and Associates document [1997[190]], the questions the commenter notes as being insufficiently specific were not asked in the survey conducted by CSUF SSRC. Rather than, "Typically, how many times per month do you use your lawnmower?" the CSUF SSRC survey asked, "On average, how often do you use this piece of equipment throughout the year?" [CSUF SSRC, 2019[191]]. Also, CSUF SSRC did not ask, "How long does it take you to mow the lawn?" but rather, "How long do you use this piece of equipment each time?" [CSUF SSRC, 2019[192]]. As the commenter notes, asking appropriately specific questions is important to obtain accurate survey results. The commenter reiterates portions of its November 29, 2021, and April 14, 2022, comments. Statements regarding survey comprehension, successful execution of a survey, OPEI's concerns regarding "outliers," OPEI's survey of landscapers, and correlation of survey responses to real-world equipment user are not responsive to the May 2022 15-Day Notice.

Please refer to the Agency Responses in sections IV.A.2, IV.A.14 and IV.A.35.1 for discussion of OPEI's November 29, 2021, comments and section IV.B.3 for discussion of OPEI's April 14, 2022, comments.

[190] EHP&A, Inc. 1997. Guidance for Estimating Lawn and Garden Equipment Activity Levels; Volume IV, Chapter 3. Prepared by E. H. Pechan & Assoc., Inc. (EHP&A) for U.S. Environmental Protection Agency, Mobile Source Committee Emission Inventory Improvement Program. September 1997.

[191] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

[192] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

## C.3. Truck & Engine Manufacturers Association

Comment: At its December 9, 2021 public hearing, the California Air Resources Board (CARB) approved for adoption certain amendments to the California Code of Regulations as recommended by the CARB staff, and further directed the staff to make additional regulatory changes with additional supporting documentation. Those additional changes and documentation were published on March 30, 2022. Subsequently, CARB published a Third Notice of Public Availability of Additional Documents and Information on May 27, 2022, which notice is the subject of these comments. These comments are in addition to the comments the Truck and Engine Manufacturers Association (EMA) previously submitted regarding the Amendments that the Board approved at the December 9, 2021 public hearing, and the comments that EMA submitted regarding the additional changes and documentation published on March 30, 2022. (5006-Docket)

CARB has added twenty-three (23) documents to the Rulemaking Record through the Third Notice at issue. However, CARB has not provided adequate actual notice with respect to those documents. More specifically, the Notice was published at the end of the business day on the Friday before the 3-day Memorial Holiday Weekend. In addition, the 23 documents were only made available for inspection at CARB's offices in Sacramento, unless a request for electronic access was submitted to CARB staff. EMA submitted such a request on the first business day after the holiday weekend (Tuesday, May 31st) and was later granted access to a password-controlled site on which the documents were posted. Nowhere in the password-controlled site is there any explanation of why the 23 documents are being added to the Record, or how they might support CARB's rulemaking. Rather, the 23 documents appear to be a hodge-podge of documents including Operator Manuals, Executive Orders, references to research publications, previously published government reports, and various marketing materials. (5006-Docket)

The foregoing raises a number of procedural issues. First, CARB's pre-Memorial Day filing and its failure to make the 23 documents readily accessible has resulted in a period of review that is, in fact, less than the requisite 15 days. That is a violation of the California Administrative Procedure Act (APA). Second the 23 documents are not germane to any specific 15-day changes - - indeed, CARB makes no claim that they are - - and so CARB's action in that regard, in effect, amounts to an improper attempt to supplement the Record in a broad-based manner after the close of that Record. That too amounts to a violation of the APA. (5006-Docket)

**Agency Response:**

These comments include an introduction that describes EMA's assessment of CARB's actions and refers to EMA's previous comments. The commenter argues that CARB's May 2022 15-Day Notice violated APA. CARB did not make any changes in response to this comment. The commenter does not cite any APA provisions to support its comment arguing that the May 2022 15-Day Notice is prohibited by APA. In fact, the May 2022 15-Day Notice is consistent with Government Code section 11347.1 of APA, which requires an "agency that adds any technical, theoretical, or empirical study, report or similar document to the rulemaking file after publication of the notice of proposed action and relies on the document in proposing the action shall make the document available [for]…. At least 15 calendar days before the proposed action is adopted by the agency…." CARB notified all interested parties of the availability of the May 2022 15-Day Notice and allowed these parties at least 15 calendar days to review and comment on the proposed documents to be added to the record before CARB, through delegation to the Executive Officer in resolution 21-28, formally adopts the Proposed Amendments' rulemaking package and sends the rulemaking package to

OAL for review. Nothing in APA prohibits a comment period to run through a weekend or holiday and commenter does not cite any legal basis to establish the claim that the 15 calendar days exclude weekends or holidays. Government code section 11347.1 also does not require an agency, in a 15-Day Notice, to describe how it intends to rely on the documents proposed to be added to the record. The additional documents have been used in responses to comments in this FSOR.

