

State of California
CALIFORNIA AIR RESOURCES BOARD

**INNOVATIVE CLEAN TRANSIT REGULATION
A REPLACEMENT OF THE FLEET RULE FOR TRANSIT AGENCIES**

FINAL STATEMENT OF REASONS

June 2019

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State of California
AIR RESOURCES BOARD

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

**PUBLIC HEARING TO CONSIDER THE PROPOSED INNOVATIVE CLEAN TRANSIT
REGULATION, A REPLACEMENT OF THE FLEET RULE FOR TRANSIT AGENCIES**

Public Hearing Date: September 28, 2018, and December 14, 2018
Agenda Item No.: 18-7-6; 18-10-8

I. GENERAL

A. ACTION TAKEN IN THIS RULEMAKING

The Staff Report: Initial Statement of Reasons for Rulemaking (Staff Report), entitled "The Proposed Innovative Clean Transit Regulation, a Replacement of the Fleet Rule for Transit Agencies," released on August 7, 2018, is incorporated by reference herein. The Staff Report contained a description of the rationale for the proposed amendments. On August 7, 2018, all references relied upon and identified in the staff report were made available to the public.

As explained in the Staff Report, the Innovative Clean Transit (ICT) Regulation is designed to assist in attaining air quality standards, reducing health risks to individuals living in California, and meeting climate change goals by requiring California's public transit fleets to transition to zero-emission buses (ZEBs).

On September 28, 2018, following a 45-day comment period, the California Air Resources Board (CARB or Board) held a public hearing to consider the proposed ICT Regulation, as described in the Staff Report and associated Notice of Public Hearing (45-Day Notice). The regulation requirements are included in title 13, division 3, chapter 1, article 4.3, sections 2023-2023.11 of the California Code of Regulations.

Written comments were received from a total of 423 comment letters from individuals or organizations during the 45-day comment period. Oral comments were given by 62 individuals during the September public hearing. Seven written comments were received at the hearing. After the September 28, 2018, public hearing, staff proposed to make modifications to the originally proposed regulation, in order to address comments received during the 45-day public comment period, as well as comments during the Board Hearing.

The text of the proposed modifications to the originally proposed regulation and supporting documents were made available for a supplemental 15-day comment period through a "Notice of Public Availability of Modified Text and Availability of Additional Documents" (15-Day Notice). The 15-Day Notice, modified regulatory language, and

additional supporting documents were posted on November 9, 2018, on CARB's website (<https://www.arb.ca.gov/regact/2018/ict2018/ict2018.htm>), accessible to stakeholders and interested parties. The comment period commenced on November 9, 2018, and ended on November 26, 2018. All modifications to the regulatory language are clearly indicated in the Notice of Public Availability of Modified Text (<https://www.arb.ca.gov/regact/2018/ict2018/15daynotice.pdf>). There were 28 comment letters received during this period.

The written responses to the Draft Environmental Analysis (EA) was posted on December 4, 2018, for public review. The Final EA was subsequently published on December 7, 2018, for public review.

On December 14, 2018, the Final Environmental Analysis, Response to Comments, Final Regulation Order, and Proposed Resolution 18-60 for the proposed regulations were presented at the second Board Hearing. Oral comments were given by 41 individuals during the December public hearing. The Board adopted Resolution 18-60 which approves written responses to the Draft EA, certifies the Final EA, approves the proposed amendments to the ICT regulation, and makes a commitment to provide the board with annual updates and a commitment to conduct a comprehensive review at least one year before the first ZEB purchase requirement. This Final Statement of Reasons (FSOR) updates the Staff Report by identifying and providing the rationale for the modifications made to the originally proposed regulatory text, including changes directed by the Board at the September 2018 hearing and text circulated for public comment during the 15-day comment period. The FSOR also contains a summary of the comments received during the formal rulemaking process by CARB on the proposed ICT regulation or the process by which they were adopted, and CARB's responses to those comments.

B. 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, but not to school districts. However, as explained in the Staff Report, 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. Costs are not reimbursable when they may be fully financed by local agencies raising their own fees. (See, e.g., *Clovis Unified School Dist. v. Chiang* (2010) 188 Cal App.4th 794, 812; *Connell v. Superior Court* (1997) 59 Cal. App. 4th 382, 397-403; *County of Fresno v. State of California* (1991) 53 Cal.3d 482, 487-88; Cal. Gov. Code § 17556(d)). The local transit agencies have authority to raise fees, if needed, to address the costs of this regulation. Therefore, this is not a reimbursable mandate.

The ICT regulation directly impacts transit agencies, which are local governmental agencies. In the cost analysis of the ISOR, compared to current conditions, the ICT

regulation is expected to result in a total cost saving of \$1.5 billion for transit agencies from 2020 through 2050.¹

C. CONSIDERATION OF ALTERNATIVES

For the reasons set forth in the ISOR, in 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. (See CARB Resolution No. 18-60, Dec. 14, 2018, p. 9.)

D. ORGANIZATION OF THIS DOCUMENT

The FSOR comprises:

- Chapter I. GENERAL provides an overview of ICT regulation rulemaking process and the mandatory finding, how alternatives were analyzed and considered, and the organization of this document.
- Chapter II. MODIFICATIONS MADE TO THE ORIGINAL PROPOSAL summarizes all changes made since the original proposal released for the 45-day comment period and addenda to the ISOR.
- Chapter III. DOCUMENT INCORPORATED BY REFERENCE lists the document that was incorporated in the ICT regulation.
- Chapter IV. COMMENTS RECEIVED DURING THE 45-DAY COMMENT PERIOD AND AT THE BOARD HEARING ON SEPTEMBER 28, 2018, AND AGENCY RESPONSES. This chapter includes all written comments on the proposed regulations or the process by which they were adopted that were received during the 45-day comment period and the written and oral comments received at the first Board Hearing, and a response to each of these comments. This chapter is organized and categorized based on the nature of comments. There are nine major categories (sections) identified, including:

IV.A. Comments in support

IV.B. Benchmark and regulatory assessment

IV.C. Technology

¹ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/isor.pdf?_ga=2.93247005.1056658111.1554742789-1649277338.1553838884.

- IV.D. Workforce training
- IV.E. Economic impact assessment
- IV.F. Consideration of alternatives
- IV.G. Environmental analysis
- IV.H. Comments on specific regulatory provisions
- IV.I. Others

Each category may also have subcategories so that each comment can be fully responded to based on its nature. For example, workforce training (category D) is further divided into three subcategories: D-1 (Job creation in disadvantaged communities, D-2 (Personnel training), and D-3 (Funding for training).

When multiple comments raise similar issues that can be addressed with the same response, these comments are grouped together under the same category or subcategory. Only one response will be provided for the topic associated with each subcategory.

When a comment raises multiple issues, this comment appears in each corresponding category (or subcategory) and is addressed separately in each subcategory. For example, the Golden Gate Bridge, Highway and Transportation District stated at the Board Hearing that

We also want to reiterate our support for the California Transit Association's recommendation and the Association's alternative, namely including a benchmarking and regulatory assessment in the actual regulation. We believe that in order to implement a responsible transition to zero-emission vehicles without imposing negative impacts on service levels and ridership, a regulatory assessment for evaluating real-world performance and costs with benchmarks established at the time the rule is adopted is important, and allowing transit agencies to use incentive funding for regulatory...

This comment is being addressed in both categories B-1 (Benchmarks using data points in staff analysis) and E-1 (Total cost of ownership). Table IV.1 provides a list of subcategories for each comment letter.

- Chapter V. COMMENTS RECEIVED DURING THE 15-DAY COMMENT PERIOD AND AT THE BOARD HEARING ON DECEMBER 14, 2018, AND AGENCY RESPONSES includes all written comments on the proposed regulations or the process by which they were adopted that were received during the 15-day comment period and the written and oral comments received at the second Board Hearing, and the response to each of these comments.

Similar to the comment received during the 45-day comment period and at the first Board Hearing, comments received here are also categorized based on the nature of their content.

There are eight major categories identified, including

- V.A. Comments in support
- V.B. Benchmark and regulatory assessment
- V.C. Technology
- V.D. Workforce training
- V.E. Economic impact assessment
- V.F. Environmental analysis
- V.G. Comments on specific regulatory provisions
- V.H. Others

All categorization is done in a similar fashion as in Chapter IV.

Note that category A (Comments in Support) in both Chapters IV and V list only supporters without further comments. If a comment or comment letter states support but has additional comments or concerns, this comment or comment letter will not be listed in Category A but will be in the respective category(ies).

Appendices 1 through 3 contain the full written comment letters received during the 45-day comment period and the written and oral comments received at the first Board Hearing. Appendices 4 through 6 contain the full written comment letters received during the 15-day comment period and the written and oral comments received at the second Board Hearing. These are annotated to identify the comments on the proposed regulations or the process by which they were adopted and which CARB responded to below in Chapters IV and V.

Appendix 7 is the *Responses to Comments on the Draft Environmental Analysis Prepared for the Innovative Clean Transit Regulation* that was released on December 4, 2018, to be approved at the December 14, 2018, Board Hearing. These *Responses to Comments* address all comments related to the Draft Environmental Analysis that raised significant environmental issues or issues that raised or related to environmental concerns with or potential adverse impacts from the proposed regulations. The Board approved these *Responses to Comments* and certified the Final Environmental Analysis at the December 14, 2018, Board Hearing.

To provide information about the comments and responses to readers in an organized way, there are three tables in Chapter IV and another three tables in Chapter V describing the comment letters and the specific comments on the regulations or the process by which they were adopted. These tables can be used to locate the response to any comment and are summarized below:

- Table IV.1 Comment letters submitted during the 45-day comment period
- Table IV.2 Oral comments given at the September 28, 2018, Board Hearing
- Table IV.3 Written comments given at the September 28, 2018, Board Hearing
- Table V.1 Comment letters submitted during the 15-day comment period
- Table V.2 Oral comments given at the December 14, 2018, Board Hearing
- Table V.3 Written comments given at the December 14, 2018, Board Hearing

Chapter IV provides a complete description of these tables and how to locate comments and responses.

- Chapter VI. PEER REVIEW states the reasons why this rulemaking process does not need peer review under Health and Safety Code section 57004.

II. MODIFICATIONS MADE TO THE ORIGINAL PROPOSAL

A. MODIFICATIONS APPROVED AT THE BOARD HEARING AND MADE DURING THE 15-DAY COMMENT PERIOD

To follow the Board direction received on September 27, 2018, Board Hearing, CARB released a Notice of Public Availability of Modified Text and Availability of Additional Documents and Information (15-Day Notices) on November 9, 2018, which notified the public of additional documents added into the regulatory record and presented additional modifications to the initial regulatory text after consultation with stakeholders.²

The following is a summary of the changes that were made to the initial proposal and were made publicly available for a 15-day comment period. Staff proposed modifications to the previously proposed amendments in sections 2023, 2023.1, 2023.2, 2023.3, 2023.4, and proposed new sections 2023.5, 2023.6, 2023.7, 2023.8, 2023.9, 2023.10 and 2023.11, that are to be codified into a new article 4.3, chapter 1, division 3, title 13, CCR.

² California Air Resources Board. Notice of Public Availability of Modified Text and Availability of Additional Documents and Information. Posted on November 9, 2018. Available online at: https://www.arb.ca.gov/regact/2018/ict2018/15daynotice.pdf?_ga=2.21567419.1219028025.1554829257-108560835.1540230111

(1) Modifications to Section 2023. Applicability and Scope.

- 1) In section 2023 staff added the “Applicability and Scope” to the section’s title for more clarity.
- 2) In section 2023(a)(2), the language was revised to clarify that the regulations do not apply to vehicles that operate on rails, trolleybuses, or school buses, even if operated by a transit agency.
- 3) In section 2023(b), a number of definitions were added, deleted, or modified:
 - a. Staff clarified the definition of “Active Bus.”
 - b. Staff added the definition of “Annual Maximum Service” that is used in a new definition of “Large Transit Agency”.
 - c. Staff made minor revisions to the definition of “Battery Electric Bus” to improve the clarity.
 - d. The reference in the definition of “Bus” was corrected to refer to section 2023(a)(2)(A), which was erroneously referring to section 2023(a)(2)(B).
 - e. Staff clarified the definition of “Bus Purchase” or “Purchase.”
 - f. Staff simplified and clarified the definition of “Bus Type.”
 - g. Staff deleted the definition of “Commercially Available” because the term is only used once and is explained in the text in section 2023.6(a)(1).
 - h. The reference in the definition of “Conversion to a Zero-Emission Bus” was corrected to refer to renumbered section 2023(b)(54).
 - i. Staff added the definition of “Demand Response,” which has the same meaning as defined in title 49 of Code of Federal Regulations, section 604.3(g), and is used to support the new definitions of “Annual Maximum Service.”
 - j. Staff made minor change in the definition of “Emergency Contingency Vehicle” for better clarity.
 - k. Staff deleted the definition of “Fleet Size” because this term was replaced with the updated definitions of “Large Transit Agency” and “Small Transit Agency.”
 - l. Staff simplified the definition of “Fuel Cell Electric Bus.”
 - m. Staff added the definition of “Gradeability.” It was needed to address stakeholder concerns with the ability of zero-emission buses to safely traverse grades in areas with hilly terrain. The definition is used in a new subsection that describes how a transit agency can receive an exemption from the zero-emission bus purchase requirement as described in section 2023.4.
 - n. Staff revised the definitions of “Large Transit Agency” and “Small Transit Agency” to a definition that is more commonly used by transit agencies to remain consistent with Federal requirements for funding buses, based on stakeholder comments.

- o. Staff added text to clarify the definition of “Minimum Useful Life.”
- p. Staff clarified the definition of “Over-The-Road Bus.”
- q. Staff deleted the unnecessary and duplicative text in the definition of “Regional Transportation Planning Organization” from 49 U.S.C. section 5303(b)(5) for better clarity.
- r. Staff revised the definition of “Repower” to simplify the language.
- s. Staff clarified the definition of “Revenue Service.”
- t. Staff moved the definition for “Revenue Vehicle” to be in alphabetical order.
- u. Staff moved the definition for “Small Transit Agency” to be in alphabetical order and modified it to be consistent with the changes to the “Large Transit Agency” definition.
- v. Staff renamed the former definition of “Spare Vehicle” to “Spare Bus” because the term “Spare Vehicle” is not used. Additional changes were made to clarify the definition.
- w. Staff added the definition of “Urbanized Area” due to the proposed revision in the definition of “Large Transit Agency.” These definitions incorporate federal definitions to be consistent with federal requirements for funding transit buses.
- x. Staff simplified the definition of “Zero-Emission Bus.”
- y. Staff clarified the definition of “Zero-Emission Passenger Miles.”

(2) Modifications to Section 2023.1. Zero-Emission Bus Requirements.

- 1) In section 2023.1(a)(3), staff clarified language on conversions to zero-emission buses.
- 2) In section 2023.1(a)(4), staff made minor change to the text for better clarification.
- 3) In sections 2023.1(a)(4)(C) and (D), staff made minor change for better clarity and corrected the reference to refer to section 2023.1(a)(1), which was erroneously referring to section 2023.1(1).
- 4) Former section 2023.1(a)(5) was deleted to remove the two-year limit requirement for the delivery of a new bus in response to stakeholder comments. This change reduces administrative burden with needing to request extensions for bus orders that take more than two years.
- 5) Staff renumbered section 2023.1(a)(7) to 2023.1(a)(6) and clarified the condition to satisfy a zero-emission bus purchase requirement.
- 6) In section 2023.1(b) and the following subsections (1), (2), and (3) the terms “waiver” and “waived” were replaced with the terms “discharge” or “discharged” to minimize confusion with existing uses of the term “waiver” under the federal Clean Air Act. In subsections 2023.1(b)(1) and (2), staff revised the number of zero-emission buses by the end of 2020 and 2021 that

would discharge the zero-emission bus purchase requirements for calendar year 2023 and 2024. Staff lowered the requirement from 1,000 to 850 zero-emission buses purchased by the end of 2020, and increased the requirement from 1,150 to 1,250 zero-emission buses purchased by the end of 2021. The revised numbers of zero-emission buses are based on updated information from transit agencies. These changes have improved the likelihood the initial targets would be met; therefore, would increase the emissions benefits associated with meeting these targets.

7) In sections 2023.1(c) and (d), staff clarified the titles of these sections and made other minor changes to the text to improve clarity.

8) In section 2023.1(e)(1), staff simplified and clarified the text.

(3) Modifications to Section 2023.2. Compliance Option for Joint Zero-Emission Bus Groups.

1) In section 2023.2(b)(2), staff changed “may” to “will” to clarify that if at least one of the criteria to form a Joint Zero-Emission Bus Group (Joint Group) has been met, and the required notice has been provided, the Executive Officer will approve the joint agreement.

2) In section 2023.2(c)(3), staff replaced “any” with “each” to clarify the text.

3) In section 2023.2(c)(5), staff revised the language in the text to remain consistent with the revision to the definition of “Large Transit Agency” in section 2023(b)(30).

(4) Modifications to Section 2023.3. Zero-Emission Bus Bonus Credits.

1) In section 2023.3(a) and the subsequent subsections 2023.3(a)(1)-(3), staff clarified the text and the criteria for a transit agency to earn Zero-Emission Bus Bonus Credits.

2) In the newly added section 2023.3(a)(4), staff added the criteria for electric trolleybuses to earn Zero-Emission Bus Bonus Credits. The credits would be for electric trolleybuses placed in service between January 1, 2018, and December 31, 2019. Providing these bonus credits would recognize trolleybus contributions in expanding zero-emission technology. The credits would expire by the end of 2024, and would provide additional flexibility in 2023 and 2024 if the conditions to discharge the zero-emission bus purchase requirements are not met.

3) In sections 2023.3(b) and 2023.3(b)(2), staff clarified the criteria for a transit agency to use Zero-Emission Bus Bonus Credits.

(5) Modifications to Section 2023.4. Provisions for Exemption of a Zero-Emission Bus Purchase.

- 1) Staff deleted the word “Extension” from the title of this section to remain consistent with updated requirements of this section.
- 2) In section 2023.4(a), staff clarified the purpose of this section and specified that the Executive Officer will grant an exemption upon request, if the specified criteria set forth in section 2023.4(c) are met to ensure transit agencies are not adversely impacted by the zero-emission bus purchase requirements and make clear that the Executive Officer’s action would be ministerial.
- 3) In section 2023.4(b), staff deleted the request for extension but maintained the option to request an exemption to provide stronger safeguards for transit agencies. An exemption from requirements to purchase zero-emission buses would allow transit agencies to purchase conventional internal combustion engine buses and ensure transit service is not adversely affected by these requirements.
- 4) Staff deleted former section 2023.4(c)(1), regarding the extension for bus manufacturing delays because the two-year purchase period requirement specified in former section 2023.1(a)(5) was removed and the extension is no longer needed.
- 5) Former section 2023.4(c)(2) was renumbered to 2023.4(c)(1). In renumbered section 2023.4(c)(1), staff modified the language regarding construction delays to conform to other changes that remove the two-year limit on bus delivery. The modified language clarifies that a transit agency can receive an exemption from the zero-emission bus purchase requirement due to construction delays that exceed two years after the zero-emission bus purchase and after expected bus delivery. Further, staff clarified the language by stating that the delay is beyond the transit agency’s control and reorganized the language regarding reasons for delays with installing zero-emission bus infrastructure in subsection (A).
- 6) Former section 2023.4(c)(1)(A) was renumbered to 2023.4(c)(1)(B). In renumbered section 2023.4(c)(1)(B), staff clarified the required documentation a transit agency must submit to the Executive Officer to request an exemption
- 7) Former section 2023.4(c)(1)(B) was deleted to remain consistent with updated requirements of section 2023.4(c).
- 8) In section 2023.4(c)(1)(C), staff added that the transit agency must submit with a request for an exemption documentation of the reasons the infrastructure cannot be installed.

