

Notice of Public Availability of Modified Text and Availability of Additional Documents and Information

Proposed In-Use Locomotive Regulation

Public Hearing Date: November 18, 2022
Public Availability Date: March 1, 2023
Deadline for Public Comment: March 16, 2023

At its November 18, 2022, public hearing, the California Air Resources Board (CARB or Board) considered the proposed In-Use Locomotive Regulation, section 2478, Title 13, California Code of Regulations. The proposed In-Use Locomotive Regulation (Proposed Regulation) would achieve emission reductions from Locomotives Operating in California. Emission reductions from Locomotives are needed to better protect communities from near-source pollution impacts, help meet the current health-based ambient air quality standards, and further California's climate goals.

The Board directed the Executive Officer to determine if additional conforming modifications to the Proposed Regulation were appropriate and to make any proposed modified regulatory language available for public comment, with any additional supporting documents and information, for a period of at least 15 days in accordance with Government Code section 11346.8. The Board further directed the Executive Officer to consider written comments submitted during the public review period and make any further modifications that are appropriate available for public comment for at least 15 days. The Executive Officer was directed to evaluate all comments received during the public comment periods, including comments raising significant environmental issues, and prepare written responses to such comments as required by CARB's certified regulations at California Code of Regulations, title 17, sections 60000-60007 and Government Code section 11346.9, subdivision (a). The Executive Officer was further directed to present to the Board, at a subsequently scheduled public hearing, staff's written responses to environmental comments and the final environmental analysis for consideration for approval, along with the finalized Regulation for consideration for adoption.

The resolution and all other regulatory documents for this rulemaking are available online at the following [CARB website](https://ww2.arb.ca.gov/rulemaking/2022/locomotive): <https://ww2.arb.ca.gov/rulemaking/2022/locomotive>.

The text of the modified regulatory language is shown in Attachment A, in a .pdf and .docx (Word) format. The .pdf version annotates new deletions and additions to the proposed language that are made public with this notice in strikethrough to indicate deletions and underline to indicate additions.

The Word version annotates new deletions and additions to the proposed language that are made public with this notice in tracked changes and are made public with this Notice and available for comment. To review this document in a clean format, without underline or strikethrough to show changes, that shows all the proposed regulations being considered for adoption, please select "Simple Markup" or "No Markup," or accept all changes in Microsoft Word's Review menu. You can also change the view to the initially-proposed 45-Day Changes (originally proposed regulatory text prior to proposed modifications) by selecting "Original" or rejecting all tracked changes. Additionally, "Advanced Track Changes Options" will allow for further options regarding color and other markings.

In the Final Statement of Reasons, staff will respond to all comments received on the record during the comment periods. The Administrative Procedure Act requires that staff respond to comments received regarding all noticed changes. Therefore, staff will only address comments received during this 15-day comment period that are responsive to this notice, documents added to the record by staff, or the changes detailed in Attachment A.

Summary of Proposed Modifications

The following summary does not include all modifications to correct typographical or grammatical errors, changes in numbering or formatting, nor does it include all of the non-substantive revisions made to improve clarity.

1. In section 2478.2 Exemptions:
 - a. Under subsection (a), staff added clarification that for Locomotives propelled by two or more engines, the total Rated Power is the sum of the Rated Power of each engine.
 - b. Under subsection (c), staff removed "operated by Class I, Class II, and Class III," to clarify that any freight line haul or switch locomotive operated in the State is subject to the Proposed Regulation if not otherwise exempt.
2. In section 2478.3. Definitions, staff made the following revisions:
 - a. Staff clarified the definition of "Automatic Engine Stop/Start (AESS)" to reference the Code of Federal Regulations, title 40, section 1033.115(g).
 - b. Staff indicated that "year" meant "Calendar Year" unless otherwise specified.
 - c. Staff removed the definition of Class I, Class II, or Class Railroad as it is no longer used in the Proposed Regulation.
 - d. Staff simplified the definition of "Cleaner Locomotive."
 - e. Staff included a definition for "Compliant Equipment," which is used when discussing the Alternative Fleet Milestone Option and compliance extensions.