Comment: EMA and the Outdoor Power Equipment Institute (OPEI) engaged Air Improvement Resources (AIR) to conduct a review of the Documents and Information added to the rulemaking record which appear to relate to the California State University – Fullerton (CSU-F) Survey and CARB's 2020 SORE Air Emissions Inventory and Model. The Survey and Inventory and Model are foundations of the Proposed Amendments to the SORE Regulations and Transition to Zero Emissions. As detailed in AIR's Analysis (attached to and incorporated into these comments in Attachment A), the Additional Documents and Information included in this Third Notice support the comments previously submitted by EMA and the OPEI. The CSU-F Survey is materially deficient and the CARB analysis of the survey data is contrary to accepted research and analysis methodology. As discussed in more detail in the AIR Analysis (Attachment A) the Additional Documents and Information added to the Record in this Third Notice in fact confirm that the CSU- F survey is flawed and that the methodology chosen by CARB – an arithmetic mean – is inappropriate given the distribution of the survey data. The result of the use of the flawed survey data and the inappropriate analysis methodology is that the SORE air emissions inventory is materially overstated. Thus, the CARB forecasted air emission reductions of the Proposed Amendments are also overstated and the costs are substantially understated. (5006-Docket)

**Conclusion**
The Rulemaking at issue remains defective in multiple respects, including, due to the lack of necessary lead time and the reliance on materially flawed survey data which overstates the air emissions inventory and forecasted emission reductions and understates the cost of the Proposed Amendments. Accordingly, EMA again requests that serious consideration be given to the alternate proposal described in our previous comments. EMA believes that the alternative proposal will provide real-world emission reductions in a cost-effective and technologically achievable manner. (5006-Docket)

**Agency Response:**

These comments describe commenters' actions and their assessments of and opinions regarding the Proposed Amendments. The commenter does not provide evidence to support its claims or conclusions. CARB disagrees with the commenter's assertions. CARB made no change based on these comments.

In response to the statement, "the Additional Documents and Information added to the Record in this Third Notice in fact confirm that the CSU- F survey is flawed and that the methodology chosen by CARB – an arithmetic mean – is inappropriate given the distribution of the survey data,": The commenter does not provide evidence to support this statement. CARB disagrees with the commenter's conclusion. The documents included in the May 2022 15-Day Notice do not demonstrate that the CSUF survey is flawed or that the use of an arithmetic mean in development of the SORE2020 emissions inventory was inappropriate. Rather, they demonstrate that an arithmetic mean is appropriate to use with data sets such as those from the CSUF survey, as CARB did when developing the SORE2020 emissions inventory. Statistical methods used in development of the SORE2020 emissions inventory

model can be found in the SORE2020 inventory report [CARB, 2020[193]]. Please refer to the Agency Responses in section IV.A.14 for additional discussion of comments related to the CSUF survey and the SORE emissions inventory. Please refer to the Agency Responses in sections IV.B.3 and IV.B.5 for additional discussion of comments regarding geometric and arithmetic means. Please refer to the Agency Responses in sections IV.C.2 and IV.C.4 for discussion of the AIR review of the documents proposed to be added to the record in the May 2022 15-Day Notice.

Please refer to the Agency Responses in sections IV.A.2.3.5, IV.A.2.4.2, IV.A.2.6.2, IV.A.2.6.3, IV.A.10, IV.A.14, IV.A.35.2, and IV.B.5 for discussion of EMA's similar comments expressed during the 45-day comment period and 15-day comment period for the March 2022 15-Day Notice about the current technological feasibility of ZEE, lead time for implementation of the Proposed Amendments, and EMA's proposed alternative.

## C.4. AIR Review submitted by OPEI and EMA

Comment: **Additional 15-day Comments Based on New Resources Submitted by CARB, Air Improvement Resource, Inc.**

ARB submitted a number of new statistical references to support their SORE survey and subsequent emission inventory analysis.[1] [Footnote 1: References 4, 9, 10, 14, 17, 19, 23] ARB's emission analysis and modeling is described in their September 2020 emission inventory report.[2] [Footnote 2: *2020 Emissions Model for Small Off-Road Engines – SORE2020*, ARB, September 2020] Section 4.2 of the report describes ARB's methods for estimating annual activity from different equipment types from its SORE equipment survey. The report also describes "outlier" data that were examined by CARB and eliminated prior to estimating annual equipment usage. Basically, ARB estimated annual activity by using an arithmetic average of the data that remained after the ARB-identified outliers were removed.[3] [Footnote 3: AIR also identified outliers and these were identified in previous EMA and OPEI comments.] (5005-Docket) (5006-Docket)

Metric for Estimating Central Tendency (annual hours of use per year) From the Data
AIR has commented that ARB should have used a geometric mean to estimate annual activity instead of an arithmetic average, even after removing outliers. Arithmetic averages are generally used for data that is normally distributed – i.e., the familiar bell-shaped curve. The annual activity data, however, are not normally distributed, even after removing a few outliers. The data are highly skewed toward higher uses, and there is no data below 0 hours, for obvious reasons. Nowhere in ARB's analysis can we find a discussion of how the ARB annual use data from the survey are distributed (after removal of outliers), and what rationale ARB relied upon in choosing and arithmetic average instead of some other metric for estimating central tendency. (5005-Docket) (5006-Docket)