- 9) In newly numbered section 2023.4(c)(1)(D) staff clarified the text by deleting the unnecessary language about the exemption being valid until the transit agency's next purchase cycle. An exemption has to be obtained in the year of bus purchase.
- 10) Former section 2023.4(c)(3) was renumbered to 2023.4(c)(2). In renumbered section 2023.4(c)(2), staff clarified and simplified language to address concerns regarding transit agencies' daily mileage needs. Staff removed the language on available range at the end of the warranty period for the battery and fuel cell stack due to degradation to simplify the exemption criteria. This deletion has removed conflicting language that could be interpreted as inconsistent with the intent and rationale described in the Initial Statement of Reasons. Staff added new language to clarify a transit agency may request an exemption if no available depot-charging battery electric bus of similar bus types in the fleet can meet the agency's daily mileage needs. These updated criteria made it clear the mileage exemption will be based on battery electric bus range capabilities on a single charge for the bus type being purchased. This means that a zero-emission bus purchase exemption would be granted even if on-route charging could extend the range of a battery electric bus, or if a fuel cell electric bus with sufficient range is available to purchase.
- 11) Former section 2023.4(c)(3)(B) is renumbered to 2023.4(c)(2)(A). In the renumbered section 2023.4(c)(2)(A), staff clarified the documentation a transit agency must submit to the Executive Officer to request an exemption.
- 12) The language in the renumbered sections 2023.4(c)(2)(B) and (C) allows for measured energy use data to be used in lieu of the Orange County Bus Cycle and explains transit agencies can purchase conventional internal combustion engine buses instead once the exemption is granted.
- 13) Former section 2023.4(c)(4) was renumbered to 2023.4(c)(3). New language was added in the renumbered section 2023.4(c)(3) to address stakeholder concerns about gradeability performance for zero-emission buses that would be operated on steep grades.
- 14) The new language in renumbered section 2023.4(c)(3)(A) describes the information a transit agency must provide to the Executive Officer to receive an exemption from the zero-emission bus purchase requirement. This consists of information to show that the zero-emission bus type being purchased cannot be placed in service in the fleet, topography information to show measured grades where the buses would be operated, and data about existing buses' performance on the grades in question.
- 15) The new language in renumbered section 2023.4(c)(3)(B) states the transit agency may purchase conventional internal combustion engine buses instead of zero-emission buses once the exemption is granted.

- 16) Staff made minor changes to the language in section 2023.4(c)(4) to clarify which documents are required to be submitted to the Executive Officer to receive an exemption and to make clear the exemption would be approved if the conditions are satisfied.
- 17) In section 2023.4(c)(5)(A) staff expanded the language regarding financial hardship to include situations where a transit agency can document that it cannot offset the incremental costs of purchasing any zero-emission bus by considering all available zero-emission buses of the relevant bus type, or it cannot offset the electricity costs for operating a depot charging battery electric bus when compared to the same type of conventional internal combustion engine bus.
- 18) In section 2023.4(c)(5)(B), staff added new language to specify the documents that must be submitted to support the exemption request.
- 19) In sections 2023.4(c)(5)(C) and (D), staff modified the language to remove ambiguity as to whether the exemption would be approved if the conditions are satisfied and make clear that the Executive Officer's action would be ministerial and clarified the language by deleting the unnecessary text.

(6) Modifications to Section 2023.5. Zero-Emission Mobility Option.

- 1) In section 2023.5(a)(1), staff clarified the type of vehicles that can be considered in a Zero-Emission Mobility Program by adding scooters to the list. Staff also clarified that any combination of eligible zero-emission vehicles can be used in the program.
- 2) In section 2023.5(c)(1), staff revised the language that specifies the requirements on how a transit agency that opts into a Zero-Emission Mobility Option may receive a credit, instead of using the language "upon approval by the Executive Officer". These modifications have removed potential ambiguity as to whether credits would be issued if the required conditions are met and made it clear that the Executive Officer's action would be ministerial.
- 3) In sections 2023.5(c)(1)(A) and (B), staff clarified language on how to calculate the zero-emission mobility credit. Preference is given for bicycles because of their greater utility and implementation, which enhances the likelihood they will be used to a significant degree as compared to other options that are encountering opposition in some jurisdictions (such as electric scooters).
- 4) Staff corrected the reference in sections 2023.5(c)(1)(D) and 2023.5(d)(1) to refer to section 2023.5(c)(1)(B), which was erroneously referring to section 2023.5(c)(1)(A).

- 5) In section 2023.5(d)(2), staff clarified how a mobility credit may be counted as having a zero-emission bus.
- 6) In section 2023.5(e), staff clarified the language and deleted the redundant reference because section 2023.8(f) is also referring to the requirements of section 2023.5(e).

(7) Modifications to Section 2023.6. Low-NOx Engine Purchase Requirements.

- 1) In section 2023.6(a), staff added language to clarify the Low-NOx engine purchase requirements apply to purchase of new hybrid buses as well, if the Low-NOx engines are available and meet both of the updated criteria in sections 2023.6(a)(1) and (2) for the bus type and propulsion systems being purchased.
- 2) In sections 2023.6(a)(1) and (2), staff added the language to include “hybrid propulsion system paired with the engine” for the Low-NOx Engine Purchase Requirements to clarify that a hybrid bus would only be required to have a low-NOx engine if the hybrid propulsion system in combination with the engine was certified to the Low-NOx engine standard.
- 3) In section 2023.6(a)(1), staff clarified “commercially available” by including the language for both purchase or lease that was originally in the definition of “Commercially Available” that is no longer needed.
- 4) In section 2023.6(a)(2), staff clarified that the engine or hybrid propulsion system paired with the engine for a hybrid bus must be certified to the lowest level of NOx emissions per title 13 of California Code of Regulations, section 2208(c)(18).
- 5) In section 2023.6(b), staff clarified the language and corrected the reference to updated section 2023(b)(39).

(8) Modifications to Section 2023.8. Reporting Requirements for Transit Agencies.

- 1) In section 2023.8(c), staff made organizational changes to separate the subsections of required reporting information.
- 2) In section 2023.8(f)(1), staff clarified the reporting for vehicle types that accumulate zero-emission passenger miles by adding scooters.
- 3) In section 2023.8(f)(3), staff changed the reference from 2023.5(c)(1)(A) to 2023.5(c) to more appropriately reference the entire zero-emission mobility section.
- 4) In section 2023.8(g), staff changed the reference from 2023.6(b)(1) to 2023.6(b) as section 2023.6(b)(1) does not exist.

(9) Modifications to Section 2023.9. Record Keeping Requirements.

- 1) In section 2023.9(c), staff updated the types of vehicles that must keep records of zero-emission passenger miles, by adding scooters and other eligible zero-emission vehicles to the list. This is to support the changes made in sections 2023.5(a)(1) and 2023.8(f)(1).
- 2) In section 2023.9(e), staff clarified that each large transit agency must maintain records of all fuel contracts that are executed on and after January 1, 2020.
- 3) In sections 2023.9(f) and (g), staff clarified that transit agencies must only retain the records that are required in section 2023.9 and make them available to CARB staff within 10 days of request.

These proposed modifications did not change implementation of the regulation in any way that was anticipated to affect the conclusions of the environmental analysis included in the Staff Report because the modifications consist primarily of refinements and clarifications to the initial proposal. CARB did not expect that any changes in compliance responses resulting from the modifications would result in any of the circumstances requiring recirculation of the analysis as set forth in section 15088.5 of the CEQA Guidelines.

B. NON-SUBSTANTIAL MODIFICATIONS

Staff identified the following non-substantial changes to the regulation before the second hearing on December 14, 2019:

1. Annotation. Deleted repetitive phrase “California Code of Regulations.”
2. Section 2023(a)(1). Substituted “13” for “20” for correct section reference.
3. Section 2023(a)(2). Added a comma after the word school buses to separate single items.
4. Section 2023(b)(5). Substituted “of” for “for” after the word “source” for correct grammar.
5. Section 2023(b)(7)(A). Added “or,” at the end of section (A) to clarify (A), (B), and (C) are all options, as consistent with the last phrase in existing section (b)(7) requiring only, “one of the following”.
6. Section 2023(b)(10). Added a comma after the word “public health” to separate single items.
7. Section 2023(b)(14). Deleted the comma after the “conventional internal combustion engine bus” for correct grammar.

8. Section 2023(b)(15). Substituted “U.S.C.” for “United States Code” to remain consistent with the rest of regulation.
9. Section 2023(b)(22). Substituted “U.S.C.” for “United States Code” for consistency throughout the regulation.
10. Section 2023(b)(23). Added “bus” to reiterate that this regulation only applies to busses..
11. Section 2023.1(a)(3)(C). Added “double-decker,” to remain consistent with section 2023.1(c).
12. Section 2023.1(b)(3). Substituted “requirements of sections 2023.1(b)(1) and (2)” for “bus-fleet requirements discharge the purchase requirement” to provide correct section referencing.
13. Section 2023.1(c). Substituted “double-decker” for “double decker” for correct grammar and consistency throughout the regulation.
14. Section 2023.1(d)(2). Substituted “Board of Directors” for “governing board” for consistency throughout the regulation.
15. Section 2023.1(d)(3). Substituted “agency” for “agencies” after the “participating transit” for correct grammar.
16. Section 2023.2(a)(3). Added a comma after the “or” at the end of subsection for correct grammar.
17. Section 2023.4(a). Substituted a period for comma after the “affected” and capitalized “transit” for correct grammar.
18. Section 2023.4(c)(1)(A). Substituted a semicolon for comma after “facilities” for correct grammar.
19. Section 2023.4(c)(1)(A)1. Substituted “in” for “with” for correct grammar.
20. Section 2023.4(c)(1)(A)5. Deleted the word “Archeological” and used sentence case for correct grammar. (see additional revisions to this section below).
21. Section 2023.4(c)(1)(B). Substituted a colon for comma for correct grammar.
22. Section 2023.4(c)(1)(B)2. Added a comma after “project” for clarity.
23. Section 2023.4(c)(1)(C). Deleted “set forth” for brevity.
24. Section 2023.4(c)(1)(D). Changed to active from passive voice to reiterate that the Executive Officer grants the exemption.
25. Section 2023.4(c)(2). Added “in section 2023.1(a)” to clarify the section the requirement is referencing to.
26. Section 2023.4(c)(2)(B). Substituted a period for comma after the word “mile” for correct grammar and add closed parenthesis after “battery pack” erroneously deleted in 15-day changes.
27. Section 2023.4(c)(2)(C). Changed singular “bus” to plural “buses” and changed to active from passive voice to reiterate that the Executive Officer grants the exemption.
28. Section 2023.4(c)(3)(A). Substituted a colon for semicolon for correct grammar.

29. Section 2023.4(c)(3)(A)1. Added the word “shows” for clarity.
30. Section 2023.4(c)(3)(A)3. Substituted “A” for “An” preceding “description” for correct grammar.
31. Section 2023.4(c)(3)(A)6. Changed the word “buses” from plural to singular for clarity and correct grammar.
32. Section 2023.4(c)(3)(B). Changed singular “bus” to plural “buses” and changed to active from passive voice to reiterate that the Executive Officer grants the exemption.
33. Section 2023.4(c)(4)(A). Removed phrase “as set forth” for brevity and added “no” to indicate negation instead of using negative prefix “un-” for clarity.
34. Section 2023.4(c)(4)(C)2. Substituted “has” for “have” for correct grammar.
35. Section 2023.4(c)(4)(C)3. Used plural in the word “requirements” in the phrase “Americans with Disabilities requirements” for correct grammar.
36. Section 2023.4(c)(5). Deleted the phrase “set forth” for brevity.
37. Section 2023.4(c)(5)(B)2.a. Substituted “Board of Directors” for “board” for clarity and consistency throughout the regulation.
38. Section 2023.4(c)(5)(D). Changed to active from passive voice to reiterate that the Executive Officer grants the exemption.
39. Section 2023.5(b)(1). Changed the first letter of each word in “Zero-Emission Mobility Option” to upper case for consistency throughout the regulation and used lower case in the phrase “request to opt-in” for correct grammar.
40. Section 2023.5(b)(2). Used lower case in the phrase “request to opt-out” for correct grammar.
41. Section 2023.8(c)(1)(G). Substituted number “3)” for “2” for correct referencing and grammar.
42. Section 2023.8(c)(2)(B)7. Added “or” for clarity that a bus charging strategy type can be “on-route, in depot, or combination”.
43. Section 2023.8(f)(3). Added “accumulated annual” for consistency throughout the regulation with terminology used in conjunction with a Zero-Emission Mobility Option.
44. Section 2023.8(g). Added “the” in front of “requirements for” for correct grammar. Also deleted “as set forth” for brevity and substituted section “2023.6” for “2023.6(b)” to reference the correct section for low-NOx engine purchase requirements.
45. Section 2023.9 (b). Added several commas to separate single items in a list for correct grammar and the letter “y” to the word “full” for correct grammar.
46. Section 2023.9(c). Added a hyphen to the zero-emission for consistency throughout the regulation.
47. Section 2023.9(e). Added “to” for correct grammar.

48. Section 2023.9(f). Substituted “2023.9(b)-(e)” for “this” to clarify section referencing.

49. Section 2023.9(g). Substituted “2023.9(b)-(e)” for “this” to clarify section referencing.

Staff identified the following additional non-substantial changes to the regulation *after* the second hearing on December 14, 2019:

1. Section 2023(b)(12). Changed California Code of Regulations cross reference to section 95481(a)(27), as the referenced section was amended on January 4, 2019.
2. Section 2023(b)(31). Added “the” in front of the phrase “California Code of Regulations” to correct grammar.
3. Section 2023(b)(43). Changed California Code of Regulations cross reference to section 95481(a)(123), as the referenced section was amended on January 4, 2019; replaced “Biomass-Based Diesel” with “Renewable Hydrocarbon Diesel” to use consistent terminology with the cross referenced section.
4. Section 2023(b)(44). Changed California Code of Regulations cross reference to section 95481(a)(20), as the referenced section was amended on January 4, 2019.
5. Section 2023(b)(55). Added a hyphen to the “zero-emission” for consistency throughout the regulation, and added a comma after the word “pounds” to correct punctuation.
6. Sections 2023.1(a)(1)(A) and (B). Replaced sections 2023.1(a)(1)(A)a.-c. and 2023.1(a)(1)(B)a.-b. with 2023.1(a)(1)(A)1.-3. and 2023.1(a)(1)(A)1.-2., respectively, to correct hierarchy.
7. Section 2023.1(a)(3)(B). Added a hyphen to the “zero-emission” for consistency throughout the regulation.
8. Section 2023.1(a)(4)(D). The text of the sub-section that was marked at 2023.1(a)(4)(D) applies to all preceding sub-sections (A) – (C), and is not one more of that series. It should be marked as part of the preceding subsection (4) rather than a sub-section of (4).
9. Section 2023.1(a)(6). Substituted “the” for “a” in front of the phrase “zero-emission bus purchase requirements” at the end of paragraph for correct grammar, added a hyphen to the “zero-emission” used in this phrase, and substituted “requirements” for “requirement” for consistency throughout the regulation.
10. Section 2023.1(b)(2). Deleted “and” in “one-thousand two hundred fifty” for correct grammar, replaced “service” with “bus fleet” to use consistent

terminology with the section 2023.1(b)(1), and added “the end of” in front of the phrase “calendar year 2021” for clarity and to use consistent terminology with the section 2023.1(b)(1).

11. Section 2023.1(d)(1)(D). Substituted “bus” for “buses” in the first sentence for correct grammar preceding “purchases”.
12. Section 2023.1(d)(2). Substituted “governing body” for “Board of Directors” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities.
13. Sections 2023.1(d)(2)(A) and (B). Substituted “governing body” for “board” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities.
14. Section 2023.1(d)(3). Substituted “governing body” for “board” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities.
15. Section 2023.2(c)(1). Deleted the redundant word “board” after the “along with”, added the word “the”, and substituted “governing body” for “governing board” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities.
16. Section 2023.2(c)(2). Added the phrase “Subject to section 2023.3(c)” at the beginning of the paragraph to make it clear that Joint Group may use bonus credits, and used lower case in the word “member”.
17. Section 2023.2(d). Substituted “governing body” for “board” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities and substituted “approval of” for “approvals for” in the last sentence for correct grammar.
18. Section 2023.4(c)(1). Added a hyphen to the “zero-emission” for consistency throughout the regulation.
19. Section 2023.4(c)(1)(A)5. Added back the word “archeological” erroneously deleted after the 15-day notice, revised to include all three resources categories in a list, and added commas to separate single items in a list.
20. Section 2023.4(c)(1)(B)1. Substituted “governing body” for “Board of Directors” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing

structure of private entities and “governing body” is used when referencing public entities.

21. Section 2023.4(c)(1)(B)2. Deleted the comma after the “project” for clarity and correct grammar.
22. Section 2023.4(c)(2)(C). Added a hyphen to the “zero-emission” for consistency throughout the regulation.
23. Sections 2023.4(c)(3)(A)1. and 4. Added a hyphen to the “zero-emission” for consistency throughout the regulation.
24. Section 2023.4(c)(3)(A)6. Changed the word “bus” from singular to plural “buses” for correct grammar.
25. Section 2023.4(c)(3)(B). Added a hyphen to the “zero-emission” for consistency throughout the regulation.
26. Section 2023.4(c)(4)(C)3. Substituted “requirements” for “requirement” in the second phrase “Americans with Disabilities requirement” for correct grammar and clarity.
27. Section 2023.4(c)(4)(C)4. Substituted “governing body” for “Board of Directors” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities.
28. Section 2023.4(c)(4)(D). Substituted “requirements” for “requirement”, added a space in front of the section number “2023.4(c)(4)(C)”, and substituted “has been” for “had been” to correct grammar.
29. Section 2023.4(c)(5)(A). Substituted “governing body” for “Board of Directors” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities, and removed the space in front of “cannot” for correct grammar, and added a hyphen to the “zero-emission” for consistency throughout the regulation.
30. Section 2023.4(c)(5)(B)1. Substituted “governing body” for “board” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities.
31. Section 2023.4(c)(5)(B)2.a. Substituted “governing body” for “Board of Directors” for consistency throughout the regulation and with existing California statute, where “Board of Directors” is used to refer to the governing structure of private entities and “governing body” is used when referencing public entities.
32. Section 2023.5(c)(1)(B). Added a hyphen to the “zero-emission” for consistency throughout the regulation.