- f. Staff revised the definition of "Disadvantaged Communities (DAC)" to be consistent with how it is defined in other CARB regulations.
- g. Staff clarified the definition of "Enforceable Emission Reductions."
- h. Staff revised the definition of "Engine Tier" to specify the tier names set forth in Table 1 and Table 2 of the Code of Federal Regulations, title 40, section 1033.101.
- i. Staff included a definition for "Good Engineering Judgement," which is used when describing the need for a Temporary Operating Extension and Alternative Fleet Milestone Option Detailed Timeline Report.
- j. Staff added the meaning for "g/bhp-hr" as gram per brake horsepower-hour to clarify the term when used for emission factors.
- k. Staff simplified the definition of "Idling."
- l. Staff clarified the definition of "Locomotive."
- m. Staff simplified the definition of "Locomotive Engine."
- n. Staff included a definition for "MWh," which is used throughout the Proposed Regulation.
- o. Staff included a definition for "MWh meter," which is used throughout the Proposed Regulation.
- p. Staff included a definition for "NO_x Emission Factor (EF)," which is the Locomotive Oxides of Nitrogen (NO_x) certification level as shown in the United States Environmental Protection Agency (U.S. EPA) Locomotive Engine Certification Data.
- q. Staff modified the definition of "Operate" to clarify that Operate means to keep in use.
- r. Staff revised the definition for "Original Engine Build Date" to clarify that a Locomotive propelled by more than one Locomotive Engine will have its Original Engine Build Date based on the oldest Locomotive Engine.
- s. Staff revised the definition of "Person" to increase ease of reference.
- t. Staff included a definition for "PM Emission Factor (EF)," which is the Locomotive Particulate Matter (PM) certification level as shown in the United States Environmental Protection Agency (U.S. EPA) Locomotive Engine Certification Data.
- u. Staff added a definition for "Pre-Tier 0" which is used as part of the Alternative Fleet Milestone Option.
- v. Staff removed the definition of "Primary Engine" to avoid redundancy.

- w. Staff added the definition of "Rated Power" to clarify it has the same meaning as set forth in Code of Federal Regulations, title 40, section 1033.140.
 - x. Staff removed the definition of "Real Emission Reductions" to avoid redundancy.
 - y. Staff revised the definition of "Switch Locomotive" to reference Code of Federal Regulations, title 40, section 1033.901.
 - z. Staff added the definition of "Tier 0," which means relating to the Tier 0 emission standards, as shown in Code of Federal Regulations, title 40, section 1033.101.
 - aa. Staff added the definition of "Tier 1," which means relating to the Tier 1 emission standards, as shown in Code of Federal Regulations, title 40, section 1033.101.
 - bb. Staff added the definition of "Tier 2," which means relating to the Tier 2 emission standards, as shown in Code of Federal Regulations, title 40, section 1033.101.
 - cc. Staff added the definition of "Tier 3," which means relating to the Tier 3 emission standards, as shown in Code of Federal Regulations, title 40, section 1033.101.
 - dd. Staff added the definition of "Tier 4," which means relating to the Tier 4 emission standards, as shown in Code of Federal Regulations, title 40, section 1033.101.
 - ee. Staff added a definition of "Usage," meaning the total MWh a Locomotive was Operated in California for an applicable Calendar Year. The definition includes an option to measure Usage using annual fuel consumption, when a Locomotive does not have a MWh meter and Operates 100 percent of the time in California. The fuel consumption option was moved from the Spending Account section in the 45-day text.
 - ff. Staff revised the definition of "Zero Emission (ZE) Capable Locomotive" to clarify that it means a Locomotive that can be Operated in a Zero Emission Configuration or Operated on a fuel that produces emissions and to simplify the definition.
 - gg. Staff revised the definition of "Zero Emission (ZE) Configuration" to clarify that it means a mode of Operation for a Locomotive that causes the Locomotive to Operate in a zero-emission capacity in California.
3. In section 2478.4 Spending Account, staff made the following revisions:
- a. Staff added language in subsection (a) specifying that an Operator may elect to use the Alternative Compliance Plan or Alternative Fleet Milestone Option, if applicable, instead of complying with the Spending Account directly. This is

necessary because staff added a new alternative compliance option, the Alternative Fleet Milestone Option, to the Proposed Regulation.