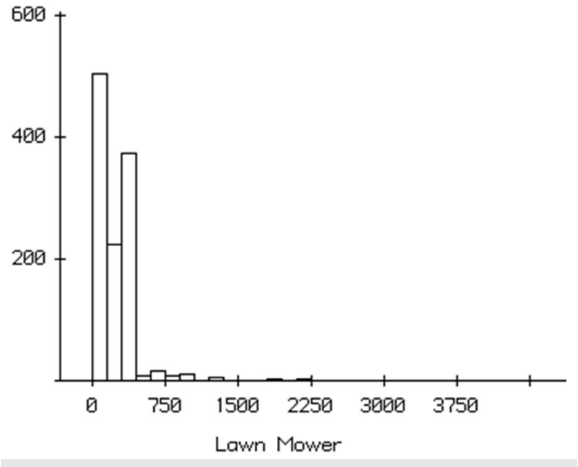
Reference 9 (Costa) from ARB's new sources discusses circumstances under which the geometric mean can be used in certain datasets. The following statements from the report are relevant.(5005-Docket) (5006-Docket)

a. "Page 1, "A geometric mean, unlike an arithmetic mean, tends to dampen the effect of very high or low values, which might bias the mean if a straight average were calculated"

[193] CARB. 2020. 2020 Emissions Model for Small Off-Road Engines – SORE2020. Report prepared by staff of the Air Quality Planning and Science Division (AQPSD). September 2020.

b. Page 2, "Geometric mean is often used to evaluate data covering several orders of magnitude, and sometimes for evaluating ratios, or percentages, or other data sets bounded by zero."(5005-Docket) (5006-Docket)

The plot below shows the distribution of data on annual use for landscape lawnmowers. The vertical axis is frequency, the horizontal axis is hours per year of use. No outliers have been removed from these data. (5005-Docket) (5006-Docket)



(5005-Docket)(5006-Docket)

Some landscape lawnmowers are used for less than 0.5 hours per year, others as much as 2250 hours per year. These data cover several orders of magnitude as discussed in Costa and therefore the use of a geometric mean is appropriate. (5005-Docket) (5006-Docket)

Overall, this report lends support to the use of a geometric mean to estimate annual activity as recommended by AIR. At a minimum, ARB should have examined the distribution of responses for each equipment type (and category) after removal of outliers and determined the best method of estimating annual use after examining these distributions. (5005-Docket) (5006-Docket)

Survey Methods

Reference 10 (E.H. Pechan) from the new ARB sources discusses how to develop local or regional inputs lawn and garden activity (hours per year) for the EPA NONROAD model. There are extensive discussions on sample sizes and survey methods. Chapter 3 discusses survey methods. Pages 3-10 and 3-11 discuss forming the correct survey questions to get the appropriate answers. On page 3-11, one of the suggested survey questions is "How long does it take to mow your lawn?" The report qualifies this question, however, by indicating (5005-Docket) (5006-Docket)

> "The……question as posed could lead to overestimating lawn mowing activity if survey respondents consider the actual time that they spend taking care of the lawn, including, e.g., raking clippings or using an edge trimmer. Instead, the more accurate and direct question "How long does your lawnmower run when you mow the lawn?" should be asked. (5005-Docket) (5006-Docket)

This is a critical point that ARB and its contractor overlooked when conducting the SORE survey. The surveyors never asked the respondents for engine-on or equipment run times. Some respondents probably understood what the surveyors meant, but many did not. ARB should clearly address whether they think their survey appropriately considered this point. (5005-Docket) (5006-Docket)

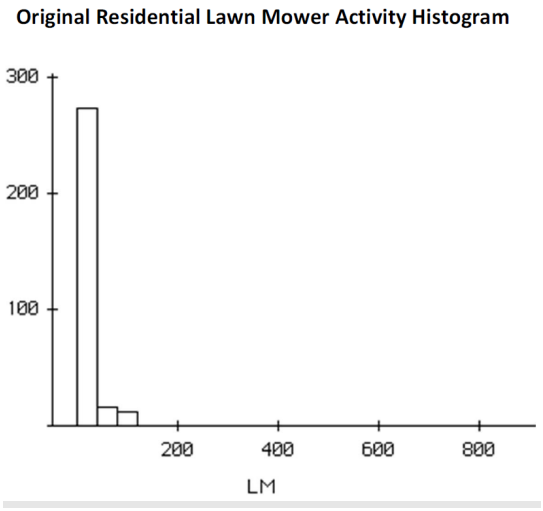
Box-Cox Transformations of Activity Data

The Box-Cox transformation is also often used for data that is highly skewed. The data are first transformed using this methodology, and then an arithmetic average is computed and converted back to real space.[4] [Footnote 4: https://onlinestatbook.com/2/transformations/box-cox.html] (5005-Docket) (5006-Docket)

We used the Box-Cox transformation method on residential and commercial lawnmowers as an example. (5005-Docket) (5006-Docket)

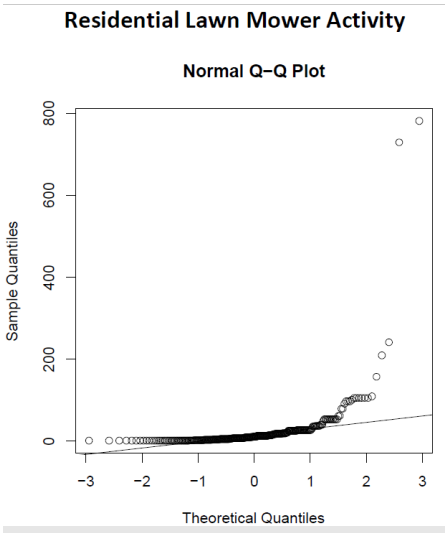
Residential Lawnmowers

The Box Cox Transformation methodology was applied to the Residential Lawn Mower data. This statistical procedure usually changes a highly skewed dataset into a more normal distribution. The graph below shows the histogram of the original data. As can be seen, the data are highly skewed to the right. (5005-Docket) (5006-Docket)