33. Section 2023.6(a). Substituted “propulsion” for “prolusions” for correct grammar and spelling.
34. Section 2023.6(a)(2). Added “the” in front of the phrase “California Code of Regulations” to correct grammar, added a comma after the section “2208(c)(18)” to correct punctuation, substituted “and” for “that is” in front of the word “suitable” and “of” for “for” in front of the phrase “the engine being purchased” to correct grammar.
35. Section 2023.8(c)(1)(H). Added “the” in front of the “contact person” for correct grammar.
36. Section 2023.8(c)(1)(I) and (J). Substituted “contact person’s” for “contact” for clarity.
37. Section 2023.8(c)(2)(A)3. Deleted the redundant word “fleet’s own” and used possessive form of “agency” for clarity.
38. Section 2023.8(f). Substituted “that opts into” for “operating” for clarity and correct grammar.
39. Section 2023.8(f)(3). Added “to” after the word “according” for correct grammar.
40. Section 2023.8(h). Added “an” after the word “submit” for clarity and correct grammar.
41. Section 2023.9(b). Substituted “records” for “record” in the last sentence for correct grammar.

The above-described modifications constitute non-substantial 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.

C. ADDITIONAL REFERENCES AND SUPPLEMENTAL DOCUMENTS RELIED UPON

After providing public notice of these proposed regulations, CARB added seven additional documents to the record when it provided notice of the 15-day comment period on proposed changes to the initially proposed amendments. This section describes these documents.

The documents were addenda to the ISOR and the references to the first addenda, the Supplemental to Economic Impact Assessment. The other addenda comprised Updates to the Emissions Inventory Methods and Results.

The Supplemental to Economic Impact Assessment is available at https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.24474938.1494044421.1554829676-1226064564.1501789954. It includes further analysis of costs and adds detailed financing examples that demonstrates the regulation is feasible and will not cause reductions in service nor adverse impacts on fares.

The Updates to the Emissions Inventory Methods and Results presented updates and corrections to Appendix L of the ISOR. It consisted of corrections reflecting: (1) changes in the proposed regulation regarding purchase requirements for articulated buses; (2) changes in the proposed regulations regarding bonus credits; (3) changes to the baseline scenario of the number of transit buses; (4) changes in the proposed regulation to the definitions of large and small transit agencies; and (5) changes in the proposed regulation regarding bonus credits available to the San Francisco Municipal Transportation Agency.

CARB also provided public notice of the following additional documents relied upon, which were references to the Supplemental to Economic Impact Assessment:

- 1) U.S. Department of Transportation (U.S. DOT), Federal Transit Administration (FTA) (2016). Annual Report on Leasing Arrangements. Released December 2016. Available: <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA%202016%20Annual%20Report%20on%20Leasing%20Arrangements.pdf>.

The document provides more detail on financing options and includes example analyses showing annual costs for ZEB purchases that are financed without funding grants or incentives. Financing bus purchases is a viable option for transit agencies in the U.S. to purchase vehicles. In the 2016 reporting period, the National Transit Database (NTD) shows that 9,414 revenue vehicles were leased.

- 2) U.S. Department of Transportation (U.S. DOT), Federal Transit Administration (FTA) (2017). Annual Report on Leasing Arrangements. Released December 2017. Available: <https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/funding/funding-finance-resources/capital-leasing/69001/tbp-171031-001-capital-leasing-report-2017.pdf>.

The Fixing America's Surface Transportation (FAST) Act, Public Law 114-94, in section 3019(c), removed the requirement that limited leasing arrangements to only those that are more cost effective than purchase or construction.

- 3) Proterra (2017). Funding Opportunities for Electric Buses. Released January 11, 2017. Available: <https://www.proterra.com/news-resources/blog/financing-a-proterra-bus/>.

Battery leases enable customers to purchase a vehicle for roughly the same price as a diesel bus, putting the operating savings toward the battery lease. Proterra is responsible for the performance of the batteries through the life of the lease (including any midlife battery replacement).

- 4) BYD (2018). BYD and Generate Capital to Launch First-Ever U.S. Partnership for an Electric Bus Leasing Program \$200 million allocated to lease program to accelerate adoption of private and public sector electric buses. Released July 11, 2018. Available: http://www.byd.com/sites/Satellite?c=BydArticle&cid=1514427870145&d=Touch&pagename=BYD_EN%2FBydArticle%2FByd_ENCommon%2FArticleDetails&rendermode=preview.

Battery leases enable customers to purchase a vehicle for roughly the same price as a diesel bus, putting the operating savings toward the battery lease. BYD partnered with Generate Capital for an electric bus leasing program that allocated \$200 million to accelerate adoption of private and public sector electric buses. These programs are options for purchasing buses beyond normal government financing that is commonly used for infrastructure and other capital improvements.

- 5) Proterra (2017). Public Transit Funding Options for Electric Buses and Charging Systems. Released December 2017. Available: <https://vimeo.com/247358040/eae37fc3d9>.

To illustrate how financing can address concerns about higher incremental costs, staff chose several examples where \$300,000, which represents about 40 percent of the bus cost on average, is financed over a 14-year period and the remaining costs are paid up front as the down payment. The financed amount can vary depending on the transit agency's need. In this analysis, an interest rate of 3.5 percent is used, as in Proterra's case study.

The other addendum to the ISOR is the Updates to the Emissions Inventory Methods and Results which is available at

https://www.arb.ca.gov/regact/2018/ict2018/15dayattc.pdf?_ga=2.92657053.1494044421.1554829676-1226064564.1501789954. This addendum presents the updates and corrections to Appendix L of ISOR (published on August 7, 2018). All the references in this document are already included in the ISOR.

III. DOCUMENT INCORPORATED BY REFERENCE

The regulation adopted by the Executive Officer incorporates the following document by reference:

- Society of Automotive Engineering (SAE) International (2002). Recommended Practice for Measuring Fuel Economy and Emissions of Hybrid-Electric and Conventional Heavy-Duty Vehicles J2711_200209. Issued September 2002.

This document provides an SAE test for measuring fuel economy and emissions, and is identified in page III-6 of the ISOR

(https://www.arb.ca.gov/regact/2018/ict2018/isor.pdf?_ga=2.108997570.1188921060.1553280838-101119359.1503420219). This test is referenced in sections 2023(b)(40) and

2023.4(c)(2)(B) for determining energy use per mile for qualifying an exemption. We would determine energy use per mile and only accept energy use per mile estimates that followed this procedure.

This document was incorporated by reference because it would be cumbersome, unduly expensive, and otherwise impractical to publish it in the California Code of Regulations. In addition, the document is copyrighted, and cannot be reprinted or distributed without violating the licensing agreements. The document is lengthy and contains 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 this document 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 document was made available by CARB upon request during the rulemaking action and will continue to be available in the future. The document is also available from college and public libraries, or may be purchased directly from the publishers.

IV. COMMENTS RECEIVED DURING THE 45-DAY COMMENT PERIOD AND AT THE BOARD HEARING ON SEPTEMBER 28, 2018 AND AGENCY RESPONSES

This chapter contains comments on the regulations or the process by which they were adopted that were in comment letters submitted during the 45-day comment period, and written or oral comments provided at the Board Hearing on September 28, 2018. This chapter also contains responses for these comments. Chapter V contains CARB's responses to such comments on the proposed changes to the amendments that were made available for a 15-day comment period, and comments made at the public hearing on those changes.

The comments are grouped into tables for each of the primary opportunities for public comment. Table IV.1 lists comment letters submitted during the 45-day comment period and their corresponding sections. Table IV.2 lists oral comments given at the September 28, 2018, Board Hearing and their response categories. Table IV.3 lists written comments given at the September 28, 2018, Board Hearing and their response categories.

There are seven fields in each of these tables:

- "Docket number". This is a unique number assigned by CARB based on the order comments are received.
- "Reference code". This is an abbreviation assigned by CARB to represent an entity or when there are multiple comment letters submitted by the same entity. For example, Docket number 373 in Table VI.1 was submitted by Eric Ustation who is with Riverside Transit Agency. Docket number 374 in Table VI.1 was also submitted by Eric Ustation. Reference codes for docket numbers 373 and 374 are therefore assigned as "RTA-1" and "RTA-2", respectively. The use of reference code provides efficiency in completing this FSOR document while retaining the commenter's identity.
- "Submitted by". This field indicates the submitter's name for a comment or comment letter.
- "Affiliation". This field indicates the organization associated with the comment or comment letter.
- "Duplicated identical letter". This field indicates whether a comment letter is a duplicate from an earlier comment letter. For example, docket number 374 in Table VI.1 is an identical comment letter as docket number 373 in Table VI.1. Such duplication will be indicated in this field. For all duplicated comment letters, please refer to the first letter for responses.
- "Date received". This field indicates when the comment or comment letter was received to demonstrate which comment period the comment or comment letter was received in and that it was properly addressed.

- “Section (category) number (#)”. This field lists all applicable response categories or subcategories other than environmental impact (which is addressed in Appendix 7) in which the comment or comment letters are responded to.

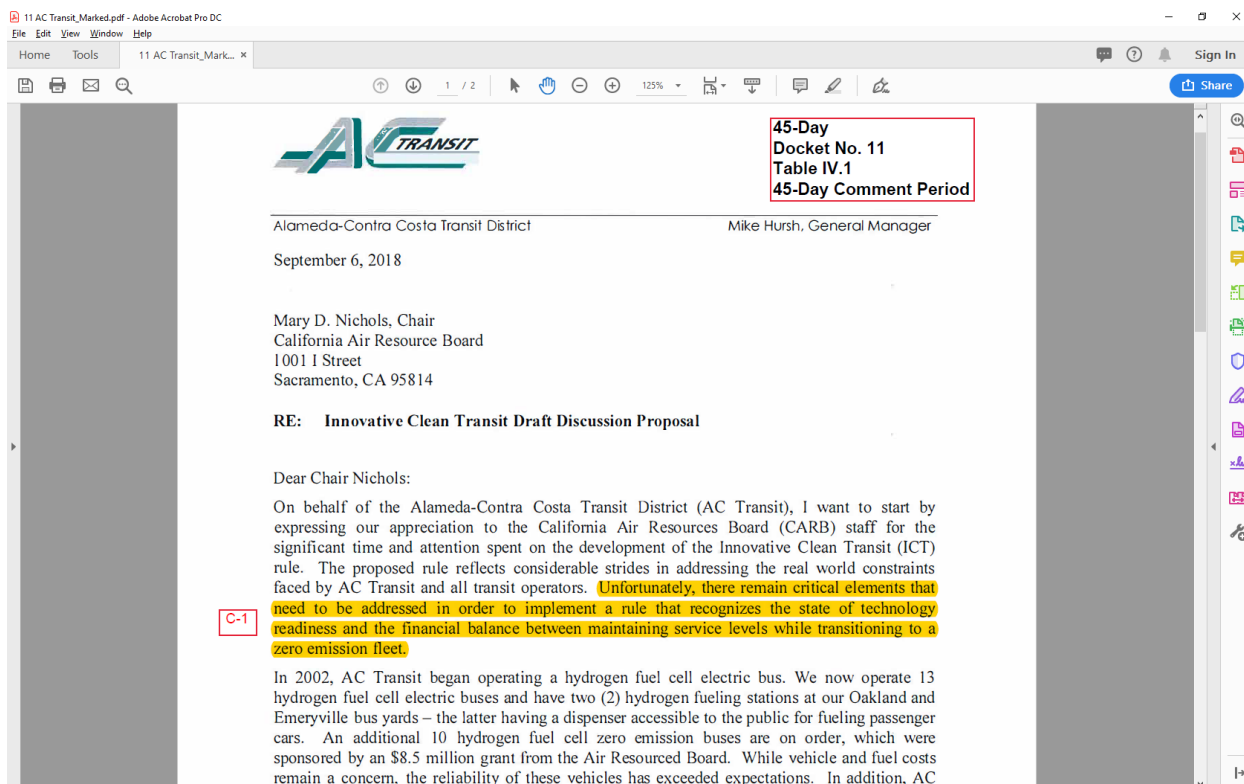
The complete written comment letters received during the 45-day comment period and the written and oral comments received at the first Board Hearing are in Appendices 1 through 3. Appendices 4 through 6 are the written comment letters received during the 15-day comment period and the written and oral comments received at the second Board Hearing.

To identify the original comments in the following tables and responses, each comment or comment letter is marked in the top-right corner with the following information:

- Which period the comment was submitted during. If “45-day” is used, it means such comment or comment letter was submitted during the 45-day comment period or at the first Board Hearing. If “15-day” is used, it means such comment or comment letter was submitted during the 15-day comment period or at the second Board Hearing.
- Docket number or commenter number. Docket number is an identifier used by CARB to indicate the order in which a comment letter was received. The commenter number is given to oral or written comments provided at the hearings on the proposal, based on the order in which the commenter’s statements were given at the indicated hearing.
- Table number. Table number (e.g. Table IV.1) indicates where this comment or comment letter is listed in this FSOR. Using the table number, a reader can easily locate the responses provided for this comment or comment letter. A comment or comment letter can only appear in either Chapter IV or V. No single comment or comment letter can appear in both Chapters IV and V. If an identical comment or comment letter is submitted during both time periods, it will be treated as a different comment or comment letter and responded to separately in Chapters IV and V.
- Comment category. Comment category will identify which specific category the comment or comment letter belongs to for either the 45-Day or 15-Day comment period. In a comment period (e.g. 45-Day, 15-Day), each comment or comment letter will be coded based on when the comment or comment letter was received (e.g. 45 Day Comment Period, 1st Board Written, 1st Board Oral).
- Comment section number. Each comment category number is unique and addresses a specific issue category. Each comment or comment letter will also be bracketed to show how responses are addressed based on the issue category or sub-categories (e.g. C-1). If a comment raises multiple issues, all related sub-categories will be identified for this bracketed comment (e.g. C-1, C-9).

To illustrate how the comment letters are marked, the AC Transit comment letter from the 45-day comment period is marked as shown in Figure 1 below. For identification purpose, this comment letter can be found in Docket Number 11 in Table IV.1. The comment on the first page is in category C-1 for a response.

Figure 1: AC Transit bracketed comment letter from the 45 Day Comment Period



Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

Table IV. 1: Comment Letters Submitted During the 45-day Comment Period

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
1	Del Mar-1	Worden, Dwight	City of Del Mar		8/13/2018	A
2	Vista-1	Aguilera, John J.	City of Vista		8/14/2018	H-8-6
3	Del Mar-2	Brown, Clem	City of Del Mar	This letter is identical to #1, Del Mar-1 though submitted by a different person. Please refer to #1, Del Mar-1 for responses.	8/15/2018	A
4	Vista-2	Aguilera, John J.	City of Vista	This letter is identical to #2, Vista-1 though submitted on different dates. Please refer to #2, Vista-1 for responses.	8/20/2018	H-8-6
5	MBTA	Goodale, Mark	Morongo Basin Transit Authority (MBTA)		8/21/2018	H-1-3, H-1-5
6	35 California Mayors	Spita, Michelle	35 California Mayors		8/23/2018	A
7	MacKerel	MacKerel, Martin	Individual		8/27/2018	A
8	UCS-1	Heffling, Emily	Union of Concerned Scientists (UCS)	This letter provides supporting materials for the ICT regulation and is not considered a comment letter.	8/29/2018	NC**
9	ACT Coalition Partners-1	Pingle, Ray	Advanced Clean Transit (ACT) Coalition Partners ³		8/29/2018	H-3-3, H-4-3, H-5-2, H-5-5
10	JMA-1	Bhola, Abhilasha	Jobs to Move America (JMA)	This letter provides supporting materials for the Jobs to Move America coalition and is not considered a comment letter.	8/30/2018	NC**
11	AC Transit	Wallauch, Steven	Alameda-Contra Costa Transit District (AC Transit)		9/7/2018	B-2 C-1, C-9 E-8, E-10 H-10
12	Vogel	Vogel, Nathan	Individual		9/10/2018	A
13	Form Letter-1	Knopp, Kristeene	Individual		9/10/2018	A
14	Garcia	Garcia, Armando A.	Individual		9/10/2018	***

³ The Advanced Clean Transit Coalition Partners comprise the following 12 entities: Sierra Club, Union of Concerned Scientists, EarthJustice, Environment California / Environment California Research & Policy Center, American Lung Association in California, IBEW-NECA California & Nevada, International Brotherhood of Electrical Workers (IBEW) Local 11, Los Angeles NECA, Labor Management Cooperation Committee, IBEW Local 569, Jobs to Move America, Coalition for Clean Air, BlueGreen Alliance, CALPIRG.