- b. Staff removed the formula previously found in subsection (c) and replaced it with simplified text that describes the formula and process for calculations to aid in readability.
- c. Staff added subsection (e) to clarify that Spending Account funds and any interest earned on Spending Account funds cannot be used to pay for the portion of equipment or expenses that are reimbursed or compensated by grant funding to ensure Spending Account funds are being appropriately expended.
- d. Staff added subsection (f) to clarify that Locomotive Operators cannot transfer the ownership or lease of equipment purchased using Spending Account funds to another party within one year of the purchase date.
- e. Staff revised subsection (g)(1) to replace references to 2023 with references to the first year of the Spending Account. This is necessary to provide flexibility to the Proposed Regulation in the case the Proposed Regulation does not become effective until after 2023.
- f. Staff moved most of subsection (g)(2)(F)(1) and (2), along with Table 2, to the new definition of "Usage." The requirement that Locomotives have a properly functioning MWh meter was moved to a new subsection 2478.10(d). The word "usage" was capitalized throughout the Proposed Regulation.
- g. Staff revised subsection (h) to allow Operators to receive ZE Credit for use of Wayside Power, regardless of whether it is in excess of any legal mandate requiring its use. This is necessary because subsection 2478.9(d) requires Locomotives equipped to connect to Wayside Power to use Wayside Power if idling for longer than 30 minutes and if Wayside Power is available. This legal mandate would not allow Operators to receive ZE Credit beyond a maximum of 30 minutes for each time they are connected to Wayside Power. Staff was concerned the original language would inadvertently decrease the appeal of using Wayside Power.
- h. Staff revised subsection (h)(1) to clarify that the Operation of the Locomotive, Equipment, or Wayside Power must occur prior to the January 1, 2030, deadline to qualify for ZE Credit.
- i. Staff revised subsection (h)(3)(B) to further clarify what is considered as Usage for calculating the ZE Credit.
- j. Staff provided a provision in subsection (i) to allow a Locomotive Operator to remove funds and close their Spending Account if all Locomotives are Operated in a ZE Configuration in California in the previous Calendar Year. This is necessary to address the issue of funds retained in the Spending Account

after the Locomotive Operator has already transitioned their fleet to be only operated in zero emission in California.

4. In section 2478.5 In-Use Operational Requirements, staff had the following revisions:
 - a. Staff revised language in subsection (b) and (c) to clarify that the 2027 and 2032 assessments will be presented to the Board after the assessments have been available for public review for 30 days, without requiring the assessment to be presented to the Board during a public meeting.
 - b. Staff added language in subsection (d) specifying that an Operator may choose to use an Alternative Compliance Plan or the Alternative Fleet Milestone Option, if applicable, instead of complying with the In-Use Operational Requirements directly, to be consistent with section 2478.4.
5. In section 2478.6 Compliance Extensions, staff had the follow revisions:
 - a. Staff changed the name "Temporary Locomotive Operating Waiver" to "Temporary Operating Extension" to better clarify its purpose.
 - b. Staff revised subsection (a)(1) and (a)(2) to allow the Temporary Operating Extension to apply to any Locomotive that would be prohibited from Operation in California under the Proposed Regulation, instead of only under section 2478.5. This is necessary to account for any other scenarios where a Locomotive would be prohibited from Operation in California under the Proposed Regulation.
 - c. Staff revised subsections (a)(1)(C), (a)(1)(D), and (a)(2)(C) to clarify that applications for a Temporary Operating Extension must demonstrate Good Engineering Judgment to the Executive Officer when determining the duration a Temporary Operating Extension is needed and the purpose of the Temporary Operating Extension.
 - d. Staff added the requirement to submit applicant contact information with a Temporary Operating Extension application in subsection (a)(3)(A).
 - e. Staff included a one-year compliance extension in subsection (b) to the Spending Account, In-Use Operational Requirements, Alternative Compliance Plan, or Alternative Fleet Milestone Option requirements, for any delays due to Compliant Equipment manufacture delays, installation delays, or unavailability. This section includes the process to obtain the extensions.
 - f. Staff added subsection (c) to describe the process by which compliance extension applications will be made accessible to the public.
6. In section 2478.7 Alternative Compliance Plan (ACP), staff made changes intended to clarify and streamline the requirements of an ACP. Staff also made the following changes.
 - a. Subsection (a) was revised to be more declarative.