(5005-Docket) (5006-Docket)

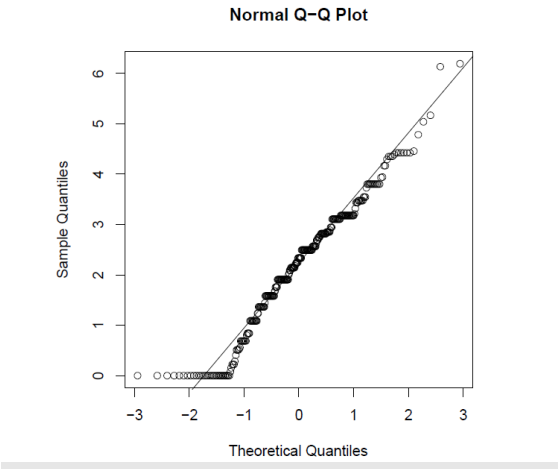
Since the Box Cox Transformation requires positive data, all activity values were increased by 1. The Q-Q below shows that the data are still highly skewed. (A normal distribution will have the symbols lie along the line.) (5005-Docket) (5006-Docket)




(5005-Docket) (5006-Docket)

The next step was to perform the Box Cox Transformation on the data. This resulted in a more normally distributed Q-Q plot, but the 32 zero activity entries are an issue. (5005-Docket) (5006-Docket)

**Box Cox Transformed Lawn Mower Annual Activity**




(5005-Docket) (5006-Docket)

Finally, the mean and median of this transformed data were computed and then reverted back to real-space, with 1 subtracted. (5005-Docket) (5006-Docket)

The results of this analysis are summarized below:

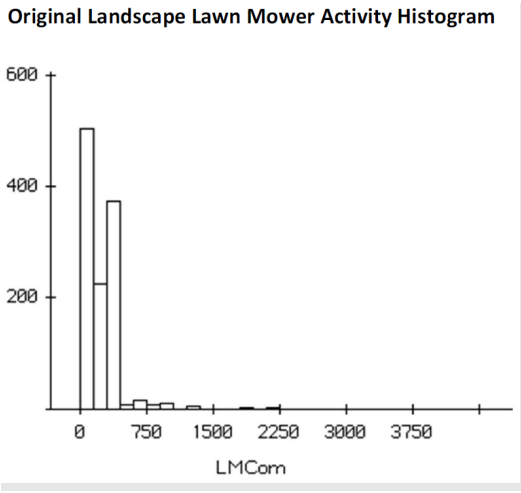
| Household Gasoline Lawn Mower Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| Dataset/ Method | Count | Minimum | Maximum | Average | Median | Geometric Mean |
| Original | 308 | 0 | 780 | 23.4 | 10.0 | 8.5 |
| Box Cox | 308 | - | - | 8.3 | 10.0 | - |

(5005-Docket)(5006-Docket)

As can be seen, the Geometric Mean and the Box Cox Average values are very close and are much lower than the arithmetic average. (5005-Docket) (5006-Docket)

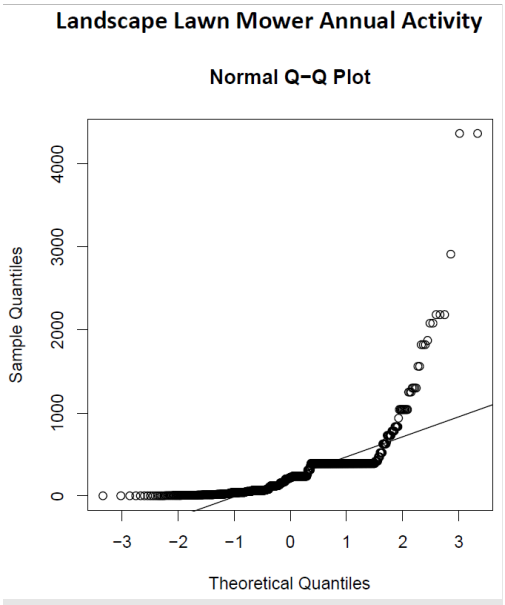
Landscape Lawnmowers

The Box Cox Transformation methodology was applied to the Landscape Lawn Mower data. This statistical procedure usually changes a highly skewed dataset into a more normal distribution. The graph below shows the histogram of the original data. As can be seen, the data are highly skewed to the right, and may be bimodal via the two peaks. (5005-Docket) (5006-Docket)



(5005-Docket) (5006-Docket)

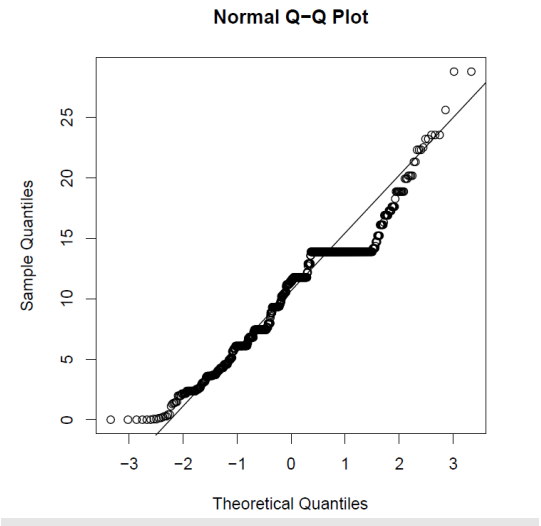
Since the Box Cox Transformation requires positive data, all activity values were increased by 1. The Q-Q below shows that the data are still highly skewed. (A normal distribution will have the symbols lie along the line.)