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
15	Bippert-Plymate	Bippert-Plymate, Teresa	Individual		9/10/2018	A
16	Lynch	Lynch, Dennis	Individual		9/10/2018	A
17	Robinson	Robinson, Richard	Individual		9/10/2018	***
18	Serio	Serio, Amie	Individual		9/10/2018	***
19	Agzarian	Agzarian, Amy	Individual		9/10/2018	A
20	Rosin	Rosin, Steve	Individual		9/10/2018	A
21	Coston	Coston, Charles	Individual		9/10/2018	A
22	Majors	Majors, Michael	Individual		9/10/2018	A
23	GShana	G, Shana	Individual		9/10/2018	***
24	Rothberg	Rothberg, Donald	Individual		9/10/2018	A
25	Hofland	Hofland, Freda	Individual		9/10/2018	A
26	Rubel	Rubel, Scott	Individual		9/10/2018	A
27	Davis	Davis, Anya	Individual		9/10/2018	A
28	Larkin	Larkin, Timothy	Individual		9/10/2018	A
29	Arizpe	Arizpe, Ken	Individual		9/10/2018	***
30	Krupinski	Krupinski, K	Individual		9/10/2018	A
31	Krick	Krick, Shellie	Individual		9/10/2018	A
32	Hansen	Hansen, Janet	Individual		9/10/2018	A
33	Dempsey	Dempsey, Mark	Individual		9/10/2018	***
34	Clark	Clark, Pamela	Individual		9/10/2018	A
35	Lackides	Lackides, Constantine	Individual		9/10/2018	A
36	Suesoff	Suesoff, Jessika	Individual		9/10/2018	A
37	Cerny	Cerny, Jayne	Individual		9/10/2018	A
38	Yatman	Yatman, Deatra	Individual		9/10/2018	A
39	Gray	Gray, Hod	Individual		9/10/2018	***
40	St. Clair	St. Clair, John	Individual		9/10/2018	***
41	Nason	Nason, Kirk	Individual		9/10/2018	A
42	Henderson	Henderson, Almalee	Individual		9/10/2018	A
43	Knoll	Knoll, Carolyn	Individual		9/10/2018	***
44	Spohr	Spohr, Mark	Individual		9/10/2018	A
45	Cheeseman	Cheeseman, Gail	Individual		9/10/2018	A
46	Slone	Slone, Tom	Individual		9/10/2018	***
47	Sandberg	Sandberg, Pamela	Individual		9/10/2018	A
48	Forrest	Forrest, Scott	Individual		9/10/2018	A
49	Dakin	Dakin, Hillary	Individual		9/10/2018	***
50	Bianco	Bianco, Tony	Individual		9/10/2018	NC**
51	Granlund	Granlund, Fred	Individual		9/10/2018	***
52	Froome	Froome, Roberta	Individual		9/10/2018	A
53	Tutor	Tutor, Patricia	Individual		9/10/2018	***
54	Carraway	Carraway, Coralie	Individual		9/10/2018	A
55	Fray	Fray, Tom	Individual		9/10/2018	***
56	Monahan	Monahan, Claudia	Individual		9/10/2018	A
57	Gartin	Gartin, Courtney	Individual		9/10/2018	***
58	Perkins	Perkins, Katherine	Individual		9/10/2018	***
59	Zamora	Zamora, Barbara	Individual		9/10/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
60	Fitz Gibbon	Fitz Gibbon, Linda	Individual		9/10/2018	***
61	Barnes	Barnes, John	Individual		9/10/2018	A
62	Watts	Watts, Anne	Individual		9/10/2018	A
63	Pham	Pham, John	Individual		9/10/2018	A
64	Worker	Worker, Scott	Individual		9/10/2018	A
65	Leslie	Leslie, M. Virginia	Individual		9/10/2018	***
66	Pace	Pace, Kristy	Individual		9/10/2018	A
67	Orahood	Orahood, Don	Individual		9/10/2018	***
68	Henderson	Henderson, Michael	Individual		9/10/2018	***
69	Franker	Franker, Marsha	Individual		9/10/2018	A
70	Bush	Bush, Don	Individual		9/10/2018	A
71	Hoelke	Hoelke, Steven	Individual		9/10/2018	A
72	Britton	Britton, Ruth	Individual		9/10/2018	A
73	Blazek	Blazek, Mignonette	Individual		9/10/2018	A
74	Mone	Mone, Carol	Individual		9/10/2018	***
75	Krell-Bates	Krell-Bates, Diane	Individual		9/10/2018	***
76	Mueller	Mueller, Karsten	Individual		9/10/2018	***
77	Larson	Larson, Sharyl	Individual		9/10/2018	A
78	Zenker	Zenker, Elizabeth	Individual		9/10/2018	***
79	McCready	McCready, Tami	Individual		9/10/2018	***
80	Bear	Bear, Clare	Individual		9/10/2018	A
81	Monahan	Monahan, Louise	Individual		9/10/2018	A
82	Harkins	Harkins, Lynne	Individual		9/10/2018	***
83	Walsh	Walsh, Tom	Individual		9/10/2018	A
84	Parsons	Parsons, Ron	Individual		9/10/2018	A
85	Osborne	Osborne, Elizabeth	Individual		9/10/2018	***
86	Mello	Mello, Betty	Individual		9/10/2018	A
87	Stark	Stark, Kathleen	Individual		9/10/2018	A
88	Newquist	Newquist, Robin	Individual		9/10/2018	A
89	Ostwald	Ostwald, Andy	Individual		9/10/2018	A
90	Koster	Koster, Anna	Individual		9/10/2018	A
91	Hawkins	Hawkins, Terry	Individual		9/10/2018	***
92	Nirenstein	Nirenstein, Dorothy	Individual		9/10/2018	A
93	Horne	Horne, Richard	Individual		9/10/2018	A
94	Rocha	Rocha, Candace	Individual		9/10/2018	A
95	Clark	Clark, JD	Individual		9/10/2018	A
96	MacRaith	MacRaith, Bonnie	Individual		9/10/2018	A
97	Bullock	Bullock, Janet	Individual		9/10/2018	A
98	Berger	Berger, Dan	Individual		9/10/2018	A
99	Lamm	Lamm, James	Individual		9/10/2018	A
100	Katzen	Katzen, Joanne	Individual		9/10/2018	A
101	Quinn	Quinn, Terrence	Individual		9/10/2018	A
102	Uschyk	Uschyk, Carol	Individual		9/10/2018	A
103	Hubacek	Hubacek, Richard	Individual		9/10/2018	***
104	Kosinski	Kosinski, Kathy	Individual		9/10/2018	***
105	Hazelwood	Hazelwood, Denise	Individual		9/10/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
106	McCullough	McCullough, Sue	Individual		9/10/2018	***
107	Schwager	Schwager, Michael	Individual		9/10/2018	A
108	Gaffin	Gaffin, Benjamin	Individual		9/10/2018	A
109	Schilling	Schilling, Barbara	Individual		9/10/2018	A
110	King	King, Jean	Individual		9/10/2018	A
111	Schegloff	Schegloff, Myra	Individual		9/10/2018	A
112	Burnham	Burnham, Jeremy	Individual		9/10/2018	A
113	Latshaw	Latshaw, Gary	Individual		9/10/2018	A
114	Williams	Williams, Marilyn	Individual		9/10/2018	A
115	Costello	Costello, Patrick	Individual		9/10/2018	A
116	Vargas	Vargas, Frank	Individual		9/10/2018	A
117	Gottejman	Gottejman, Brian	Individual		9/10/2018	A
118	Steiner	Steiner, Gabriele	Individual		9/10/2018	A
119	Hamer	Hamer, Donna	Individual		9/10/2018	***
120	Correa	Correa, Hana	Individual		9/10/2018	A
121	Abramson	Abramson, Michael	Individual		9/10/2018	A
122	Stern	Stern, Joan	Individual		9/10/2018	A
123	Jacques	Jacques, Karen	Individual		9/10/2018	A
124	Britton	Britton, Bill	Individual		9/10/2018	A
125	Wilinsky	Wilinsky, Christine	Individual		9/10/2018	A
126	Form Letter-2	Dalforno , Alicia	Individual		9/10/2018	A
127	Hawkins	Hawkins, Angela	Individual		9/10/2018	
128	Sanderson	Sanderson, Michele	Individual		9/10/2018	NC**
129	Craig	Craig, Ella	Individual		9/10/2018	A
130	Walp	Walp, Susan	Individual		9/10/2018	A
131	Brooks	Brooks, Marilee	Individual		9/10/2018	A
132	Bungarz	Bungarz, Kathy	Individual		9/10/2018	A
133	Hardin	Hardin, Joseph	Individual		9/10/2018	A
134	Mitchem	Mitchem, Virginie	Individual		9/10/2018	A
135	Nunamaker	Nunamaker, Jean	Individual		9/10/2018	A
136	Alexander	Alexander, Rhetta	Individual		9/10/2018	***
137	Zimmermann	Zimmermann, John	Individual		9/10/2018	A
138	McLaughlin	McLaughlin, Wendy	Individual		9/10/2018	A
139	Redman	Redman, Richard	Individual		9/10/2018	A
140	LaNew	LaNew, Maryann	Individual		9/10/2018	A
141	Roop	Roop, Jeffrey	Individual		9/10/2018	A
142	Rodgers	Rodgers, Shelly	Individual		9/10/2018	A
143	Illades	Illades, Jane	Individual		9/10/2018	A
144	Mercer	Mercer, Noah	Individual		9/10/2018	A
145	Briner	Briner, Martin	Individual		9/10/2018	A
146	Faulkner	Faulkner, Bob	Individual		9/10/2018	A
147	Arrivee	Arrivee, David	Individual		9/10/2018	***
148	Ware	Ware, Christopher	Individual		9/10/2018	***
149	Knapp	Knapp, Harry	Individual		9/10/2018	A
150	Livingston	Livingston, Linda	Individual		9/10/2018	A
151	Jones	Jones, Jan	Individual		9/10/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
152	Beckham	Beckham, Marie	Individual		9/10/2018	A
153	Jasper	Jasper, Marilyn	Individual		9/10/2018	A
154	Crumpton	Crumpton, Tom	Individual		9/10/2018	A
155	Lorraine	Lorraine, Janet	Individual		9/10/2018	***
156	La Frinere	La Frinere, Rochelle	Individual		9/10/2018	A
157	Hall	Hall, Holly	Individual		9/10/2018	A
158	Stanojevic	Stanojevic, Erica	Individual		9/10/2018	A
159	Masi	Masi, James	Individual		9/10/2018	A
160	Wein	Wein, Stacey	Individual		9/10/2018	A
161	Goodson	Goodson, Patricia	Individual		9/10/2018	A
162	Gilgun	Gilgun, Michael	Individual		9/10/2018	A
163	Chan	Chan, B.	Individual		9/10/2018	***
164	WN	W, N	Individual		9/10/2018	A
165	Freeman	Freeman, Heeb	Individual		9/10/2018	A
166	Hurley	Hurley, Maureen	Individual		9/10/2018	A
167	Hale	Hale, Lauren	Individual		9/10/2018	***
168	Lebas	Lebas, Anne	Individual		9/10/2018	***
169	Perricelli	Perricelli, Claire	Individual		9/10/2018	A
170	Licht	Licht, Fred	Individual		9/10/2018	A
171	Heidemann	Heidemann, Gaille	Individual		9/10/2018	***
172	Gregg	Gregg, Brandon	Individual		9/10/2018	A
173	Downing	Downing, David	Individual		9/10/2018	A
174	Mason	Mason, Marie	Individual		9/10/2018	***
175	Sagheb	Sagheb, Nina	Individual		9/10/2018	***
176	Oda	Oda, John	Individual		9/10/2018	***
177	Wagnon	Wagnon, Mana-Jean	Individual		9/10/2018	A
178	Swanberg	Swanberg, Gabriele	Individual		9/10/2018	A
179	Raphael	Raphael, Joan	Individual		9/10/2018	A
180	Liebert	Liebert, Elizabeth	Individual		9/10/2018	***
181	Toyohara	Toyohara, Karen	Individual		9/10/2018	A
182	Battat	Battat, Kathy	Individual		9/10/2018	A
183	Hearle	Hearle, Kevin	Individual		9/10/2018	A
184	Khalsa	Khalsa, Mha Atma	Individual		9/10/2018	***
185	Lebo	Lebo, Harlan	Individual		9/10/2018	A
186	Law	Law, Linda	Individual		9/10/2018	A
187	Socher	Socher, Karentransit	Individual		9/10/2018	A
188	Ogilvie	Ogilvie, Dave	Individual		9/10/2018	A
189	Ruth	Ruth, Doug & Phyllis	Individual		9/10/2018	A
190	Obershaw	Obershaw, Lynda	Individual		9/10/2018	A
191	Caruso	Caruso, Suzanne	Individual		9/10/2018	A
192	Karno	Karno , Raquel	Individual		9/10/2018	A
193	Hoaglund	Hoaglund, Judith	Individual		9/10/2018	A
194	Sobo	Sobo, Naomi	Individual		9/10/2018	A
195	Knowles	Knowles, Derek	Individual		9/10/2018	***
196	Tapley	Tapley, Mary	Individual		9/10/2018	***
197	Sanfilippo	Sanfilippo, Val	Individual		9/10/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
198	Kirschling	Kirschling, Karen	Individual		9/10/2018	***
199	Mutascio	Mutascio, Robert	Individual		9/10/2018	***
200	Kerkhoff	Kerkhoff, Nick	Individual		9/10/2018	A
201	Robinson	Robinson, Tim	Individual		9/10/2018	A
202	Wase	Wase, Charles	Individual		9/10/2018	A
203	Wisniewski	Wisniewski, Michael	Individual		9/10/2018	***
204	Spielmann	Spielmann, Edda	Individual		9/10/2018	A
205	Spooner	Spooner, Greg	Individual		9/10/2018	***
206	Crane	Crane, Cecelia	Individual		9/10/2018	A
207	Edinger	Edinger, Elizabeth	Individual		9/10/2018	A
208	Lewis	Lewis, Sherman	Individual		9/10/2018	A
209	Peterson	Peterson, John	Individual		9/10/2018	A
210	Penfield	Penfield, Ralph	Individual		9/10/2018	A
211	Mcintyre	Mcintyre, Dennis	Individual		9/10/2018	***
212	Borcz	Borcz, Judith	Individual		9/10/2018	***
213	Patterson	Patterson, Rosalind	Individual		9/10/2018	***
214	Potter	Potter, Elizabeth	Individual		9/10/2018	A
215	Thompson	Thompson, Donna	Individual		9/10/2018	***
216	Hall	Hall, Andrew	Individual		9/10/2018	A
217	Meisel	Meisel, Myron	Individual		9/10/2018	A
218	Krysl	Krysl, Petr	Individual		9/10/2018	A
219	Bacorn	Bacorn, Tommy	Individual		9/10/2018	A
220	Del Valle	Del Valle, Javier	Individual		9/10/2018	A
221	Schulman	Schulman, Richard	Individual		9/10/2018	***
222	Hirth	Hirth, Carol	Individual		9/10/2018	A
223	Harte	Harte, Mary	Individual		9/10/2018	A
224	Peterson	Peterson, Roger	Individual		9/10/2018	A
225	Kraslavsky	Kraslavsky, Teri	Individual		9/10/2018	***
226	Wicks	Wicks, Cara lou	Individual		9/10/2018	A
227	Adkins	Adkins, Julia	Individual		9/10/2018	A
228	Wagner	Wagner, John	Individual		9/10/2018	A
229	TAndre	T, Andre	Individual		9/10/2018	***
230	Lauer	Lauer, Patricia	Individual		9/10/2018	***
231	Lilly	Lilly, Carolyn	Individual		9/10/2018	A
232	Movsesyan	Movsesyan, Greg	Individual		9/10/2018	A
233	Foster	Foster, John	Individual		9/10/2018	A
234	Guerry	Guerry, Melyssa	Individual		9/10/2018	***
235	Goldman	Goldman, Ron	Individual		9/10/2018	***
236	Thagard	Thagard, Elizabeth	Individual		9/10/2018	A
237	Madia	Madia, Scott	Individual		9/10/2018	***
238	Bezanson	Bezanson, David	Individual		9/10/2018	A
239	Reader	Reader, Stephanie	Individual		9/10/2018	A
240	Mohan	Mohan, Rachel	Individual		9/10/2018	A
241	Price	Price, Marilyn	Individual		9/10/2018	A
242	KSaran	K., Saran	Individual		9/10/2018	A
243	Hirshfield	Hirshfield, Susan	Individual		9/10/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
244	De Baca	De Baca, Sylvia	Individual		9/10/2018	A
245	Dev	Dev, Gita	Individual		9/10/2018	***
246	Watson	Watson, Richard	Individual		9/10/2018	***
247	Hannah	Hannah, Connie	Individual		9/10/2018	A
248	Arbuckle	Arbuckle, Bonnie	Individual		9/10/2018	A
249	Freer	Freer, Greg	Individual		9/10/2018	A
250	Adams	Adams, L.	Individual		9/10/2018	A
251	Griffith	Griffith, David	Individual		9/10/2018	***
252	Sullivan	Sullivan, Elizabeth	Individual		9/10/2018	***
253	Carlino	Carlino, Thomas	Individual		9/10/2018	***
254	Piatigorski	Piatigorski, Roxie	Individual		9/10/2018	A
255	Weininger	Weininger, Gail	Individual		9/10/2018	A
256	Mansell	Mansell, Jonathan	Individual		9/10/2018	A
257	Neft	Neft, Darrell	Individual		9/10/2018	A
258	Moskowitz	Moskowitz, Mignon	Individual		9/10/2018	A
259	Schneider	Schneider, Nancy	Individual		9/10/2018	***
260	Fronce	Fronce, Linnea	Individual		9/10/2018	A
261	Nealon	Nealon, Austin	Individual		9/10/2018	***
262	Simon	Simon, Philip	Individual		9/10/2018	***
263	Boyland	Boyland, Lesley	Individual		9/10/2018	***
264	Anderholm	Anderholm, Jon	Individual		9/10/2018	A
265	Marshland	Marshland, Susanna	Individual		9/10/2018	A
266	Mandrussow	Mandrussow, Olga	Individual		9/10/2018	A
267	Morris	Morris, Sharon	Individual		9/10/2018	A
268	Lifton	Lifton, Paul	Individual		9/10/2018	***
269	Vignocchi	Vignocchi, Carmela	Individual		9/10/2018	A
270	Koivisto	Koivisto, Ellen	Individual		9/10/2018	A
271	Hamilton	Hamilton, Ogden	Individual		9/10/2018	A
272	McClinton	McClinton, Ben	Individual		9/10/2018	A
273	Lewis	Lewis, Polly	Individual		9/10/2018	A
274	Byers	Byers, Nancy	Individual		9/10/2018	A
275	Wooldridge	Wooldridge, Bernard	Individual		9/10/2018	A
276	Phenix	Phenix, Lisa	Individual		9/10/2018	A
277	Blackwell-Marchant	Blackwell-Marchant, Pat	Individual		9/10/2018	A
278	Riker	Riker, Robert	Individual		9/10/2018	A
279	Wishingrad	Wishingrad, Barbara	Individual		9/10/2018	***
280	Sherman	Sherman, David	Individual		9/10/2018	***
281	Doull	Doull, Deanna	Individual		9/10/2018	A
282	Isaacs	Isaacs, Ernest	Individual		9/10/2018	A
283	Sternberg	Sternberg, Laura	Individual		9/10/2018	A
284	Earhart	Earhart, Anne	Individual		9/10/2018	A
285	Kim	Kim, Heather	Individual		9/10/2018	***
286	Gachesa	Gachesa, Ellen	Individual		9/11/2018	A
287	Gonzales	Gonzales, Joe	Individual		9/11/2018	A
288	Tomeo	Tomeo , Edward	Individual		9/11/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
289	Gurdin	Gurdin, J. Barry	Individual		9/11/2018	A
290	Suhr	Suhr, Eva	Individual		9/11/2018	A
291	Gallo	Gallo, Richard	Individual		9/11/2018	***
292	Queener	Queener, Carolyn	Individual		9/11/2018	A
293	Knueven	Knueven, Mary Jo	Individual		9/11/2018	A
294	Bonelli	Bonelli, Ricco	Individual		9/11/2018	A
295	Griffin	Griffin, Norene	Individual		9/11/2018	***
296	Curtis	Curtis, Katherine	Individual		9/11/2018	***
297	Pauker	Pauker, Jed	Individual		9/11/2018	***
298	Benson	Benson, Julia	Individual		9/11/2018	A
299	Nast	Nast, Carroll	Individual		9/11/2018	A
300	Hoyt	Hoyt, Margie	Individual		9/11/2018	A
301	Sherk	Sherk, Susan	Individual		9/11/2018	A
302	Brandt	Brandt, Elaine	Individual		9/11/2018	A
303	Poulton	Poulton, Marijane	Individual		9/11/2018	A
304	Hayden	Hayden, Sandra	Individual		9/11/2018	A
305	Miller	Miller, Richard	Individual		9/11/2018	***
306	Mielke	Mielke, Diana	Individual		9/11/2018	A
307	Klepin	Klepin, Lois	Individual		9/11/2018	A
308	Pulliam	Pulliam, Teela	Individual		9/11/2018	A
309	Hoang	Hoang, Lynn	Individual		9/11/2018	A
310	Wolfe	Wolfe, Charles	Individual		9/11/2018	A
311	Moore	Moore, Dorothy	Individual		9/11/2018	A
312	Nunez	Nunez, Stephanie	Individual		9/11/2018	A
313	Morgan	Morgan, Dan	Individual		9/11/2018	***
314	Bishop	Bishop, James	Individual		9/11/2018	A
315	Simonetti	Simonetti, Hilary	Individual		9/11/2018	NC**
316	Warden	Warden, Lew	Individual		9/11/2018	A
317	Morgen	Morgen, Henry	Individual		9/11/2018	A
318	Grigg	Grigg, Melody	Individual		9/11/2018	A
319	Tasto	Tasto, Henry	Individual		9/11/2018	A
320	Lucas	Lucas, John	Individual	Received seven identical letters from the same person.	9/11/2018	A
321	Deutsch	Deutsch, Vivian	Individual		9/11/2018	A
322	Alter	Alter, Judy	Individual		9/11/2018	A
323	Kurz	Kurz, David	Individual		9/12/2018	A
324	Crumpton	Crumpton, Thomas	Individual	Received eleven identical letters from the same person.	9/12/2018	A
325	Demers	Demers, Judith	Individual		9/12/2018	A
326	Russell	Russell, Donna	Individual		9/12/2018	A
327	Clark	Clark, Leigh	Individual		9/12/2018	A
328	Goode	Goode, Beth	Individual		9/12/2018	***
329	Adams	Adams, Judy	Individual		9/12/2018	A
330	Hendricks	Hendricks, Leslie	Individual		9/12/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
331	Stewart	Stewart, Jim	Individual		9/12/2018	A
332	Pinkerton	Pinkerton, Ann	Individual		9/12/2018	A
333	Roberts	Roberts, Michael	Individual		9/13/2018	A
334	Borchman	Borchman, Tenley	Individual		9/13/2018	B-3
						C-5, C-6
						E-9, E-13, E-14
						H-8-2, H-8-5
						I-10
335	Baldwin	Baldwin, Richard	Individual		9/13/2018	A
336	Parkinson	Parkinson, Robert	Individual		9/13/2018	A
337	Eaton	Eaton, Chris	Individual		9/13/2018	A
338	Goldberg	Goldberg, Marshall	Individual		9/14/2018	A
339	Cooper	Cooper, Ruth	Individual		9/14/2018	A
340	Sharpe	Sharpe, Chip	Individual		9/14/2018	A
341	Rasmussen	Rasmussen, Mckenzie	Individual		9/14/2018	***
342	Berliner	Berliner, Diane	Individual		9/14/2018	***
343	Gassman	Gassman, David	Individual		9/14/2018	A
344	Wallace	Wallace, Susan	Individual		9/14/2018	A
345	Shadoan	Shadoan, Greg	Individual		9/15/2018	***
346	Fenton	Fenton, Bruce	Individual		9/15/2018	***
347	Koenig	Koenig, Marcia	Individual		9/15/2018	A
348	Wood	Wood, Joy	Individual		9/16/2018	A
349	Forrest	Forrest, Kim	Individual		9/16/2018	***
350	Etgen	Etgen, Benjamin	Individual		9/16/2018	A
351	Dunn	Dunn, Susan	Individual		9/16/2018	A
352	Anke	Anke, Lee	Individual		9/16/2018	A
353	Kamendrowsky	Kamendrowsky, Victor	Individual		9/17/2018	A
354	Proterra	Leacock, Kent	Proterra		9/17/2018	E-8
						H-8-2
355	Sierra Club	Pingle, Ray	Sierra Club California		9/17/2018	NC*
356	Weikel	Weikel, Wendy	Individual		9/17/2018	A
357	Schleifer	Schleifer, Robert	Individual		9/17/2018	A
358	Trautwein	Trautwein, Mary Beth	Individual		9/17/2018	A
359	Touchton	Touchton, Jennifer	Individual		9/17/2018	A
360	CTE	Levin, Jaimie	Center for Transportation and the Environment (CTE)		9/17/2018	C-9
						D-3
						E-7, E-10-, E-11
361	Fite	Fite, Gregory	Individual		9/17/2018	A
362	LeBaron	LeBaron, Lauren	Individual		9/18/2018	A
363	DLII	D, LII	Individual		9/18/2018	A
364	SFMTA-1	Sakelaris, Kathleen	San Francisco Municipal Transportation Agency (SFMTA)		9/19/2018	H-7-4, H-8-4
365	Nachazel	Nachazel, Jane	Individual		9/19/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
366	Rund	Rund, Jen	Individual		9/20/2018	A
367	SFMTA-2	Reiskin, Edward D.	San Francisco Municipal Transportation Agency (SFMTA)	This letter is identical to #364, SFMTA-1 though submitted on different dates. Please refer to #364, SFMTA-1 for responses.	9/20/2018	H-7-4, H-8-4
368	MST-1	Harvath, Hunter	Monterey-Salinas Transit District (MST)		9/20/2018	B-2 E-1, E-8, E-10 H-1-2, H-2-1, H-2-4 H-5-5
369	Santa Cruz METRO	Clifford, Alex	Santa Cruz Metropolitan Transit District (Santa Cruz METRO)		9/20/2018	B-2 C-5 E-8 H-1-2, H-3-2, H-4-2, H-5-2, H-8-3
370	MTC	Josefowitz, Nicholas	MTC Commissioner and BART Board member		9/20/2018	A
371	San Diego MTS	Jablonski, Paul	San Diego Metropolitan Transit System (San Diego MTS)		9/21/2018	B-2 C-10 E-1, E-2, E-3, E-4, E-8, E-15 H-8-6
372	SamTrans	Epstein, Jessica	San Mateo County Transit District (SanTrans)		9/21/2018	B-2, B-3 C-9 E-8, E-9, E-10
373	RTA-1	Ustation, Eric	Riverside Transit Agency (RTA)		9/21/2018	E-6, E-8 E-14 F-2 H-8-5
374	RTA-2	Ustation, Eric	Riverside Transit Agency (RTA)	This letter is identical to #373, RTA-1 and was submitted on the same date. Please refer to #373, RTA-1 for responses.	9/21/2018	E-6, E-8 E-14 F-2 H-8-5
375	MST-2	Sedoryk, Carl	Monterey Salinas Transit District (MST)	This letter is identical to #368, MST-1 and was submitted on the different date. Please refer to #368, MST-1 for responses.	9/21/2018	E-1, E-8, E-10 H-1-2, H-2-1, H-2-4 H-5-5
376	RTA-3	Ustation, Eric	Riverside Transit Agency (RTA)	This letter is identical to #373, RTA-1 and was submitted on same date. Please refer to #373, RTA-1 for responses.	9/21/2018	E-6, E-8 E-14 F-2 H-8-5
377	TAMC	Hale, Debbie			9/21/2018	B-2