- b. Subsection (b) was revised to be more declarative. Subsections (b)(1), (2), and (3) were revised to make it clearer that the listed items are to be used as assumptions when developing the ACP. An assumption was added in subsection (b)(1)(A) that annual Locomotive Usage is calculated using the previous year's data. An assumption was added in subsection (b)(1)(B) that annual activity estimated in subsection (b)(1)(A) is multiplied by 5 to get the total emissions over the projection period. Subsection (b)(2)(A) was revised to clarify when Tier 4 and ZE Locomotive purchases are assumed to occur for a Spending Account.
 - c. Subsection (c) was revised to allow greenhouse gas (GHG) emission reductions from an ACP to be achieved with no geographical constraints, because GHGs are global pollutants.
 - d. Subsection (d) was revised to include more detailed information on what would be required to be submitted to the Executive Officer for an ACP application, including Locomotive fleet information.
 - e. Subsection (e) was added to establish that an ACP application requires a payment following the requirements of section 2478.12.
 - f. Subsection (j) was added to inform stakeholders of the process for amending an ACP.
 - g. Staff added language to subsection (k) to clarify that a reapplication for an ACP will use the Operator's Locomotive fleet at the time of reapplication for all calculations required for the reapplication.
 - h. Subsection (m) was added for public transparency by establishing that all approved ACPs and notices of disapproved or revoked ACPs will be published to the "Reducing Rail Emissions in California" webpage.
 - i. Language regarding severability was moved to section 2478.17 for better organization.
7. In section 2478.8, staff included the Alternative Fleet Milestone Option (AFMO), which Operators can follow in lieu of directly complying with the Spending Account and In-Use Operational Requirements. The AFMO requires that: (1) beginning January 1, 2030, 50 percent of a Locomotive Operator's annual fleet Usage be from Tier 4 or cleaner Locomotives, incorporating offsets for pre-Tier 4 Locomotives from use of ZE Locomotives or ZE Rail Equipment; (2) beginning January 1, 2035, 100 percent of the annual fleet Usage must be from Tier 4 or cleaner Locomotives, incorporating offsets for pre-Tier 4 Locomotives from surplus use of ZE Locomotives or ZE Rail Equipment; (3) beginning January 1, 2042, 50 percent of an Operator's annual fleet Usage must be from ZE Locomotives or ZE Rail Equipment, incorporating offsets for pre-Tier 4 Locomotives from use of ZE Locomotives or ZE Rail Equipment; and (4) by January 1, 2047, 100 percent of fleet Usage must be from ZE Locomotives or ZE Rail Equipment, with no offsets allowed.

This section was included per the Board's direction to continue to work with passenger Operators on a compliance plan that works with their unique funding and operations. Staff assumes only passenger Operators will opt to comply via the AFMO due to their cleaner fleet composition. If the AFMO was used by all California passenger Operators, it could result in a one percent decrease in total particulate matter (PM) and total oxides of nitrogen (NOx) emission reductions compared to the total emission reductions from the Spending Account and In-Use Operational Requirements.

8. In section 2478.9, Idling Requirements, staff removed subsection (e) (annual reporting) because it was redundant with the requirements stated in the reporting section. Staff added a new subsection (e) to clarify that ZE Locomotives are exempt from Idling requirements.
9. In section 2478.10, Registration Requirements, staff added a requirement to identify if each Locomotive registered is AESS equipped. Staff added a new subsection (d) that requires Locomotives Operating in California to have a functional MWh meter at all times. An exception is provided for Locomotives that Operate 100 percent of the time in California, and a provision is included to permit maintenance.
10. In Section 2478.11 Reporting and Recordkeeping Requirements, staff made the following changes.
 - a. The old subsection (a) and subsection (b) were combined into a new subsection (a) (General recordkeeping requirements). Staff clarified that the Operator must keep records related to reporting requirements for three years and make such records available to CARB upon request, to support CARB efforts to verify or audit annual reports. Staff added general requirements that reports be submitted annually no later than July 1, that reports cover the prior Calendar Year, and that the first reporting deadline is July 1, 2024. These requirements were previously repeated throughout the reporting section; this change is meant to simplify and clarify the reporting requirements set forth in the 45-day regulatory proposal. Throughout this reporting section, redundant references to these requirements were removed.
 - b. Subsection (b) (Locomotive Emissions Report) was simplified, with provisions specific to regulatory requirements moved to other reports in this section. Staff intend to use the Locomotive Emissions Report to support CARB's ongoing efforts to better understand and quantify emissions sources throughout California. This goal is part of CARB's statutory mandate and also supports CARB efforts to comply with various state and federal laws, including Clean Air Act SIP requirements.
 - c. Staff clarified that Locomotive Operators for which the Proposed Regulation applies must submit a Locomotive Emissions Report under subsection (b).
 - d. Staff clarified in subsection (b) that the Locomotive Emissions Report should be for non-ZE Locomotives or ZE Capable Locomotives. In other words, Operators