(5005-Docket) (5006-Docket)

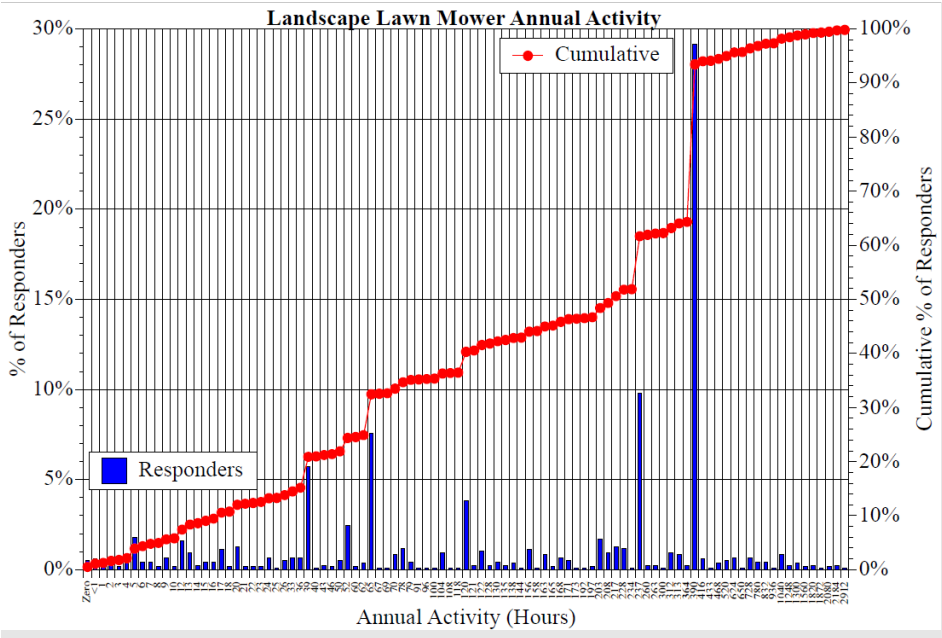
The next step was to perform the Box Cox Transformation on the data. This resulted in a more normally distributed Q-Q plot.

**Box Cox Transformed Lawn Mower Annual Activity**




(5005-Docket) (5006-Docket)

However, an abnormality is present in the Q-Q plot. The horizontally flat area indicates that something is very odd about the data. As a result, the following plot was created.




(5005-Docket)(5006-Docket)

This plot shows that 342 responses (~29% of the total) were at the 390 hour/year mark. Such a concentration can adversely affect obtaining any meaningful statistics. Nevertheless, the mean and median of the Box Cox transformed data were computed and then reverted back to real-space, with 1 subtracted. The results of this analysis are summarized below:

| Landscape Gasoline Lawn Mower Annual Hours | | | | | | |
|---|---|---|---|---|---|---|
| Dataset/ Method | Count | Minimum | Maximum | Average | Median | Geometric Mean |
| Original | 1174 | 0 | 4368 | 253.8 | 216.7 | 162.3 |
| Box Cox | 1174 | - | - | **121.4** | 216.7 | - |

(5005-Docket) (5006-Docket)

Finally, the table below shows that the landscape lawn mower activities are being dominated by only a few responders.:

| ID | Count | Hours |
|---|---|---|
| 199-G2 | 50 | 390.0 |
| 258-G1 | 50 | 390.0 |
| 315-G1 | 50 | 236.6 |
| 397-G1 | 50 | 390.0 |
| 16-G1 | 35 | 390.0 |
| 480-G1 | 32 | 236.6 |
| 345-G1 | 30 | 65.0 |
| 208-G2 | 20 | 390.0 |
| 269-G1 | 20 | 202.5 |
| 1-G5 | 15 | 216.7 |
| 21-G1 | 15 | 5.4 |
| 97-G2 | 15 | 39.0 |
| 527-G1 | 12 | 121.7 |
| 182-G1 | 10 | 65.0 |
| 190-G1 | 10 | 69.8 |
| 2-G1 | 10 | 162.5 |
| 319-G1 | 10 | 227.5 |
| 324-G1 | 10 | 313.3 |
| 4-G2 | 10 | 390.0 |
| 462-G1 | 10 | 12.8 |
| 484-G1 | 10 | 390.0 |
| 499-G1 | 10 | 390.0 |
| 18-G1 | 8 | 390.0 |
| 194-G1 | 8 | 39.4 |
| 276-G1 | 8 | 168.1 |
| 13-G2 | 7 | 119.6 |
| 218-G1 | 7 | 390.0 |
| 90-G1 | 7 | 12.2 |
| 147-G2 | 6 | 236.6 |
| 151-G1 | 6 | 236.6 |
| 152-G1 | 6 | 32.9 |
| 190-G2 | 6 | 170.9 |
| 211-G1 | 6 | 17.3 |
| 222-G1 | 6 | 19.9 |
| 302-G1 | 6 | 65.0 |
| 313-G1 | 6 | 39.0 |
| 41-G1 | 6 | 390.0 |
| 426-G1 | 6 | 390.0 |
| 501-G1 | 6 | 390.0 |