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
			Transportation Agency for Monterey County (TAMC)			C-5
						E-3, E-9
						F-2, F-3
378	City of Pasadena	Gibson, Valerie	City of Pasadena		9/21/2018	C-5, C-8
						E-4, E-5, E-9, E-14
						H-2-5
						I-9
379	Nafziger	Nafziger, Nikki	Individual		9/21/2018	A
380	NVTA	Paniagua, Justin	Napa Valley Transportation Authority (NVTA)		9/21/2018	E-8, E-9
						H-2-2, H-4-1, H-7-2
381	Motiv	Nagrani, Urvi	Motiv Power Systems		9/21/2018	E-9
						H-4-3, H-5-2, H-5-5
382	County Connection	Ramacier, Rick	Central Contra Costa Transit Authority (County Connection)		9/21/2018	B-1, B-2
						C-4
						E-4, E-8
						H-1-2, H-4-1
383	Olivine	Soneji, Hitesh	Olivine Inc.		9/21/2018	H-2-6, H-2-7, H-8-7 H-8-8
384	Lish	Lish, Christopher	Individual		9/23/2018	***
385	ARBOC	Yoder, Kim	ARBOC Specialty Vehicles, LLC		9/24/2018	B-2
						E-8, E-9, E-10, E-13
						H-1-2, H-1-5, H-5-5
386	FCRTA	Del Campo, Janelle	Fresno County Rural Transit Agency (FCRTA)		9/24/2018	B-2
						E-8, E-14
387	AMPLY	Hurlbut, Brandon	Boundary Stone Partners; AMPLY Power, Inc.		9/24/2018	A
388	Form Letter-3	Garde, Carol	Individual		9/24/2018	A
389	WESTCAT-1	Thompson, Robert	Western Contra Costa Transit Authority (WESTCAT)	This letter is blank though submitted on different dates. Please refer to #397, WESTCAT-2 for responses.	9/24/2018	B-2
						E-8, E-9, E-10, E-13
						H-1-2, H-1-5, H-5-5
390	LACI	Kinman, Michelle	Los Angeles Cleantech Incubator (LACI)		9/24/2018	A
391	BYD	Wiraatmadja, Vincent	OBO BYD Motors		9/24/2018	E-8, E-9
392	Trillium	Cashmareck, Bill	Love's/Trillium		9/24/2018	B-3
393	OCTA	Johnson, Darrell E.	Orange County Transportation Authority (OCTA)		9/24/2018	B-2, B-3, B-5
						D-2
						E-1, E-8, E-9
						H-1-1, H-1-4, H-2-2, H-3-4, H-4-2, H-5-1, H-7-1, H-8-2
394	Taschereau	Taschereau, Eileen	Individual		9/24/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
395	Delman	Delman, Madeleine	Individual		9/24/2018	A
396	UCS-2	Heffling, Emily	Union of Concerned Scientists (UCS)		9/24/2018	B-5 D-1 H-3-2, H-4-3, H-5-2, H-5-5, H-11
397	WESTCAT-2	Thompson, Robert	Western Contra Costa Transit Authority (WESTCAT)		9/24/2018	B-2 E-8, E-9, E-10, E-13 H-1-2, H-1-5, H-5-5
398	Creditor	Creditor, Michael-Leonard	Individual		9/24/2018	A
399	CALACT	Montgomery, Jacklyn	California Association for Coordinated Transportation (CALACT)		9/24/2018	E-8, E-10, E-13 H-1-2, H-1-5, H-5-5, H-8-1
400	Lacey	Lacey, Pamela	Individual		9/24/2018	A
401	CalETC	Goldsmith, Hannah	California Electric Transportation Coalition (CalETC)		9/24/2018	E-8 H-4-2, H-5-1, H-5-2, H-5-5, H-7-1
402	GGBHTD	Babauta, Mona	Golden Gate Bridge, Highway and Transportation District (GGBHTD)		9/24/2018	B-2 E-8
403	VCTC	De Haan, Peter	Ventura County Transportation Commission (VCTC)		9/24/2018	E-14 H-4-2
404	TCTC-1	Chapman, Polly	Trinity County Transportation Commission	This letter is blank though submitted on same dates. Please refer to #416, TCTC-2 for responses.	9/24/2018	B-2 E-8, E-9, E-10, E-13 H-1-2, H-1-5 H-2-4, H-5-5
405	Flores	Flores, Regina	Individual		9/24/2018	A
406	MKeiko	M, Keiko	Individual		9/24/2018	A
407	Terrella	Terrella, Amy	Individual		9/24/2018	A
408	SCE	Renger, Laura	Southern California Edison (SCE)		9/24/2018	A
409	Sommer	Sommer, Audrey	Individual	This letter is blank	9/24/2018	NC**
410	Allison	Mann, Greg	Allison Transmission, Inc.		9/24/2018	B-3 E-1, E-9 F-1 H-1-6, H-9-1 I-7
411	Garbulinski	Garbulinski, Greg	Individual		9/24/2018	NC**
412	Ludwig	Ludwig, George	Individual		9/24/2018	A
413	Rusch	Rusch, Emily	Individual		9/24/2018	A

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
414	ACT Coalition Partners-2	Bhola, Abhilasha	Advanced Clean Transit (ACT) Coalition Partners ⁴		9/24/2018	D-1
415	CTA	Pimentel, Michael	California Transit Association (CTA)		9/24/2018	B-1, B-3, B-4
						E-8, E-14, E-16
						F-4
						H-1-1, H-1-2, H-2-1, H-2-3, H-3-2, H-4-2, H-5-5, H-6, H-7-1, H-7-3, H-7-4, H-8-3, H-8-5, H-11
416	TCTC-2	Chapman, Polly	Trinity County Transportation Commission (TCTC)		9/24/2018	B-2
						E-8, E-9, E-10, E-13
						H-1-2, H-1-5 H-2-4, H-5-5
417	Koivisto	Koivisto, Ellen	Individual		9/24/2018	A
418	MackKerel	MackKerel, Martin	Individual		9/24/2018	A
419	Haines	Haines, Shauna	Individual		9/24/2018	A
420	LA Metro	Montes, Jesus	Los Angeles County Metropolitan Transportation Authority (LA Metro)		9/24/2018	B-1, B-3
						C-5, C-9,
						E-9
421	SoCalGas	Maggay, Kevin	SoCalGas		9/24/2018	C-1
						B-3
						E-1, E-5, E-8, E-15
						F-2, F-3
						H-2-3, H-5-4, H-7-1, H-8-1
422	Clean Energy	Campbell, Todd	Clean Energy		9/24/2018	I-6, I-11
						B-2
						C-1
						E-1
						F-1, F-3, F-5
423	UCS-3	O'Dea, Jimmy	Union of Concerned Scientist (UCS)		9/24/2018	H-1-2, H-2-8, H-9-2
						H-4-3, H-5-2, H-5-5

* The docket number is assigned based on the date received.

** These comment letters are not considered a comment.

*** These comments are identical to Form Letter-1 and Form Letter-2 as described in section A: Comments in Support.

⁴ The Advanced Clean Transit Coalition Partners comprise the following 14 entities: Big John Cares, Blue Green Alliance, California Environmental Justice Alliance Coalition for Clean Air, EarthJustice, Jobs to Move America, Labor Network for Sustainability, Sierra Club California, IBEW Local 569, IBEW Local 11, Western States Council SMART, SMART Local 105, and United Steelworkers (USW) Local 675.

Table IV. 2: Oral Comments Given at the September 28, 2018, Board Hearing

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
1	B-O-Proterra	Leacock, Kent	Proterra, Inc.		9/28/2018	E-9
2	B-O-Motiv	Nagrani, Urvi	Motiv Power Systems		9/28/2018	A
3	B-O-CAPCOA	Abbs, Alan	California Air Pollution Control Officers Association (CAPCOA)		9/28/2018	E-12 H-9-4
4	B-O-New Flyer	Warren, David	New Flyer of America		9/28/2018	C-3, C-5, C-6, C-8, C-10
5	B-O-CHBC	Wagner, Emmanuel	California Hydrogen Business Council (CHBC)		9/28/2018	H-5-3, H-5-4
6	B-O-MTC	Tepke, Glen	Metropolitan Transportation Commission (MTC)		9/28/2018	E-8 H-7-4
7	B-O-HTA	Pratt, Greg	Humboldt Transit Authority (HTA)		9/28/2018	**
8	B-O-SCE	Renger, Laura	Southern California Edison		9/28/2018	A
9	B-O-CALSTART	Schuchard, Ryan	CALSTART		9/28/2018	E-9, E-10 H-8-6
10	B-O-IBEW-1	McEntagart, John	IBEW Local 551		9/28/2018	D-2 I-1
11	B-O-IBEW-2	Clark, David	IBEW Local 100		9/28/2018	A
12	B-O-IBEW-3	Kropke, Jennifer	IBEW		9/28/2018	A
13	B-O-IBEW-4	Cole, Derek	IBEW Local 302		9/28/2018	A
14	B-O-IBEW-5	Segura, Nick	IBEW Local 569		9/28/2018	D-2
15	B-O-LA Metro	Naylor, Robert	Los Angeles County Metropolitan Transportation Authority (LA Metro)		9/28/2018	B-2 C-5 E-3, E-4, E-9
16	B-O-SFMTA	Khatri, Bhavin	San Francisco Municipal Transportation Agency (SFMTA)		9/28/2018	H-7-4
17	B-O-Ballard	Sasseen, Tim	Ballard Power Systems Inc.		9/28/2018	H-5-3, H-5-4 I-2, I-6
18	B-O-CaFCP	Bouwkamp, Nico	California Fuel Cell Partnership (CaFCP)		9/28/2018	I-3
19	B-O-American Lung Association	Barrett, Will	American Lung Association		9/28/2018	A
20	B-O-Horton	Horton, Mark	MD, Individual		9/28/2018	A
21	B-O-UCS	O'Dea, Jimmy	Union Of Concerned Scientists (UCS)		9/28/2018	H-4-3
22	B-O-OCTA	Essner, Kristin	Orange County Transportation Authority (OCTA)		9/28/2018	B-2 E-9
23	B-O-CCA	Magavern, Bill	Coalition for Clean Air (CCA)		9/28/2018	H-5-2
24	B-O-ChargePoint	Harrison, Anthony	ChargePoint, Inc.		9/28/2018	A
25	B-O-Smart Union-1	Seda, Edgar	Smart Union		9/28/2018	A
26	B-O-SacRT	Loneragan, Mark	Sacramento Regional Transit District (SacRT)		9/28/2018	C-5 E-9 H-2-1

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
27	B-O-Smart Union-2	McCanley, Steven	Smart Union		9/28/2018	A
28	B-O-Earthjustice	Weber, Rikki	Earthjustice		9/28/2018	A
29	B-O-JMA	Bhola, Abhilasha	Jobs to Move America (JMA)		9/28/2018	D-1
30	B-O-CWA	Pacheco, Ernesto	Communications Workers of America (CWA)		9/28/2018	D-1
31	B-O-BlueGreen Alliance	Tengco, JB	BlueGreen Alliance		9/28/2018	D-1
32	B-O-SunLine	LeFlorc, Rudy	SunLine Transit Agency		9/28/2018	D-2 H-5-1, H-5-7
33	B-O-SoCalGas	Maggay, Kevin	SoCalGas		9/28/2018	E-14 F-3 H-5-4, H-9-2 I-8
34	B-O-Clean Energy-1	Campbell, Todd	Clean Energy		9/28/2018	B-2 F-1, F-3 H-9-2 I-4
35	B-O-Enviro CA	Jacobson, Dan	Environment California (Enviro CA)		9/28/2018	H-5-1, H-5-2
36	B-O-CALPIRG	Rusch, Emily	CALPIRG		9/28/2018	A
37	B-O-California NGV Coalition	Lawson, Thomas	California Natural Gas Vehicle Coalition (California NGV Coalition)		9/28/2018	H-5-2, H-9-3
38	B-O-San Diego MTS	Jablonski, Paul	San Diego Metropolitan Transit System (San Diego MTS)		9/28/2018	B-1 C-5 E-1, E-9, E-14
39	B-O-GGBHTD	Nunn, Keith	Golden Gate Bridge, Highway and Transportation District (GGBHTD)		9/28/2018	B-1 E-1, E-8 H-4-2
40	B-O-Santa Cruz METRO	Solis, Silvia	Santa Cruz Metropolitan Transit District (Santa Cruz METRO)		9/28/2018	B-2 C-5 E-7, E-14
41	B-O-CTA	Shaw, Joshua	California Transit Association		9/28/2018	B-1 E-1, E-8
42	B-O-Foothill Transit	Barnes, Doran	Foothill Transit		9/28/2018	B-2, B-3 E-9
43	B-O-AC Transit	Sepulveda, Estee	Alameda-Contra Costa Transit District (AC Transit)		9/28/2018	C-5, C-9 E-4, E-9
44	B-O-MST	Sedovyk, Carl	Monterey-Salinas Transit (MST)		9/28/2018	B-2 E-8, E-14
45	B-O-CALACT	Montgomery, Jackie	California Association for Coordinated Transportation (CALACT)		9/28/2018	E-8 H-1-2, H-4-1, H-5-5
46	B-O-Paratransit	Fink, Tiffani	Paratransit Inc.		9/28/2018	B-2
47	B-O-HTA	Wilson, Jim			9/28/2018	C-1, C-10

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
			Humboldt Transit Authority (HTA)			E-9, E-10, H-4-2
48	B-O-County Connection	Ramacier, Rick	County Connection/CALACT		9/28/2018	B-1 E-7 H-1-2, H-4-1
49	B-O-BYD	Wiraatmadja, Vincent	BYD Motors		9/28/2018	E-8
50	B-O-Jacques	Jacques, Karen	Individual		9/28/2018	A
51	B-O-CalETC	Tutt, Eileen	California Electric Transportation Coalition (CalETC)		9/28/2018	E-4
52	B-O-CTE	Levin, Jamie	Center for Transportation and the Environment (CTE)		9/28/2018	C-9 E-8
53	B-O-SDAP	McGhee, Lisa	San Diego Airport Parking Company (SDAP)		9/28/2018	B-2 C-1, C-5 E-2, E-4 H-4-1, H-5-6 I-5
54	B-O-Trillium	Zobel, Bill	Trillium		9/28/2018	B-3
55	B-O-SLORTA	Straw, Geoff	San Luis Obispo Regional Transit Authority (SLORTA)**		9/28/2018	**
56	B-O-Brightline Defense	Ahn, Eddie	Brightline Defense		9/28/2018	H-7-4
57	B-O-RNG Coalition	Kapoor, Nina	Coalition For Renewable Natural Gas (RNG Coalition)		9/28/2018	I-6
58	B-O-PG&E	Sawaya, David	Pacific Gas and Electric Company (PG&E)		9/28/2018	E-4
59	B-O-Sierra Club-1	De La Cruz, Carlo	Sierra Club, LA Bus Coalition		9/28/2018	A
60	B-O-Sierra Club-2	Pingle, Ray	Sierra Club California		9/28/2018	A
61	B-O-Sierra Club-3	Phillips, Kathryn	Sierra Club California		9/28/2018	E-8 H-5-5
62	B-O-Clean Energy-2	Kenny, Ryan	Clean Energy		9/28/2018	F-3 H-9-3

* The docket number is assigned based on the date received.