do not have to report emissions-related activity information for ZE Locomotives. This exemption was previously stated in a different manner in a removed subsection.

- e. In subsection (b)(4)(A)-(B), staff relocated Idling Annual Reporting Requirements from a previous subsection.
 - f. An In-Use Operational Requirements report was added in subsection (d), for those Operators subject to the requirements of section 2478.5. For each Locomotive, Operators shall report total MWh of Operation since the Original Engine Build Date. For each ZE Capable Locomotive, Operators shall report total Operation in ZE Configuration and total Operation, broken down by California Air District, in non-ZE Configuration. Note that it may or may not be a violation of the Proposed Regulation to Operate a ZE Capable Locomotive in a non-ZE Configuration while in California, depending on circumstances and whether an exemption, compliance extension, Alternative Compliance Plan, or Alternative Fleet Milestone Option applies.
 - g. Subsection (d)(2) was added to require that Operators accurately track their ZE Capable Locomotives while Operating in California.
 - h. Subsection (e) was revised to streamline requirements and clarify reporting requirements for the ACP if the ACP is used in lieu of direct compliance with section 2478.5. Staff also included a subsection informing regulated parties that they will need to submit additional data as outlined in their ACP Executive Order.
 - i. The Alternative Fleet Milestone Option report was added in subsection (f) to include reporting requirements for the AFMO. Subsection (f)(3) requires Operators that use an AFMO plan to report Locomotive activity, as required under subsection (b) (Locomotive Emissions Report) for ZE Locomotives. This is needed so that Operators and CARB staff can determine compliance with the ZE fleet percentages used in the AFMO.
 - j. Staff added a subsection (h) to require specific information from Operators using the Small Business Hardship Extension of section 2478.14.
11. In section 2478.12 Administrative Payment and Alternative Compliance Plan Application Payment, staff made the following revisions:
- a. Staff specified that fees collected in this section will be deposited in the Certification and Compliance Fund to recover the estimated costs of the Executive Officer administering the Proposed Regulation and that these fees are not refundable.
 - b. Staff added the payment requirements for ACP applications. This is necessary to cover the cost of processing ACP applications.
 - c. Staff removed language specifying payment logistical details, to be consistent with other CARB regulations.

- d. Staff removed language regarding severability to avoid redundancy.
12. In section 2478.14 Small Business Hardship Extension, staff made the following changes:
- a. Staff added subsection (b) to require extension applications be submitted following the requirements of section 2478.15 in order to be consistent with the rest of the Proposed Regulation.
 - b. Staff added subsection (c) to clarify deadlines for submitting extension applications.
 - c. Staff revised subsection (d), (e), and (h) to simplify what may be requested in an extension.
13. In section 2478.15 Submittals to CARB, staff simplified the requirements of the Statement of Accuracy.
14. In section 2478.16 Non-Compliance, Penalties, and Right of Entry, staff included section (c), which outlines the consequences of noncompliance with the AFMO.
15. In section 2478.17 Severability, staff moved the ACP severability language from section 2478.7 and included it in this section for better organization. Staff added the following three definitions to this section to avoid repeating lengthy phrases throughout this section: "invalidates," "invalidates as to any Person," and "part." Staff added a specific severability provision applicable to the Alternative Fleet Milestone Option (AFMO). In short, the AFMO remains in effect if a court invalidates some other provision of the Proposed Regulation. If the court invalidates a provision of the AFMO section as applied to a particular Person, staff intend for the AFMO used by that Person to automatically expire. If a court otherwise invalidates a provision of the AFMO, staff intend for all AFMOs to automatically expire. This is intended to prevent confusion as to whether an existing AFMO continues to be in force following a court ruling.