(5005-Docket) (5006-Docket)

Summary

Due to the survey methods used, and the general nature of activity data obtained through telephone surveys instead of through using actual data loggers on equipment, the annual activity data collected by ARB and its contractor are highly skewed. As a result, arithmetic averages should not be used on

the raw data, but alternative methods such as geometric averages, or transformation of the data by the Box-Cox method, should have been used by ARB to estimate annual activity for SORE equipment. (5005-Docket) (5006-Docket)

**Agency Response:**

These comments were submitted by both OPEI and EMA and describe a review conducted by Air Improvement Resource, Inc. (AIR) of the documents added to the rulemaking record by the May 2022 15-Day Notice. OPEI submitted the AIR review as "Annex A OPEI, EMA and AIR Box Cox Analysis Discussion" with its June 13, 2022, comment letter. EMA submitted the AIR review as "Attachment A" with its June 13, 2022, comment letter. The commenters discuss their assessments of actions taken by CARB and CARB's analysis of CSUF survey data and state opinions and conclusions regarding the Proposed Amendments and the documents CARB proposed to add to the rulemaking record. The commenters do not provide evidence to support their claims or conclusions. CARB disagrees with the commenters' assertions. CARB made no change based on these comments.

These comments seem to suggest that CARB consider an alternative to the Proposed Amendments. They suggest that CARB should have used alternative measurements of central tendency, rather than the arithmetic mean in evaluating CSUF survey data for annual equipment use time in the development of the SORE2020 emissions inventory. They also suggest that CARB should redo the CSUF survey with different question phrasing. They further suggest that CARB should perform a Box-Cox transformation on the annual use times found by the CSUF survey data as an additional statistical measure.

There are many potential measures of central tendency, which capture different meanings of where the "center" of the data set lies. The three most common measures of central tendency are the mode, which is the most common value, the median, which is the middle value and is insensitive to the size of other values, and the mean, or average, which is sensitive to the size of all values [Howell, 2010, section 2.7[194]].

In analyzing the CSUF survey data set, the goal was not to provide a narrative description of the data, but to estimate total emissions from SORE. An arithmetic mean is appropriate for calculating total emissions. To estimate total emissions, as shown in equation (1), CARB calculated the product of 1) mean emissions per hour of equipment use (an emission factor), 2) mean annual use time in hours, and 3) equipment population.

$$Total\ Emissions_i = Emission\ Factor_i \times Mean\ Annual\ Use\ Time_i \times Population_i \qquad (1)$$

Where $i$ = equipment type, e.g., lawn mower

The arithmetic mean of the CSUF survey data set is the total annual use time of all equipment divided by the population of that equipment type. In order to calculate total annual use time, the arithmetic mean is multiplied by the number of units (population). The geometric mean or any other measure of central tendency is inappropriate for calculating total emissions. The commenters do not provide evidence that the use of an arithmetic mean in development of

[194] Howell, David C. 2010. Statistical Methods for Psychology, Seventh Edition. Belmont, California: Cengage Wadsworth.

the SORE2020 emissions inventory was inappropriate or that the use of a different measure of central tendency would have been appropriate in development of the SORE2020 emissions inventory.

As the commenters note of one reference, Costa explains, "Geometric mean is often used to evaluate data covering several orders of magnitude, and sometimes for evaluating ratios, or percentages, or other data sets bounded by zero." [Costa, 2022[195]]. Evaluation of the CSUF survey data, however, did not involve determining percentages or ratios of equipment population or use. The commenters also note that Costa says, "A geometric mean, unlike an arithmetic mean, tends to dampen the effect of very high or low values, which might bias the mean if a straight average were calculated." [Costa, 2022[196]]. Total emissions, not the mean, or other measures of central tendency, is the primary quantity of interest for the SORE2020 emissions inventory. The arithmetic mean is used to calculate total emissions by multiplying the arithmetic mean of annual use time by the equipment population and the emission factor, as shown in equation (1).

Total emissions can be calculated without first calculating the mean of the survey data. Consider an imaginary data set of annual use time in hours [1, 2, 30, 50], which represents a sample of 10 percent of all 40 users in the population. The total annual use time for this sample is calculated in equation (2):

$$1 + 2 + 30 + 50 = 83 \qquad (2)$$

Since the sample is 10 percent of the population, the total annual use time for the population can be estimated to be 830 hours. The arithmetic mean is calculated by dividing the total by the number of users sampled, as shown in equation (3):

$$83 \div 4 = 20.75 \qquad (3)$$

Multiplying the arithmetic mean annual use time by the population yields the same total annual use time:

$$20.75 \times 40 = 830 \qquad (4)$$

The geometric mean of the data set is 7.4. Multiplying the geometric mean by the population does not return the same total annual use time:

$$7.4 \times 40 = 296 \qquad (5)$$

Any transformation of the data, whether by calculation of a geometric mean or another method, is inappropriate when the value of interest is the total.