** The commenter was on the Board Hearing list but did not comment.

Table IV. 3: Written Comments Given at the September 28, 2018, Board Hearing

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
1	B-W-HTA	Pratt, Greg	Humboldt Transit Authority (HTA)		9/28/2018	B-2
						C-5
						E-2, E-8, E-9, E-10, E-13
						H-1-2
2	B-W-SCAQMD	Abbs, Alan	South Coast Air Quality Management District (SCAQMD)		9/28/2018	A
3	B-W-NCTD	Tucker, Matthew	North County Transit District (NCTD)		9/28/2018	B-2
						E-8
4	B-W-MTC	Tepke, Glen	Metropolitan Transportation Commission (MTC)		9/28/2018	B-2, B-3
						E-1, E-7, E-8, E-9, E-10
						H-2-3, H-3-1, H-4-1, H-5-1, , H-7-1, H-7-4, H-8-1, H-12
5	B-W-CHBC	Wagner, Emanuel	California Hydrogen Business Council (CHBC)		9/28/2018	H-5-3, H-5-4
6	B-W-New Flyer	Warren, David	New Flyer		9/28/2018	C-2, C-5, C-6, C-7,- C-10
						E-2
7	B-W-BlueGreen Alliance	Tengco, JB	BlueGreen Alliance		9/28/2018	D-1

* The docket number is assigned based on the date received.

A. COMMENTS IN SUPPORT

Multiple Comments:

This category contains all comments or comment letters showing only full support of the ICT regulation without additional concerns or recommendations. In addition to these comments in support, CARB also received comments or comment letters that support certain regulatory provisions (e.g. 2040 goal, schedule of purchase requirements, etc.) but with additional concerns or comments in other areas (e.g. funding certainties, range, etc.) Those comments are addressed in later sections along with similar comments.

As an example of a comment that expressed support but made a separate substantive comment, Proterra submitted a comment letter that can be found in Docket Number 354 in Table IV.1 that said:

We strongly support adoption and implementation of a robust ICT rule and applaud the actions of the California Air Resources Board to meet California's important air quality goals and the state's leadership to address climate change. We further support efforts to deploy zero-emission vehicles that are accessible to all Californians and that eliminate toxic emissions and associated exposures from diesel and conventional natural gas buses.

* * *

We strongly support continued funding of incentive programs as available through the life of the regulation. Programs such as HVIP are essential to assist the transition to 100% zero-emission.

* * *

We recognize that some transit agencies have a few very long duty cycles that current technology cannot service. In our experience, these bus routes remain an outlier to the vast majority of routes that can be serviced today by electric transit. We support the ability to defer zero-emission bus purchase requirements due to the inability to meet isolated mileage needs, but this should be limited strictly to vehicles serving those duty-cycles. We strongly recommend that exemptions or deferrals do not apply to an entire agency, if only a few duty cycles cannot be serviced by zero-emission technology.

The supportive comment will not be separately addressed because CARB's response to all supportive comments is appreciation. The substantive comments are in sections E-8 (Funding for Regulation Compliance) and H-8-2 (Exemptions Provisions- Daily Mileage Needs) and addressed there.

The following commenters plus additional 355 individuals support the objectives and goals of the Innovative Clean Transit Regulation to achieve air quality and climate mitigation targets. These commenters in general state that adopting the ICT Regulation

is a key component of California's policy portfolio of solutions enabling a transition to zero emission vehicles. In addition to the public health and global warming benefits, zero-emission buses can also help boost transit ridership, as they provide a better experience by operating more quietly, smoothly, and cleanly than conventional-fueled buses. Increasing transit ridership is critical to cities and counties implementing sustainable community development strategies. **(Del Mar-1, 35 California Mayors, MacKerel, Vogel, Bippert-Plymate, Lynch, Agzarian, Rosin, Coston, Majors, Rothberg, Hofland, Rubel, Davis, Larkin, Krupinski, Krick, Hansen, Clark, Lackides, Suesoff, Cerny, Yatman, Nason, Henderson, Sophr, Cheeseman, Sandberg, Forrest, Froome, Carraway, Monahan, Zamora, Barnes, Watts, Pham, Workinger, Pace, Franker, Bush, Hoelke, Britton, Blazek, Larson, Bear, Monahan, Walsh, Parsons, Mello, Stark, Newquist, Ostwald, Koster, Nirenstein, Horne, Rocha, Clark, MacRaith, Bullock, Berger, Lamm, Katzen, Quinn, Uschyk, Hazelwood, Schwager, Gaffin, Schilling, King, Schegloff, Burnham, Latshaw, Williams, Costello, Vargas, Gottejman, Steiner, Correa, Abramson, Stern, Jacques, Britton, Wilinsky, Craig, Walp, Brooks, Bungarz, Hardin, Mitchem, Nunamaker, Zimmermann, McLaughlin, Redman, LaNew, Roop, Rodgers, Illades, Mercer, Briner, Faulkner, Knapp, Livingston, Jones, Beckham, Jasper, Crumpton, La Frinere, Hall, Stanojevic, Masi, Wein, Goodson, Gilgun, WN, Freeman, Hurley, Perricelli, Licht, Gregg, Downing, Wagnon, Swanberg, Raphael, Toyohara, Battat, Hearle, Lebo, Law, Socher, Ogilvie, Ruth, Obershaw, Caruso, Karno, Hoaglund, Sobo, Sanfilippo, Kerkhoff, Robinson, Wase, Spielmann, Crane, Edinger, Lewis, Peterson, Penfield, Potter, Hall, Meisel, Krysl, Bacorn, Del Valle, Hirth, Harte, Peterson, Wicks, Adkins, Wagner, Lilly, Movsesyan, Foster, Thagard, Bezanson, Reader, Mohan, Price, KSaran, Hirshfield, De Baca, Hannah, Arbuckle, Freer, Adams, Piatigorski, Weininger, Mansell, Neft, Moskowitz, Fronce, Anderholm, Marshland, Mandrussow, Morris, Vignocchi, Koivisto, Hamilton, McClinton, Lewis, Byers, Wooldrindge, Phenix, Blackwell-Marchant, Riker, Doull, Isaacs, Sternnberg, earhart, Gachesa, Gonzales, Tomeo, Gurdin, Suhr, Queener, Kneuen, Bonelli, Benson, Nast, Hoyt, Sherk, Brandt, Poulton, Hayden, Mielke, Klepin, Pulliam, Hoang, Wolfe, Moore, Nunez, Bishop, Simonetti, Warden, Morgen, Grigg, Tasto, Lucas, Deutsch, Alter, Kurz, Demers, Russell, Clark, Goode, Adams, Hendricks, Stewart, Pinkerton, Roberts Baldwin, Parkinson, Eaton, Goldberg, Cooper, Sharpe, Gassman, Koenig, Wood, Forrest, Etgen, Dunn, Anke, Kamendrowsky, Weikel, Schleifer, Trautwein, Touchton, CTE, Fite, LeBaron, DLII, Nachazel, Rund, MTC, Nafziger, Motiv, Lish, AMPLY, Garde, LACI, Taschereau, Delman, Creditor, Lacey, Flores, MKeiko, Terrella, SCE, Ludwig, Rusch, Koivisto, MacKerel, Haines, B-W-SCAQMD, B-O-Motiv, B-O-SCE, B-O-IBEW-2, B-O-IBEW-3, B-O-IBEW-4, B-O-American Lung Association, B-O-Horton, B-O-ChargePoint, B-O-Smart Union-1, B-O-Smart Union-2, B-O-Earthjustice, B-O-CALPIRG, B-O-Jacques, B-O-Sierra Club 1, B-O-Sierra Club-2)**

In addition, letters of docket numbers 13, 126, 388 in Table IV.1 contain three form letters with a total of 342 individual signatures and include the following statements:

I support the Innovative Clean Transit Rule unveiled on August 7. I urge the board to support and adopt that rule before the end of this year. The rule will help deliver clean air across the state.

The rule will deliver cleaner air, advance technology, and support good jobs in the burgeoning California electric bus manufacturing sector. (**Form Letter-1** and **Form Letter-2**)

And;

Dear Air Resources Board Members,

The ARB has a huge opportunity to combat pollution, fight climate change, and help the economy—all at once. As a Californian who cares about the air I breathe and the opportunities available to my community, I am writing to urge you to use the Innovative Clean Transit rulemaking process to mandate all California transit agencies to transition to entirely zero-emission bus fleets by 2040.

As California finds itself amid a climate crisis, struggling with some of the dirtiest air in the nation, only zero emission technologies will allow us to reach our clean air and climate goals.

With zero tailpipe emissions, electric buses can clean up our air and prevent further harm to our climate. Beyond their environmental and health benefits, electric buses are good business for California.

California is already the electric bus manufacturing capital of the nation, bringing thousands of good jobs to our state. Assemblers, electricians and EV-service technicians are needed to manufacture and maintain buses for the one third of all California transit buses that agencies have already committed to electrify by 2040 or sooner.

As you decide the future of our state's public transit, I hope you choose a future of clean air and economic opportunity for all Californians. (**Form Letter-3**)

Agency Response:

Thank you for your support. The ICT regulation will create environmental benefits related to criteria pollutants, toxic air contaminants, and greenhouse gas (GHG) reductions by broadly implementing zero-emission technologies as a necessary component to effectively address these multiple and complicated air quality and climate protection issues all at once. CARB understands that transit agencies will continue to play an important role in helping California meet air quality standards and GHG emissions reduction goals by deploying the cleanest technologies.

B. BENCHMARK AND REGULATORY ASSESSMENT

This section addresses benchmark and regulatory assessment comments. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

B-1 Benchmarks Using Data Points In Staff Analysis

Comment:

Benchmarking and Regulatory Assessment (ISOR, pp. I-13-I-14): In our letter dated July 19, 2018, we recommended that, given the aggressive electrification goals sought in the proposed regulation and the continued uncertainty around, among other things, ZEB cost and performance, and funding availability, the regulation establish benchmarks for ZEB cost and performance and include a regulatory assessment to evaluate real-world cost and performance against these benchmarks. We argued that the regulatory assessment should take place before the ZEB purchase requirement goes into effect and should require the Board to issue an across-the-board suspension of the ZEB purchase requirement, much like the original Transit Fleet Rule did, if real-world ZEB cost and performance is underwhelming, or adequate funding to support the transition to a fully electrified transit fleet is unavailable.

The proposed regulation meets us halfway by incorporating aspects of our recommendations in the ISOR. More specifically, the ISOR states ARB staff's commitment to providing the Board with a "comprehensive update on costs, performance, and reliability of ZEBs and corresponding infrastructure...at least one year prior to the initiation of any purchase requirement. The review would look at bus categories, such as cutaway buses and standard buses individually, to ensure categorical needs and characteristics are considered.

The review would comprise the following components:

- **Costs:** Costs include infrastructure and vehicle capital, operating and maintenance costs. Infrastructure capital costs include charging/refueling equipment, installation, and utility upgrade costs.
- **Battery Performance:** Batteries used in the ZEBs will degrade over time. The assessment will help identify how battery degradation may affect daily operating range as vehicles age, and whether transit buses would require mid-life battery replacement. The assessment can help to estimate the remaining battery capacity after the end of their useful life in buses.
- **Operating Range:** The maximum operating range of a vehicle after it is fully charged or refueled. Range assessment will take into consideration various factors, such as energy storage capacity, battery degradation, HVAC, passenger loading, and grades. Understanding real world operating range is

essential for a transit agency to plan for its routes and schedule using ZEB technologies.

- Performance and Reliability: Different from small pilot or demonstration projects, a successful system-wide transition to the ZEB technologies must demonstrate the reliability and viability of the technologies. Measurements could include bus availability, road call frequency, and other performance metrics, such as fuel efficiency and factors affecting fuel efficiency, refueling or charging time and frequency, and parts availability.

We greatly appreciate the inclusion of this language in the ISOR as it is an honest assessment by ARB staff that ZEB technology is still maturing and must be closely monitored to ensure operational viability at-scale. Unfortunately, we believe relegating the language to the ISOR is inadequate, because it does not: carry the same force of law as language included in the regulation order; or, outline the steps the Board would take, or even the options they would consider, if they determined that the ZEB purchase requirement would negatively impact transit service.

We recommend that ARB strengthen the performance review identified in the ISOR by:

- Codifying its language in the proposed regulation; then,
- Adding language in the proposed regulation that would establish benchmarks for ZEB cost and performance and funding availability – these should be sourced from the inputs and assumptions used by ARB staff in the Original SRIA, Draft Environmental Analysis and Cost Update;
- Adding language in the proposed regulation that would require the Board to temporarily halt the ZEB purchase requirement, if real-world ZEB cost and performance and funding availability are misaligned with the benchmarks established in the proposed regulation.

If combined with a strong benchmarking and regulatory assessment provision that allow for an across-the-board suspension of the ZEB purchase mandate, as discussed above; a realistic waiver for early compliance; and, case-by-case, agency-by-agency, ARB Executive Officer approved, off-ramps from the ZEB purchase mandate, the ZEB purchase requirement schedule offered in the proposed regulation may be implementable. Together, these provisions would institute important safeguards that better ensure that agencies are not charged with purchasing ZEBs, if their cost and/or performance would jeopardize transit service. **(CTA)**

Comment:

To identify my first concern, I reiterate the CTA stated concern that the imposition of the zero-emission bus (ZEB) purchase requirement is not tied to benchmarks for ZEB cost and performance, infrastructure buildout costs, and funding availability. There are significant risks in assuming, that data gathered from limited, short-term ZEB deployments will accurately reflect the realities of ZEB

deployments at-scale. County Connection strongly believes that, despite the claims of some interest groups, ZEB cost and performance, infrastructure buildout, and the cost of electricity as fuel, are still issues. (**County Connection**)

Comment:

Due to the concerns noted above, we believe it is important for the rule to incorporate Benchmarking and Regulatory Assessments. This provision would require the California Air Resources Board to conduct a regulatory assessment - before a ZEB purchase requirement goes into effect - that evaluates real-world ZEB cost and performance with benchmarks for ZEB cost and performance established at the time of rule adoption. This regulatory assessment should allow the Board to issue an across-the-board suspension of the ZEB purchase requirement; much like the original Transit Fleet Rule did, if real-world ZEB cost and performance is not yet at parity with the cost and performance of conventionally-fueled transit buses. This provision would have no impact on the ZEB purchase requirement if benchmarks for ZEB cost and performance are being met, as anticipated by ARB staff and interest groups. (**LA Metro**)

Comment:

We also want to reiterate our support for the California Transit Association's recommendation and the Association's alternative, namely including a benchmarking and regulatory assessment in the actual regulation.

We believe that in order to implement a responsible transition to zero-emission vehicles without imposing negative impacts on service levels and ridership, a regulatory assessment for evaluating real-world performance and costs with benchmarks established at the time the rule is adopted is important, and allowing transit agencies to use incentive funding for regulatory compliance because existing sources are often over subscribed [sic]. (**B-O-GGBHTD**)

Comment:

If the staff believes that those assumptions are correct, then the regulation should guarantee that to us, either with benchmarks for performance that would give us relief if they're not met, or provide for the funding that's so necessary in order to do it. (**B-O-San Diego MTS**)

Comment:

First, we are advocating for modest changes to the proposed regulation that would guarantee that we move forward with mandated ZEB purchases at certain milestones only insofar as the cost and performance of the technology allows. That's our benchmarking and regulatory assessment proposal you've heard about.

Under our changes, if the cost and performance of ZEB technology hits predetermined benchmarks -- as measured during a regulatory assessment period, before an upcoming purchase mandate is scheduled to go into effect, if we hit those marks, then the mandate proceeds unimpeded. However, if the benchmarks are not achieved in an assessment year, you would temporarily suspend, or maybe adjust, or amend the regulation to better reflect the then extent real-world cost and performance and their impact on our transit service and the folks who ride our service.

There currently is no technology performance or cost review in the regulation. Staff told you they're going to do a review we appreciate that. That's a move towards us. We think put it in the regulation. We hope you'd agree there's no downside to doing that. **(B-O-CTA)**

Comment:

CalAct is [sic] support of the ICT with just a couple of things we'd like to see improvement on, and those are consistent with our agencies' wishes, and that is the benchmarks. We support the CTA's approach on benchmarks for the reasons you've heard. **(B-O-County Connection)**

Agency Response:

The ICT regulation addresses cost and performance issues through exemptions on a case-by-case basis. CTA's benchmark-based approach would utilize the variables assessed in the ISOR and SRIA and does not include metrics like bus performance, gradeability, and bus type availability. Such a benchmark-based alternative, as compared to a case-by-case exemption evaluation, may not help transit agencies truly in need. It could exempt transit agencies that need no exemption and therefore does not have nearly the same level of certainty as the ICT regulation to reduce air quality and GHG emissions. Transit fleets are diverse and their circumstances vary; these circumstances are better considered individually, while maintaining environmentally protective regulations to the extent appropriate across the State. A benchmark may be more likely to result in the suspension of the ZEB purchase requirement and the associated air quality benefits from all transit agencies when that benchmark measure is only a challenge for a few transit fleets. Exemptions lend themselves to application based on the circumstances of a transit agency in purchasing new buses and flexibly tailored to yield the results needed.