In addition to the modifications described above, staff corrected grammar, punctuation, and spelling throughout the proposed changes. These changes are nonsubstantive.

Technical Support Document on Zero Emission Conversions

The technical support document on ZE conversions (Appendix C) provides further discussion on the conversion of existing diesel Locomotives to ZE Locomotives and is intended as an introduction on the topic, with more technical analysis to be conducted in the first technology assessment of the Proposed Regulation, scheduled in 2027.

Additional Documents Added to the Record

In the interest of completeness and in accordance with Government Code section 11347.1, subdivision (a), staff has also added to the rulemaking record and invites comments on the following additional documents:

1. Facanha, C. & Horvath, A. (2007). Evaluation of Life-Cycle Air Emission Factors of Freight Transportation. *Environmental Science & Technology*, 41, 7138-7144. DOI: 10.1021/es070989q. (weblink: <https://pubs.acs.org/doi/full/10.1021/es070989q>).
2. Walter Ham, Abhilash Vijayan*, Nico Schulte, Jorn D. Herner, Commuter exposure to PM_{2.5}, BC, and UFP in six common transport microenvironments in Sacramento, California. 12 April 2017. *Atmospheric Environment* 167 (2017) 335-345. (weblink: https://www.researchgate.net/publication/319022535_Commuter_exposure_to_PM_2_5_BC_and_UFP_in_six_common_transport_microenvironments_in_Sacramento_California).
3. U.S. EPA—Petition for Declaratory Order, Surface Transportation Board Decision, 2014 WL 7392860 (S.T.B. Dec. 29, 2014), Docket No. FD 35803. (weblink: <https://dcms-external.s3.amazonaws.com/MPD/62491/E500D0709FCBEB6085257DBE005480CB/44003.pdf>).
4. CARB, 2022 State Strategy for the State Implementation Plan, Adopted September 22, 2022. (weblink: https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf).
5. Union Pacific and BNSF 10-K Forms 2020-2021. (weblinks: <https://www.up.com/investor/annual/>, <https://www.bnsf.com/about-bnsf/financial-information/form-10-k-filings/>).
6. US EPA, 49 CFR Parts 218, 221, and 232 – Miscellaneous Amendments to Brake System Safety Standards and Codification of Waivers; December 11, 2020. (weblink: <https://railroads.dot.gov/sites/fra.dot.gov/files/2020-12/FRA%20Brake%20Safety%20Standards.pdf>).
7. California Air Resources Board, Ocean-Going Vessels At-Berth Regulation Initial Statement of Reasons, Appendix C-1, August 2019. (weblink: <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/ogvatberth2019/appc-1.pdf>).
8. California Air Resources Board, Amendments to the Transport Refrigeration Unit Regulation Initial Statement of Reasons, Appendix B, May 2021. (weblink: <https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/appb.pdf>).
9. California Air Resources Board, Advanced Clean Fleets Regulation, Initial Statement of Reasons, Appendix C-1, May 2022. (weblink: <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/acf22/appc.pdf>).
10. California Air Resources Board, Advanced Clean Cars II Regulations, Initial Statement of Reasons, Appendix C-1, March 2022. (weblink: <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/appc1.pdf>).