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[195] Costa. 2022. Calculating Geometric Means. Joe Costa. Buzzards Bay National Estuary Program. Available on the State Water Resource Control Board, SWAMP Program website at: https://www.waterboards.ca.gov/water_issues/programs/swamp/docs/cwt/guidance/3413.pdf. Last accessed: May 2, 2022.

[196] Costa. 2022. Calculating Geometric Means. Joe Costa. Buzzards Bay National Estuary Program. Available on the State Water Resource Control Board, SWAMP Program website at: https://www.waterboards.ca.gov/water_issues/programs/swamp/docs/cwt/guidance/3413.pdf. Last accessed: May 2, 2022.

The commenters' discussion of a Box-Cox transformation performed by AIR is not responsive to the May 2022 15-Day Notice, but additional clarification is provided here. This analysis is inappropriate for the same reasons using a geometric mean is inappropriate for determining SORE emissions from the CSUF survey data. The mean calculated from the Box-Cox transformation may be interesting for a narrative description of the data, but it is inappropriate for calculating total annual use time, which is needed to calculate total emissions from SORE.

The commenters assert that flat areas in the Q-Q plot indicate "abnormalities" in the data, but they in fact just indicate clumping of the data. Clumping is expected in a data set such as the CSUF survey data, as many landscapers have similar operations and use equipment for similar amounts of time. Any deviation from the linear plot simply shows that the data are not normally distributed, which is expected for this type of data set and has already been noted by CARB.

The commenters suggest the application of a variety of transformations and analyses to the equipment annual use time data from the CSUF survey that would result in lower estimates of emissions from SORE equipment. The commenters discuss descriptive measures of central tendency, but do not demonstrate that a different measure of central tendency should have been used in the development of the SORE2020 emissions inventory.

In response to the comments on the E.H. Pechan and Associates, Inc. document [1997[197]], the document cites the question, "How long does it take you to mow the lawn?" as being overly broad. That, however, is not the question that was asked in the CSUF survey. The question actually asked of CSUF survey participants was, "How long do you use this piece of equipment each time?" [CSUF SSRC, 2019[198]]. The question specifically asks about equipment use. As the commenters note, developing appropriate, specific questions is an important step in survey development.

## C.5. Law Office of Melissa B. Hagan, PLLC

Comment: Please provide additional information regarding the inclusion of the following items listed in the 3rd 15-day notice. For example, a search of the ISOR and attachments does not include reference to these generators: (5007-Email)

3. American Honda Motor Co, Inc. 2022. American Honda Motor Co, Inc. (Honda) Owner's Manual: Generator EU2200i / EU22001 Companion. Available at: https://cdn.powerequipment.honda.com/pe/pdf/manuals/00X31Z446130.pdf. Last accessed: April 29, 2022. (5007-Email)

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[197] EHP&A, Inc. 1997. Guidance for Estimating Lawn and Garden Equipment Activity Levels; Volume IV, Chapter 3. Prepared by E. H. Pechan & Assoc., Inc. (EHP&A) for U.S. Environmental Protection Agency, Mobile Source Committee Emission Inventory Improvement Program. September 1997. Available at: https://www.epa.gov/sites/default/files/2015-08/documents/iv03.pdf. Last accessed: May 2, 2022.

[198] CSUF SSRC. 2019. Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations. Prepared by the Social Science Research Center (SSRC) at California State University, Fullerton (CSUF), for CARB and the California Environmental Protection Agency, under CARB Agreement 16MLD011. May 15, 2019.

8. Champion Power Equipment. 2022. Champion Global Power Equipment Owner's Manual & Operating Instructions: 3400 Starting watts / 3100 Running watts Portable Inverter Generator, model Number 100233. Available at https://www.championpowerequipment.com/wpcontent/uploads/2017/08/100233om-english.pdf. Last accessed: April 29, 2022. (5007-Email)

13. Generac. 2022. Owner's Manual: GP Series Portable Generator. Models: 005625-0, 005626-0, 005680-0, 005681-0. Available at: https://prodgeneracsoa.azurefd.net/manualsweb/manuals/5644258/0G8751. Last accessed: April 29, 2022. (5007-Email)

**Agency Response:**

This commenter requests clarification regarding documents added to the record for this rulemaking in the May 2022 15-Day Notice. CARB did not make any changes in response to this comment. The additional documents have been used in responses to comments in this FSOR. Please refer to the Agency Responses in sections IV.A.35.1 and IV.A.35.3 for discussion of these documents.

## C.6. San Diego Exterior Pro's

Comment: I own a pressure washing company that does landscaping as well. I have gas operated machines and as I look to buy new machines this year I would love to buy electric. However the higher price range for electric equivalent machines scares me as a sole proprietor. How can I apply for a grant from the 30 Million incentive funds program? (5008-Email)

**Agency Response:**

This commenter mentions higher upfront costs of ZEE and asks how to apply for incentive funding. This comment is beyond the scope of the May 2022 15-Day Notice, and therefore CARB made no changes based on this comment. To clarify, the scope of the rulemaking described in the October 2021 45-Day Notice also does not include providing incentive funding. The Budget Act of 2021 provided $30 million for the FY21-22 California state budget "to create a program, or utilize an existing program, to provide incentives for professional landscaping services in California operated by small businesses or sole proprietors to purchase zero-emission small off-road equipment." That funding was included in CORE. The Board voted on this inclusion at their November 2021 hearing. Details of how the CORE funding will be distributed will be determined through a public process. ISOR section I.F provides additional discussion of sources of incentive funding.