A benchmark provision is not as effective, less burdensome to affected private persons, or more cost-effective to affected private persons and equally effective, than the adopted regulations due to these reasons:

1. The ICT regulation contains exemptions that can provide maximum safeguards to transit agencies to help address potential unintentional individual

consequences and ensure transit service are not adversely affected during implementation of the rule;

2. In addition, the benchmark approach does not maintain the benefits of the rule while allowing relief for particular challenges encountered by individual transit agencies. The ICT regulation allows transit agencies to utilize exemption options to address particular issues such as a delay in infrastructure, range, gradeability, gross vehicle weight rating (GVWR), and financial hardship. The ICT regulation protects an individual fleet's operation integrity and better protects environmental benefits without giving a blanket deferral when a specific issue does not apply to all agencies;
3. The comprehensive review committed to in Resolution 18-60 will provide the information requested by the comments without the negative aspects of a regulatory provision that would suspend the benefits of the regulation. The review will, at a minimum, address these issues: (1) costs, California incentive funding programs, performance, reliability of zero-emission buses; (2) associated infrastructure to operate and maintain zero-emission buses; (3) the extent of the creation of jobs and training programs for employment in manufacturing, maintaining, and operating zero-emission bus technologies; (4) the deployment status of zero-emission buses and related technologies; and (5) the availability and barriers to deployment of zero-emission buses of different types.

This review should help the State improve policies to advance heavy-duty zero-emission technologies, and inform funding strategies related to zero-emission vehicles, buses, and infrastructure, while ensuring transit service or fares are not adversely impacted by the transition.

4. CARB will report to the Board annually on the implementation status of the Innovative Clean Transit regulation. This report will address development and deployment of zero-emission bus technologies, status of California incentive funding program, CARB's collaboration with transit agencies, manufacturers, infrastructure providers, and other state agencies to promote zero-emission bus technologies, and any potential changes to the regulatory requirements that may be warranted.
5. The ICT regulation, as approved, also better ensures the ZEB deployment meets the project objectives identified in the Environmental Analysis⁵ including reducing criteria pollutant emissions and GHGs to the maximum extent possible to meet federal and State standards; incentivizing and spurring ZEV technology to help meet the statewide SIP strategies and protecting and preserving the public health

⁵ California Air Resources Board (2018). Final Environmental Analysis for the Proposed Innovative Clean Transit Regulation, December 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/ictfinalea.pdf?_ga=2.169212134.693820738.1550089616-373350717.1537814934.

via reducing harmful air pollution. This is because a benchmarking alternative could inappropriately and inflexibly delay environmentally protective regulations.

For all the reasons discussed above, the ICT regulation does not contain the benchmark provision.

B-2 Other Benchmark Related Comments

Multiple Comments:

The following 10 comments similarly proposed a regulatory assessment to evaluate real-world ZEB cost and performance using benchmarks established at the time of the rule adoption.

Benchmarking and Regulatory Assessment: This provision would require the California Air Resources Board to conduct a regulatory assessment - before a ZEB purchase requirement goes into effect - that evaluates real-world ZEB cost and performance with benchmarks for ZEB cost and performance established at the time of rule adoption. This regulatory assessment should allow the Board to issue an across-the-board suspension of the ZEB purchase requirement, much like the original Transit Fleet Rule did, if real-world ZEB cost and performance is not yet at parity with the cost and performance of conventionally-fueled transit buses. This provision would have no impact on the ZEB purchase requirement, if benchmarks for ZEB cost and performance are being met, as anticipated by ARB staff and interest groups. **(ARBOC, FCRTA, GGBHTD, County Connection, TCTC-2, Santa Cruz METRO, WESTCAT-2, B-W-HTA, B-W-NCTD, and TAMC [in substantial part with inconsequential omissions]).**

Multiple Comments:

The following 5 commenters similarly suggested the purchase requirement be tied to benchmarks for ZEB cost and performance.

While the progress made on the proposed regulation is substantial, we remain concerned that the imposition of the zero-emission bus (ZEB) purchase requirement is not tied to benchmarks for ZEB cost and performance, infrastructure buildout costs, and funding availability. Moreover, we see significant risks in assuming, as ARB staff has, that data gathered from limited, short-term ZEB deployments will accurately reflect the realities of ZEB deployments at-scale. We assert that, despite the claims of some interest groups, ZEB cost and performance, infrastructure buildout, and the cost of electricity as fuel, are still issues. **(ARBOC, TCTC-2, Santa Cruz METRO, WESTCAT-2, B-W-HTA)**

Multiple Comments:

The following 3 commenters similarly suggested the purchase requirement be tied to benchmarks for ZEB cost and performance.

While the progress made on the proposed regulation is substantial, we remain concerned that the imposition of the zero-emission bus (ZEB) purchase requirement is not tied to benchmarks for ZEB cost and performance, infrastructure buildout costs, and funding availability. Moreover, we see significant risks in assuming, as ARB staff has, that data gathered from limited, short-term ZEB deployments will accurately reflect the realities of ZEB deployments at-scale. We assert that, despite the claims of some interest groups, ZEB cost and performance, infrastructure buildout, and the cost of electricity as fuel, are still issues that must be worked through. **(FCRTA, GGBHTD, B-W-HTA,)**

Comment:

ARB's assessments of zero emission bus (ZEB) technology and costs remain overly optimistic. While it is evident that ZEB technology has evolved since the first adoption of ARB's first transit bus rule, today's ZEB technology still cannot meet the operational and performance needs of most transit agencies, large or small, and there is still much room for improvement before we should consider them fully commercial. In fact, most of the focus on the number of agencies adopting ZEBs into their fleets or the number of ZEBs purchased is more reflective of transit agencies willing to test out the technology based on the very generous incentives that have been provided by the State of California. Such statistics that are being showcased throughout the staff report should not be construed as either complete acceptance of the technology, a testament that the technology works for each agency, or that such purchases are anything more than a demonstration project. ARB's governing board should not overly misconstrue the true meaning of a transit's willingness to test out ZEB strategies.

The ICT's overly aggressive electrification goals combined with overly optimistic technology advancement and cost projections demand that the ARB Governing Board include a regulatory assessment that evaluates real-world ZEB costs and performance with benchmarks for ZEB cost and performance established at the time of rule adoption. Further, this regulatory assessment should occur before the ZEB purchase requirement goes into effect and should allow the Board to issue an across-the-board suspension of the ZEB purchase requirement, much like the original Transit Fleet Rule did, if real-world EB costs and performance is not yet at parity with the cost and performance of conventionally-fueled transit buses. Further, this safeguard should be in addition to the case-by-case, agency-by-agency, ARB Executive Officer-approved off-ramps from the ZEB purchase requirement discussed under the ICT's "Deferral for ZEB Purchase Requirement. **(Clean Energy)**

Comment:

First, we support including language in the proposed regulation itself, which requires ARB to establish benchmarks for ZEB cost and performance and to institute a technology assessment, based on real world data, that guarantees that transit agencies are only charged with accelerating their adoption of these technologies, if they meet the benchmarks set by the state. Currently, the staff report that accompanies the proposed regulation commits ARB to collecting real world data on ZEB cost and performance, but it does not reveal how this data will be evaluated or what steps ARB would take if this data contradicts the dominant narrative that ZEB cost and performance will reach parity with conventional technologies. **(Samtrans)**

Comment:

Omission of benchmark provisions from the proposed rule. Benchmarking would allow for analysis and a reset if the aggressive, speculative assumptions on cost factors do not materialize over the next few years. **(San Diego MTS)**

Comment:

Regulatory timeline for implementation does provide for an assessment of economic or technological benchmarks to ensure that the technology is meeting its stated goals prior to enforcement of purchase requirements. **(OCTA)**

Comment:

Biggest risks to our transit service lies in projecting the cost and technological capabilities of zero emission buses (ZEB) 5, 10, or 20 years out. Consistent with the Transit Fleet Rule, we ask that the rule be amended to include cost and performance benchmarks that would be reviewed prior to the commencement of the purchase mandate, and periodically thereafter and that such benchmarks be used to determine how the regulation proceeds. In particular, establishing these benchmarks must be based on an independent review of the vehicle technology and the fueling/charging demands for large scale deployments. **(AC Transit)**

Comment:

To address these concerns, MTC recommends that CARB work collaboratively with the transit operators and other stakeholders to:

- Conduct periodic assessments of whether ZEB technology and the market are meeting the benchmarks, and of barriers to electrification, including funding.
- If the benchmarks have not been met or funding or other barriers are inhibiting ZEB implementation plans, CARB should consider revisions to ZEB purchase requirements or other strategies to overcome barriers to implementation.

- However, if the benchmarks have been met or funding barriers have been resolved, CARB may enforce the purchase requirements established by the regulation, as reflected in transit operators' individual or group ZEB roll-out plans.

We believe this approach strikes the right balance between providing assurance to the transit operators and their funding partners, including MTC, that the transition to zero emission fleets will not impair the ability to provide transit service and fund other transit priorities on the one hand, and providing assurance to CARB and other stakeholders that transit operators will be held accountable in implementing their transition plans on the other. **(B-W-MTC)**

Comment:

While the proposed regulation is much improved, I ask for your consideration of Santa Cruz Metro's concerns relative to excluded buses, the availability of HVIP dollars, and the need for the final regulation to include a mandatory provision that the Board create a point in time in which electric bus data is collected, reviewed, and benchmarked, and which evaluate zero-emission buses against conventional buses relative to cost and performance measures, including the industry's progression towards increasing bus end-of-life range. **(B-O-Santa Cruz METRO)**

Comment:

I just want to also hammer home that our largest priorities for this regulation is that we strongly want the regulation to succeed by providing establishing cost and performance benchmarks, a rigorous performance review, and funding for regulatory compliance. We support the overall goal of 2040. **(B-O-MST)**

Comment:

Two comments in the staff presentation stood out for us as on point. On page eight it said, "Continued technology advancement and cost reductions are needed". And on page nine, the staff said, "Ensure requirements are technologically and financially feasible". To provide that kind of flexibility, we urge you to ensure that the final rule provides for benchmarking and regulatory assessments as the rule is implemented. **(B-O-LA Metro)**

Comment:

We would like to see more clear benchmarks before any purchase requirement is enforced. This is particularly of concern for OCTA, because we have a very significant procurement happening before 2023 where we would have to replace about half of our fleet, which is 299 buses.

If those buses cannot act as we need them in operations and daily services that jeopardizes our transit services, and potentially our federal funding in the future. **(B-O-OCTA)**

Comment:

There is no formal regulatory assessment of ZEB technology with established benchmarks within the rule well in advance of 2023 that would allow for a global off-ramp for transit agencies if ZEB technologies or costs of transportation electrification does not match ARB staff's best forecast. **(B-O-Clean Energy-1)**

Comment:

I would reinforce the notion that looking at benchmarks is going to be very important. And from our perspective, as one of the early adopters and early pioneers, we've seen delays. We've learned things that we didn't even know that we would learn. And we're dealing with that even today.

We took delivery of 14 buses late last year. Those buses are still largely not in operation because of delays in the infrastructure that's required to charge those buses. Now, one could say that's a failure. I look at it as a learning opportunity, but one that has cost us much more time than what we expected. And I think as we continue to scale this technology, there are going to be other points where there may be more time, it may take more resources to be able to deliver. So benchmarks and making sure that the performance is there to serve our customers is going to be critical. **(B-O-Foothill Transit)**

Comment:

We appreciate the off-ramp that's, there but we again stress the need for benchmarking.

As we know, there's not a viable Altoona-tested vehicle in this classification. And unlike fixed route transit, ADA paratransit which is a requirement to complement every route in the State of California, we cannot deny service. So whether we want to go or not or there's a vehicle that's there, we're required to meet that demand for every hour of operation.

And our passengers are not only low-income, they're often going to places such as dialysis. They're going to critically important needs, which we want to get them there. So we look forward to continuing to work with you to ensure that we can meet that.

But as we meet those challenges, if those benchmarks aren't met, that we're able to enter into a discussion on how to make sure that our fleet meets the needs. It's especially important in the more rural areas, places such as Lake County and the

fires, cutaways overwhelmingly are used in emergency response to move people who cannot evacuate on their own, and we want to make sure this is taken into consideration. **(B-O-Paratransit)**

Comment:

The efficiency related to the vehicle and the weight of the batteries is a factor that we certainly have the ability to control, if we have benchmarks and performance standards that you can comprehend as it relates to these different gross vehicle weight vehicles as well as being loaded. **(B-O-SDAP)**

Comment:

While the availability of incentive funding is critical for smoothing the introduction of ZEBs and limiting financial risk to transit agencies, we'd argue that the greater risk to our transit service would be in projecting the cost and technological capabilities of ZEBs five, ten, or twenty years out. To limit these risks, we've asked ARB staff to establish within the regulation itself cost and performance benchmarks that would be reviewed periodically, likely before the imposition of a purchase requirement, and used to determine how the regulation proceeds. This is consistent with the approach taken in the original Transit Fleet Rule.

Under this scheme, ARB would review the real-world cost and performance of zero-emission buses and their supporting infrastructure at some future date and, if they do not align with ARB staff's projections –which are built into the cost model and used to estimate the proposed regulation's economic and environmental impact – then the regulation would put on a temporary hold.

Currently, ARB staff has included language within the staff report that commits to reviewing the real-world cost and performance of ZEBs one year prior to the imposition of a purchase requirement, but there is no indication of how the data gathered would be used. We are thankful for this inclusion, but it doesn't go far enough to ensure that transit agencies will not be saddled with untenable costs or inadequate performance. We encourage you to work with ARB staff to have our preferred provisions added to the regulation itself. **(MST-1)**

Agency Response:

The commenters suggested using real-world ZEB data points as benchmarks for performance and to make the regulatory requirements contingent on meeting the benchmarks. CARB declined to make the benchmarks an explicit contingency because:

1. The comprehensive review the Board required in Resolution 18-60 will address these issues related to benchmarks:
 - a. costs,
 - b. California incentive funding programs,
 - c. performance,

- d. reliability of zero-emission buses,
- e. associated infrastructure to operate and maintain zero-emission buses,
- f. creation of jobs and training programs for employment in manufacturing,
- g. maintaining and operating zero-emission bus technologies,
- h. the deployment status of zero-emission buses and related technologies, and
- i. the availability and barriers to deployment of zero-emission buses of different types.

This review will provide the Board information on the factors that would constitute benchmarks requested by the comments. The review will inform and improve policies to advance heavy-duty zero-emission technologies, and inform funding strategies related to zero-emission vehicles, buses, and infrastructure, while ensuring transit service or fares are not adversely impacted by the transition.

2. CARB will report annually to the Board on ICT regulation implementation. This report will address development and deployment of zero-emission bus technologies, status of California incentive funding program, CARB's collaboration with transit agencies, manufacturers, infrastructure providers, and other state agencies to promote zero-emission bus technologies, and any potential changes to the regulatory requirements that may be warranted. CARB also would adjust the requirements based on the outcome of this review to ensure there are no adverse impacts to transit service. This will also provide the Board information on the factors that would constitute requested benchmarks, and an opportunity for the Board to consider whether to pursue regulatory changes if necessary.
3. The ICT regulation provides exemptions to ensure transit service at any transit agency is not adversely affected by the regulatory requirements.
4. The ICT regulation better ensures environmental benefits than a blanket deferral when a specific benchmark is not met in an instance that does not apply statewide. The ICT regulation will ensure the ZEB deployment meets the project objectives identified in the Environmental Analysis,⁹ including reducing criteria pollutant emissions and GHGs to the maximum extent possible to meet federal and State standards, incentivizing and spurring ZEV technology to help meet the State Implementation Plan, and protecting and preserving the public health by reducing harmful air pollution.

⁹ California Air Resources Board (2018). Final Environmental Analysis for the Proposed Innovative Clean Transit Regulation, December 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/ictfinalea.pdf?_ga=2.169212134.693820738.1550089616-373350717.1537814934.

B-3 Comprehensive Review

Comment:

We assert that transformation of our state's public transit network will not come about from all transit agencies fumbling through new requirements and new technologies at once, but rather through targeted investments and successful ZEB demonstrations led by key agencies, which allow best practices to be developed and shared throughout the industry. **(CTA)**

Comment:

Allison, however, would request that CARB carefully consider whether its proposed regulatory order is sufficiently supported by its accompanying technical and economic analysis, provides sufficient near-term and longer-term cost-effective options for local agencies and maintains adequate flexibility in implementation. **(Allison)**

Comment:

In communicating these risks and our approach to managing them, we align ourselves with the comments submitted to you by the California Transit Association at various points in this regulatory proceeding. The Association has voiced concerns about the cost and performance of ZEBs, the uncertainty surrounding funding availability, and the challenges of infrastructure buildout. We, therefore, support several of their long-standing recommendations, which are not yet reflected in the proposed regulation. **(SamTrans)**

Comment:

The last point I'd leave you with is that as you look at all of this information, I really, really encourage you to look at the actual data that's coming out of the operators in a real-world environment. I'm often surprised about the information that isn't quite correct that we often hear. **(B-O-Foothill Transit)**

Comment:

We believe the Proposed Regulation (Regulation) takes the earlier proposals in the right direction, allowing for the potential to lower the costs of implementation, and provide additional stakeholder flexibility. There are a number of compliance options spelled out in the rule, along with a few alternative compliance options on a case-by-case basis. What the regulation itself is missing is an opportunity for the CARB Board to review and re-evaluate important underlying cost and technology assumptions along the Rule's implementation. Trillium requests that these assumptions be revisited such that a course correction can be made, if desired or necessary.

The Initial Statement of Reason (ISOR) commits to conducting a “Performance Review” at least one year prior to the start of the purchase mandate, specifically to:

Identify the status of ZEB technology and would help the State design policies to further advance zero-emission technologies, and inform funding strategies related to zero-emission vehicles and infrastructure.

Commitment includes a review of Costs, Battery Performance, Operating Range, and Performance and Reliability. Trillium is supportive of such review, but believe that the ICT regulation itself should require such a review. As currently drafted the regulation does not. This commitment is only provided in the staff report, and there is no requirement to revisit the standards in the ICT based on this new information. Such a review could show that additional opportunities exist, or likewise identify areas that need adjustment. The ISOR quote above specifically states that the review is to help set the policies moving forward. Such policy setting cannot occur if the Performance Review is only presented as an informational item.