11. California Air Resources Board, Amendments to the Small Off-Road Engine Regulations, Initial Statement of Reasons, Appendix I, September 2021. (weblink: <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2021/sore21/appi.pdf>).
12. California Air Resources Board, Innovative Clean Transit Regulation, Initial Statement of Reasons, August 2018. (weblink: <https://ww2.arb.ca.gov/rulemaking/2018/innovative-clean-transit-2018>).
13. 40 CFR 1033.530 Duty cycles and calculations. (weblink: https://www.ecfr.gov/current/title_40/chapter_I/subchapter_U/part_1033#1033.501). Accessed: January 6, 2023.
14. Minutes of the CARB UBCO Fuel Cell Switcher Conversion Project Discussion, January 10, 2023.
15. Trains, Canadian Pacific's hydrogen-powered locomotive makes first revenue run, November 15, 2022. (weblink: <https://www.trains.com/trn/news-reviews/news-wire/canadian-pacifics-hydrogen-powered-locomotive-makes-first-revenue-run/>) Accessed: January 25, 2023.
16. Trains, 'Slugs' for extra tractive effort, May 1, 2006. (weblink: <https://www.trains.com/trn/train-basics/abcs-of-railroading/slugs/>) Accessed: January 12, 2023.
17. California CORE, EMD Joule SD70J. (weblink: https://californiacore.org/equipment/emd_joule_sd70j/). Accessed: Dec 30, 2022.
18. U.S. Department of Energy, Energy Storage Grand Challenge Roadmap, 2020, Page 48. (weblink: <https://www.energy.gov/sites/default/files/2020/12/f81/Energy%20Storage%20Grand%20Challenge%20Roadmap.pdf>).
19. U.S. Department of Energy, FOTW #1234, April 18, 2022: Volumetric Energy Density of Lithium ion Batteries Increased by More than Eight Times Between 2008 and 2020. (weblink: https://www.energy.gov/eere/vehicles/articles/fotw_1234_april_18_2022_volumetric_energy_density_lithium_ion_batteries). Accessed: January 25, 2023.
20. CSX, Railroad Equipment. (weblink: https://www.csx.com/index.cfm/customers/resources/equipment/railroad_equipment/). Accessed: December 30, 2022.
21. Massachusetts Institute of Technology, Lithium Ion Battery Safety Guidance, Page 13, March 2017 (weblink: https://ehs.mit.edu/wp-content/uploads/2019/09/Lithium_Battery_Safety_Guidance.pdf).
22. Wabtec, 3CW Compressor. (weblink: <https://www.wabteccorp.com/locomotive/air-generation-and-treatment/compressors>) Accessed: January 13, 2023.

23. U.S. Department of Energy, Fuel Cell Systems. (weblink: <https://www.energy.gov/eere/fuelcells/fuel-cell-systems>). Accessed: January 24, 2023.
24. Ballard, Heavy Duty Modules. (weblink: https://www.ballard.com/fuel_cell_solutions/fuel_cell_power_products/motive_modules). Accessed: January 5, 2023.
25. Ballard, Powering the Future of Rail with Hydrogen, March 2021 (weblink: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Finfo.ballard.com%2Fhubfs%2FReports%2FBallard_Rail_Presentation_-_Heavy_Duty_Motive_modules.pptx). Accessed: January 11, 2023.
26. Canadian Pacific, Hydrogen Locomotive Program, Biogas West 2022.
27. U.S. Department of Energy, Hydrogen Storage. (weblink: https://www.energy.gov/eere/fuelcells/hydrogen_storage). Accessed: January 4, 2023.
28. Institute of Gas Technology dba Gas Technology Institute, Sierra Northern Hydrogen Locomotive Project, California Energy Commission GFO 20 604 Hydrogen Fuel Cell Demonstrations in Rail and Marine Applications at Ports (H2RAM), October 8, 2020.
29. U.S. Department of Energy, Fuel Cells. (weblink: <https://www.energy.gov/eere/fuelcells/fuel-cells>). Accessed: January 11, 2023.
30. Title 49, Code of Federal Regulations, Subpart F - Specification for Cryogenic Liquid Tank Car Tanks and Seamless Steel Tanks (Classes DOT-113 and 107A). (weblink: <https://www.govinfo.gov/content/pkg/CFR-2011-title49-vol3/pdf/CFR-2011-title49-vol3-part179-subpartF.pdf>).
31. Chart Industries, DOT 113 Tank Cars for LNG, September 20, 2021. (weblink: <https://www.nationalacademies.org/documents/embed/link/LF2255DA3DD1C41C0A42D3BEF0989ACAECE3053A6A9B/file/D5ED320EE9C57511EA8CA605804C041648401B9B1E04>).
32. U.S. Department of Energy, DOE H2 Heavy Duty Truck Targets, January 21, 2020. (weblink: https://www.energy.gov/sites/prod/files/2020/02/f71/fcto_compressed_gas_storage_workshop_2020_adams.pdf).
33. Rail-Saver Zero-Emission Locomotive Technology, Response to South Coast Air Quality Management District Request for Information Zero- And Near-Zero Emission Locomotive Technologies RFI# 2012-01, TransPower.
34. Ballard, "Fuel Cell System Development for Freight Transport Applications," August 2016.
35. Rail Propulsion Systems, "Simple Battery Switcher Battery Locomotive Final Project Report," South Coast Air Quality Management District Contract No. 181513, July 2021.
36. BNSF Railway, Flexible Solutions for Freight Facilities Final Report, August 15, 2021.