## C.7. NMMA and Westerbeke Corporation

Comment: We recently received notification of a 15-day notice pertaining to additional public documents being available with regard to the SORE ZEE regulation. In reviewing them, we did not see any reference to the agreement we discussed regarding emissions for marine gasoline generators. I have attached a copy of the letter we sent to you in March regarding this issue after our conference call. We would like to get confirmation of acceptance of the agreement from the ARB. (5009-Email)

Comment: **Attached March 28, 2022, letter from NMMA and Westerbeke Corporation to CARB**
The National Marine Manufacturers Association and Westerbeke Corporation would like to thank you for taking the time to discuss the ZEE transition with us. As we discussed, the gasoline marine generator industry is very small, and has some special design constraints as well as US Coast Guard and EPA regulations that do not apply to any other SORE engines. These Federal regulations are critical as they protect boaters from immediate danger to health and human safety from CO poisoning. As you are aware the low CO requirement needs to be balanced with NOx. (5009-Email)

First, NMMA and Westerbeke believe that marine gasoline generators meet the EPA definition of a stationary engine, and we look forward to supporting this definition during the technology review. These generators are not portable but are integral to the vessel. As the board has already approved the current staff recommended definition, it is critical that for the model years 2024-2027, marine gasoline generator engines would have the following CO and HC+NOx standards: (5009-Email)

| | | |
|---|---|---|
| 225-825cc | HC+NOx 3.0 g/kW-hr ; | CO 4.5 g/kW-hr |
| > 825cc | HC+NOx 0.8 g/kW-hr ; | CO 4.5 g/kW-hr (5009-Email) |

However, due to the stringent CO standard and the emission useful life of marine propulsion engines, marine gasoline generators operate far less than propulsion engines and need to be appropriately subject to a durability period of 250 hours, to which Westerbeke products are currently certified. (5009-Email)

**Agency Response:**

The letter dated March 28, 2022, from NMMA and Westerbeke that was attached to Westerbeke's May 31, 2022, email is identical to their letter submitted during the March 2022 15-Day comment period. The comment letter includes expressions of the commenters' opinion that marine generator engines meet the definition for stationary engines and requests that CARB consider alternate HC + NOx standards for marine generator engines. The scope of the May 2022 15-Day Notice does not include any modifications to the Proposed Amendments to the SORE regulations for this rulemaking; therefore, it does not include changes to the proposed HC + NOx emission standards for marine generator engines. These commenters' request is not directly related to the additional documents specified in the May 2022 15-Day Notice. Therefore, it is beyond the scope of the May 2022 15-Day Notice, and CARB made no further changes based on the comment. Concerns similar to those expressed in this comment were also expressed by these and other commenters during the 45-day comment period; please see the Agency Response in section IV.A.2.3.1. Note that, as described in section II of this FSOR, in response to other stakeholder feedback about technological feasibility specific to generators, the Proposed Amendments allow more time for generators to comply with emission standards of zero. This is achieved by setting interim emission standards for MYs 2024 through 2027 for generators and setting emission standards of zero for MY 2028 and later for these generators.

Regarding Westerbeke's email comment, "…we did not see any reference to the agreement we discussed regarding emissions for marine gasoline generators": The commenters' submission of comments during the 15-day comment periods for the March 2022 15-Day Notice and the May 2022 15-Day Notice does not create an agreement between the commenters and CARB. CARB made no agreement with the commenters regarding emissions for marine gasoline generators during any stakeholder outreach meetings with Westerbeke and NMMA. APA does not require agencies to modify proposals in response to every public

comment. CARB Resolution 21-28, dated December 9, 2021, states, in part, "Be it further resolved that the Board directs CARB staff to review annually the status of the implementation of the proposed amendments and to conduct a technological review in the 2025 to 2026 timeframe to assess the progress towards the MY 2028 zero-emission standards for portable generators and any other engine or equipment category that may be newly subject to the MY 2028 zero-emission standards." Such technological review is beyond the scope of the Proposed Amendments to the SORE regulations for this rulemaking. However, it will be an important component of implementing the Proposed Amendments.

# V. Peer Review

Health and Safety Code section 57004 sets forth requirements for peer review of identified portions of rulemakings proposed by entities within the California Environmental Protection Agency, including CARB. Specifically, the scientific basis or scientific portion of a proposed rule may be subject to this peer review process. Here, CARB determined that the rulemaking did not contain a scientific basis or scientific portion subject to peer review, and thus no peer review as set forth in section 57004 needed to be performed.

The regulation at issue amends parts of the SORE regulations to transition SORE equipment to ZEE as soon as possible, to better evaluate emissions from real-world use of SORE equipment, to improve consistency with federal regulations, and to add flexibility for manufacturers. The rulemaking does not establish “a regulatory level, standard, or other requirement for the protection of public health or the environment,” such as an ambient air quality standard or toxic exposure level. As such, it does not have a “scientific basis” or “scientific portions” that form the foundations of a regulatory standard or level. The technical studies and assessments used to analyze the potential environmental impacts of the regulation, such as the finding that the Proposed Amendments would support wise and efficient uses of energy and therefore would result in long-term beneficial impacts to energy demand, were developed previously and subject to public review.

# VI. Index

## A. Commenter and Form Letter Index

# B. Comment and Response Topic Index