37. California Climate Investments, Demonstrating Emissions-Reducing Solutions for the Freight Sector. (weblink: <https://www.caclimateinvestments.ca.gov/2022-profiles/zanzeff>) accessed: January 25, 2023.
38. Loop Energy, Loop Energy and Hydrogen In Motion Inc. (H2M) Announce Project in British Columbia to Convert Diesel Electric Locomotive to Hydrogen Electric, September 1, 2021. (weblink: <https://loopenergy.com/news/loop-h2m-hydrogen-electric-locomotive/>) Accessed: January 25, 2023.
39. US DRIVE 2019, Summary Report on EVs at Scale and the U.S. Electric Power System. U.S. Driving Research and Innovation for Vehicle Efficiency and Energy Sustainability (DRIVE), 2019. (weblink: <https://www.energy.gov/sites/prod/files/2019/12/f69/GITT%20ISATT%20EVs%20at%20Scale%20Grid%20Summary%20Report%20FINAL%20Nov2019.pdf>).
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41. California Air Resources Board 2022 (August). Public Hearing to Consider the Proposed Advanced Clean Fleets Regulation, Staff Report: Initial Statement of Reasons. (weblink: <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/acf22/isor2.pdf>).

These documents are available for inspection at the California Air Resources Board, 1001 I Street, Sacramento, California, 95814, between the hours of 9:00am to 4:00pm, Monday through Friday (excluding holidays). To inspect these documents please contact Bradley Bechtold, Regulations Coordinator, at bradley.bechtold@arb.ca.gov or (279) 208-7266.

Environmental Analysis Summary

The proposed modifications do not change implementation of the Proposed Regulation in a way that affects the conclusions of the Draft Environmental Analysis (EA) included as Appendix D of the Staff Report. Many of the modifications consist primarily of revisions to provide more flexibility in complying with the requirements, as well as definitions, and provision clarifications that do not alter the compliance responses. Therefore, no additional environmental analysis or recirculation of the Draft EA is required.

Agency Contacts

Inquiries concerning the substance of the Proposed Regulation may be directed to Layla Gonzalez, Staff Air Pollution Specialist, Freight Systems Section, at (279) 208-7827 or Ajay Mangat, Manager, Freight Systems Section, at (279) 208-7827.

Public Comments

Written comments will only be accepted on the modifications identified in this Notice. Comments may be submitted by postal mail or by electronic submittal no later than the due date to the following:

Postal mail: Clerks' Office, California Air Resources Board
1001 I Street, Sacramento, California 95814

Electronic submittal: <https://www.arb.ca.gov/lispub/comm/bclist.php>

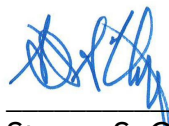
Please note that under the California Public Records Act (Gov. Code § 6250 et seq.), your written and verbal comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request.

In order to be considered by the Executive Officer, comments must be directed to CARB in one of the two forms described above and received by CARB no later than the deadline date for public comment listed at the beginning of this notice. Only comments relating to the above-described modifications to the text of the Proposed Regulation shall be considered by the Executive Officer.

If you need this document in an alternate format or another language, please contact the Clerks' Office at (916) 322-5594 or by facsimile at (916) 322-3928 no later than five (5) business days from the release date of this notice. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

Si necesita este documento en un formato alternativo u otro idioma, por favor llame a la oficina del Secretario del Consejo de Recursos Atmosféricos al (916) 322-5594 o envíe un fax al (916) 322-3928 no menos de cinco (5) días laborales a partir de la fecha del lanzamiento de este aviso. Para el Servicio Telefónico de California para Personas con Problemas Auditivos, ó de teléfonos TDD pueden marcar al 711.

California Air Resources Board



Steven S. Cliff, Ph.D.
Executive Officer

Date: March 1, 2023

Attachments

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see [CARB's website](http://www.arb.ca.gov) (www.arb.ca.gov).