The Performance Review is really a reality check on staff’s 2018 assumptions in the future. History has shown that two scenarios are likely moving forward—1) California innovation provides lower cost, better performing Zero Emission Busses, or 2) Initial aggressive assumptions need to be revisited and adjusted based on unforeseen market conditions, such as tariffs. **(Trillium)**

Comment:

Due to the concerns noted above, we believe it is important for the rule to incorporate Benchmarking and Regulatory Assessments. This provision would require the California Air Resources Board to conduct a regulatory assessment - before a ZEB purchase requirement goes into effect - that evaluates real-world ZEB cost and performance with benchmarks for ZEB cost and performance established at the time of rule adoption. This regulatory assessment should allow the Board to issue an across-the-board suspension of the ZEB purchase requirement; much like the original Transit Fleet Rule did, if real-world ZEB cost and performance is not yet at parity with the cost and performance of conventionally-fueled transit buses. This provision would have no impact on the ZEB purchase requirement if benchmarks for ZEB cost and performance are being met, as anticipated by ARB staff and interest groups. **(LA Metro)**

Comment:

I'll get right to our ask. It's much like those -- that ask of the transit industry. We support their ask, which is we believe this regulation should require a review by

this Board periodically to evaluate the technology and the cost to see where we're at. The fact is we don't know what we don't know. **(B-O-Trillium)**

Comment:

But again, we believe a periodic performance review based on experience should be required in the context of the rule. **(B-O-Trillium)**

Comment:

However, there are continued concerns about the Proposed ICT's focus on mandatory purchase requirements, insufficient identification of funding to meet the requirements, lack of regulatory language requiring a regular assessment of technology and cost benchmarks to ensure the new buses are meeting their stated goals, and an emphasis on uniform standards statewide, rather than flexibility to consider an agency's specific technology and cost dynamics. **(OCTA)**

Comment:

Many of the continued concerns can be addressed through further refinements to the proposed regulatory language, and more expansive analysis that reflects the fiscal impacts and identification of funding sources to meet expected cost increases. Attached to this letter are details on specific issues that OCTA encourages the ARB to address if the Proposed ICT is to move forward for eventual adoption. Furthermore, OCTA is also supportive of the comments submitted by the California Transit Association. Without addressing these issues, as currently drafted, the Proposed ICT could jeopardize not only existing transit service levels, but present challenges in meeting fleet operating needs. These implications directly contradict the ARB's goals in pursuing the ICT, namely improving transit service and reducing emissions. **(OCTA)**

Comment:

To address these concerns, MTC recommends that CARB work collaboratively with the transit operators and other stakeholders to:

- Conduct an independent third-party analysis of costs (operational and capital) and work collaboratively with transit agencies to establish benchmarks for ZEB cost, performance and weight. **(B-W-MTC)**

Comment:

For all these reasons, I request the Board and esteemed staff take into consideration both the nuances of the proposed regulation and of a spurious technology - both the mandated technology and the regulation in its current form are incredibly harmful to public transit, HOV infrastructure, and the head way California has just started to make on coordinating transit and mobility services in the state. **(Borchman)**

Comment:

Regulation start date and schedule: The regulation start date and schedule is far too aggressive for technologies that are not yet proven. While there have been purchases and deliveries of zero emission transit buses, there have yet to be any documented successes for large scale fleet conversions that would warrant such an aggressive schedule. Given your proposed timetable that requires a zero-emission bus (ZEB) rollout plan in 2020 for large transit agencies and 2023 for small transit agencies, large transit agencies would essentially have one year to decide on what type of ZEB pathway to take based on data that shows sub-par performance, uncertain capital costs (buses and infrastructure), and unstable electrical costs. It would not be prudent to force a technology on transit agencies without better results in the field and while competing ZEB technologies are being developed. In addition, the infrastructure issues attendant to Battery-Electric buses (e.g. charging equipment) have also proven to be less-than-ready. The ICT regulation should take this uncertainty into account and allow transit agencies more timeline flexibility. **(SoCalGas)**

Comment:

Technology feasibility studies are needed: In order to help mitigate the issues mentioned above, CARB should collect more data from those agencies that ARE piloting ZEB technology. Technology feasibility studies should be conducted that realistically assess and document the performance capabilities of ZEBs. Then, based on the ongoing findings and undoubtedly improving performance, transit agencies could calibrate their purchase and integration of ZEB technology in a manner that is best for them. Feasibility studies that prove that the technology is viable should be required prior to enacting any requirements of the regulation. **(SoCalGas)**

Comment:

Flexibility for transit agencies: As the technology is still being developed, transit agencies need flexibility in achieving emission reductions, particularly in the early years. The proposed regulation should be performance based to provide maximum flexibility to transit agencies. If CARB proceeds with a technology mandate, it should not be so aggressive until the technology is developed, particularly when Low NOx engines operating on RNG is available. **(SoCalGas)**

Agency Response:

CARB recognizes the significant concerns about the cost and performance of ZEBs, the uncertainty surrounding funding availability, and the challenges of infrastructure buildout.

Therefore, the ICT regulation contains safeguards to ensure service is not adversely affected:

1. Includes these flexibilities to allow transit fleets to implement zero emission technologies so it is consistent with their operation, provides opportunities for transit fleets to utilize incentives, and encourages innovative mobility options:
 - a. Joint Zero-Emission Option
 - b. Zero-Emission Mobility
 - c. Bonus Credits to recognize early adopters
2. The ICT regulation contains exemptions that can provide maximum safeguards to transit agencies to help address potential unintentional individual consequences and ensure transit service is not adversely affected at any transit agency.
3. Enables transit agencies to maximize access to funding by encouraging early purchases of zero-emission buses by providing credits.

In addition, Resolution 18-60 further expresses the Board's intent that the regulation should not cause adverse impacts on service. To ensure this intent is met, CARB is committed to:

1. Provide an annual update to the Board on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted.
2. Conduct a comprehensive review of program readiness, considering issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to initiating any purchase requirement. This provides the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in unintended consequences including the potential for adverse impacts on transit service.

B-4 Need for External Peer Review

Comment:

The proposed regulation contains numerous "scientific portions" that must be subjected to external peer review pursuant to § 50074 because they "are premised upon, or derived from, empirical data or other scientific findings, conclusions, or assumptions establishing a regulatory level, standard, or other requirement for the protection of public health or the environment." (Id., subd. (a)(2).) These "scientific portions" include, but are not limited to:

- Determination of the feasibility of implementing the ZEB purchase requirement
- Determination of the percentage of total new bus purchases that must be ZEBs
- Determination of the minimum number of ZEBs that transit agencies must collectively purchase to trigger waiver of the purchase requirements for 2023 and 2024
- Determination that all new bus purchases need to be ZEBs by 2029

- Determination of the number of zero-emission passenger miles per year deemed equivalent to having one ZEB in the agency's fleet
- Determination of the number of bonus credits for each fuel cell electric bus (FCEB) or battery electric bus (BEB) placed in service
- Determination of the dates for application of the bonus credits
- Determination of the date for requiring the purchase of low-NOx engines
- Determination of the date for requiring the use of renewable fuels for diesel and CNG buses
- Determination that sufficient funding will be available to offset initial capital costs such that transit agencies will not be forced to increase fares or decrease service

As such, CARB must submit these portions of the rule, "along with a statement of the scientific findings, conclusions, and assumptions on which [they] are based and the supporting scientific data, studies, and other appropriate materials, to the external scientific peer review entity for its evaluation." (Id. at subd. (d)(2).).
(CTA)

Agency Response:

Peer review is not required for the ICT Regulation. The ICT regulation requires transit agencies to purchase zero-emission buses and report data. Requirements to purchase zero-emission buses, calculate and report zero-emission miles traveled, track the number of buses in transit fleets, and other requirements of the ICT regulation do 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. It is thus not subject to peer review under Section 57004 of the Health and Safety Code.

The scientific studies and assessments used to analyze the potential environmental impacts of these regulations, such as the findings that diesel particulate is a toxic air contaminant and that greenhouse gases contribute to climate change, were developed previously and have been peer reviewed.

B-5 Technology Assessment Timeline

Comment:

ICT proposal should ensure that technology and economic assessments are done before any requirement is enforced, including prior to 2023. In addition, if at any time a requirement is found to be technologically or economically infeasible, a grace period should be applied to all transit agencies, including agencies with a procurement in process. **(OCTA)**

Comment:

We expect staff will provide updates to the Board on the status of this standard as they do with other measures implemented by the Board, however, attempts to establish regulatory performance benchmarks ignore the three years' worth of work and technical evaluation that has already gone into this standard. Such a measure would ignore the rapid technology development we've seen to date, and would delay roll-out of zero-emission buses when they are already well-suited for use in many cases. With only voluntary commitments from transit agencies, the statewide transition to zero-emission buses would be unlikely and transit agencies could miss out on significant near-term incentive funding. **(UCS-2)**

Agency Response:

The ICT regulation sets clear compliance requirements and is not voluntary. CARB also recognizes the significance that the comprehensive review will provide in helping to understand the status and monitor the development of ZEB technology. As committed to in Resolution 18-60, CARB will conduct a comprehensive review of program readiness, considering issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to initiating any purchase requirement. This provides the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts to transit service.

Besides the comprehensive review, CARB will also provide an annual update to the Board on the status of ZEB technologies, before and after the comprehensive review, and will use the latest information from the annual updates to recommend changes to the regulatory requirements that may be warranted to meet the Board's intent that the regulation should not cause adverse impacts on transit service. The ICT regulation also includes these considerations to ensure a smooth transition:

1. Later phase schedule for smaller transit agencies Rollout Plan;
2. Later starting compliance year for smaller transit agencies purchase schedule;
3. Later starting compliance year for types of buses in the pre-commercialization stage, including cutaways.

These considerations allow transit fleets to implement zero-emission technologies so it is consistent with their operation and provides opportunities for transit fleets to utilize incentives.

C. TECHNOLOGY

This section addresses all technology related comments. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

C-1 Technology Readiness

Comment:

I'm highly supportive of ZEB technology. But like you've echoed from other fleet operators, there are concerns related to the readiness level. For example, the commercial scalability of sales produced in California via the HVIP mapping tools as of 8/1/2018 for the bus sector. **(B-O-SDAP)**

Comment:

Unfortunately, there remain critical elements that need to be addressed in order to implement a rule that recognizes the state of technology readiness and the financial balance between maintaining service levels while transitioning to a zero emission fleet. **(AC Transit)**

Comment:

AC Transit's leadership in the development of zero emission bus technology underscores its commitment to transitioning to 100% zero emission buses. However, AC Transit continues to have concerns regarding the uncertainty with the scalability, the uncertainty with the technology, and, the uncertainty with the financial ability to implement this rule. **(AC Transit)**

Comment:

ARB's assessments of zero emission bus (ZEB) technology and costs remain overly optimistic. While it is evident that ZEB technology has evolved since the first adoption of ARB's first transit bus rule, today's ZEB technology still cannot meet the operational and performance needs of most transit agencies, large or small, and there is still much room for improvement before we should consider them fully commercial. In fact, most of the focus on the number of agencies adopting ZEBs into their fleets or the number of ZEBs purchased is more reflective of transit agencies willing to test out the technology based on the very

generous incentives that have been provided by the State of California. Such statistics that are being showcased throughout the staff report should not be construed as either complete acceptance of the technology, a testament that the technology works for each agency, or that such purchases are anything more than a demonstration project. ARB's governing board should not overly misconstrue the true meaning of a transit's willingness to test out ZEB strategies. **(Clean Energy)**

Comment:

The cutaways. On our intercity routes all of our routes are well over 250 to 300 miles. Just one direction is over 150 miles. So right now I don't think there's anything out there that is defined under cutaway to go that distance. We're yet to see what the true numbers come out of the new bus we got. So as soon as we get it in service, we'll -- we'll know what we've got for charging and what routes it will be able to be used on. **(B-O-HTA)**

Comment:

Zero emission buses are not yet proven to work in transit applications. While there are several current demonstrations and the technology may appear promising, it is not proven to be commercially or economically feasible. In several cases, most notably with LA Metro, battery electric buses have had a "record of poor performance and mechanical problems" (LA Times article 5/20/18). Similar issues have been reported with a number of other zero emission bus operations including Albuquerque, New Mexico (Albuquerque Business Journal, 5/17/18). Transit agencies that are using zero emission transit operators like Foothill Transit and the Orange County Transportation Authority have also raised concerns about CARB's proposed ICT rule (Foothill letter to ARB dated 7/5/18; OCTA letters dated 5/14/18 and 1/22/18). **(SoCalGas)**

Agency Response:

The ICT Staff Report acknowledges operational and performance challenges have been encountered during the early years of ZEB deployment. Therefore, the ICT regulation includes exemptions addressing a wide range of uncertainties and provides flexibility to allow transit fleets to implement zero-emission technologies so it is consistent with their operation, provides opportunities for transit fleets to utilize incentives, encourages innovative mobility options, and provides relief where demonstrated to be necessary. But the regulation provides time for the technology to improve. ZEB purchases are not required until 2023 which provides ample time for fleets to learn from experiences with early ZEBs and provides sufficient time for manufacturers to ramp up production to meet increasing demand. The approved regulation no longer sets a limit on when a bus must be delivered; therefore, longer times for bus delivery are expected to avoid non-compliance.

Resolution 18-60 further expresses the Board's intent to support the flexibility in the ICT regulation to avoid adverse impacts on transit service. As specified in Resolution 18-60, CARB staff will update the Board annually on ZEB status and conduct a comprehensive review at least one year before the first purchase requirement starts. The comprehensive review of program readiness will consider issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to initiating any purchase requirement. This provides the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts on transit service.

The ICT regulation includes exemptions addressing a wide range of uncertainties and provides flexibility to allow transit fleets to implement zero-emission technologies so it is consistent with their operation, provides opportunities for transit fleets to utilize incentives, and encourages innovative mobility options.

The regulation provides various flexibilities for transit agencies to meet their ZEB compliance obligations and has built in many safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. The Executive Officer will grant an exemption upon request, if the specified criteria are met. For example, a transit agency may receive an exemption from purchase of ZEBs under the following circumstances:

1. Setback of construction schedule of needed ZEB infrastructure (section 2023.4(c)(1);
2. Available ZEBs cannot meet transit agency's daily mileage needs (section 2023.4(c)(2) ;
3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency's daily needs (section 2023.4(c)(3);
4. A required ZEB type that has passed Altoona testing and has met all applicable safety requirements is unavailable for purchase (section 2023.4(c)(4);
5. A transit agency's governing body declares a fiscal emergency (section 2023.4(c)(5);
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5).

Resolution 18-60 further expresses CARB's intent to support the flexibility in the ICT regulation to not cause adverse impacts on transit service. As specified in Resolution 18-60, CARB will hear an update annually on ZEB status and conduct a comprehensive review at least one year before the first purchase requirement starts. The comprehensive review of program readiness will consider issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure. The annual update to the Board on the status of ZEB technologies and any potential changes to the

regulatory requirements that may be warranted will consider whether to develop proposed amendments to the requirements to ensure there are no adverse impacts on transit service.

C-2 Fuel Cell Electric Buses

Comment:

New Flyer is commercializing hydrogen fuel cell electric buses as an effective option for transit agencies. Fuel cells are used as range extenders for a battery-electric bus, performing as on-board battery charger, to provide range comparable to diesel and CNG buses and the ability to refuel quickly. During 2018 and 2019, New Flyer will deliver 27 fuel cell buses to California for commercial deployment. For fuel cell buses to become widely accepted, continued hydrogen market expansion with public and private infrastructure investment will yield growth through manufacturing volume cost reduction with this type of ZEB. **(B-W-New Flyer)**

Agency Response:

CARB appreciates New Flyer's efforts in developing and commercializing FCEBs and thanks New Flyer for the continued leadership in the hydrogen fuel cell technology market. This technology meets the requirements for zero-emission buses under the regulation.

C-3 Battery Size and Cost

Comment:

Second point, the cost of battery electric buses. Batteries comprise 35 percent of the cost of a battery electric bus. So batteries are continuing to decline in cost. But the challenge will be for transit is that instead of taking that cost reduction, we're going to stuff more batteries on the bus to close that range gap. So in the foreseeable future, don't expect the cost of these battery electric buses to come down. **(B-O-New Flyer)**

Agency Response:

The staff cost analysis reflects declining battery costs per kilowatt hour, but also reflects that longer range buses will be purchased to meet longer range needs as more zero emission buses are added to the fleet. CARB understands that batteries represent one of the most significant costs for battery electric buses. Staff prepared Appendix E "Battery Cost for Heavy-Duty Electric Vehicles" as part of the ISOR⁶ to better understand heavy-duty vehicle battery costs and their price projections. The literature

⁶ California Air Resources Board (CARB) (2017). Battery Cost for Heavy-Duty Electric Vehicles. August 14, 2017. Available at: https://www.arb.ca.gov/msprog/bus/battery_cost.pdf.

review showed the trend in battery price reductions will continue in the foreseeable future due to effects on production volume and introducing new technologies into the market. The median of the expected battery price reductions are consistent with bus price projections from Proterra and the battery cost reduction estimate from BYD. Lower battery costs per kWh are expected to result in significantly lower battery electric bus prices, longer range (for the same battery pack volume), or both depending on market factors. Although midlife battery replacements are not expected for some buses, battery cost reductions are also expected to lower the cost for midlife battery replacements in about 6 to 8 years, when needed.

The regulation provides various flexibilities for transit agencies to meet their ZEB compliance obligations and has built in safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. The Executive Officer will grant an exemption upon request, if the specified criteria are met. For example, a transit agency may request an exemption from the zero-emission bus purchase requirements in section 2023.1(a) due to financial hardship. Financial hardship would be granted if a fiscal emergency is declared under Resolution 18-60 by a transit agency's governing body following a public hearing, demonstrating it cannot offset the incremental cost of purchasing all available zero emission buses when compared to the cost of the same type of conventional bus.

C-4 Technology Availability

Comment:

First is that our BEBs have been available for service 71.6% of the time in comparison to 88.5% of the time for a comparable diesel powered bus. If we cannot significantly decrease the availability difference over time, we will need to have more BEBs than diesel buses to cover the same level of service to the public. That in turn becomes a significant capital cost when applied over a larger number of buses in service. (**County Connection**)

Agency Response:

Early demonstrations of new bus models and technology deployments are expected to be improved with experience in the field. The BEB the commenter discussed are the first BEBs made by their bus manufacturer and the infrastructure being deployed is in early commercialization and is not entirely representative of the long term BEBs market. However, the NREL Foothill demonstration report referenced in the ICT Staff Report on page II-3 shows that the ZEBs in that study have a similar bus availability as their internal combustion engine counterparts.⁷ In addition, Resolution 18-60 further

⁷ National Renewable Energy Laboratory (NREL) (2017). Foothill Transit Battery Electric Bus Demonstration Results: Second Report. June, 2017. Available: <https://www.nrel.gov/docs/fy17osti/67698.pdf>.

expresses the Board's intent that the regulation should not cause adverse impacts on transit service. To even further ensure this intent is met, CARB committed to:

1. An annual update on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted, and
2. A comprehensive review of program readiness, considering issues such as performance and reliability of ZEBs, and costs, and corresponding infrastructure, at least one year prior to initiating any purchase requirement. This provides the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts on transit service.

C-5 Range

Comment:

Range of battery electric bus. Great improvements have been made, but the current state of the art under severe conditions, 115 degrees, aged batteries, severe terrain, you're looking at 175 to 225 miles. That compares to a diesel or a CNG bus of 350 miles. So when fleets try to implement the zero-emission bus, range is going to be a consideration in their one-for-one bus replacement. **(B-O-New Flyer)**

Comment:

Range of the vehicles. We're hopeful, but they don't have the range we need yet to operate our kind of operation. **(B-O-LA Metro)**

Comment:

In May 2017, seven months prior to the release of the draft ICT, the Santa Cruz Metro board adopted a goal for a fully zero-emission bus fleet by 2040. Of course, this goal is heavily influenced by metro's ability to identify funding sources for the significantly higher cost electric buses and the need for the electric bus manufacturers to develop buses with an end-of-life range of at least 300 miles on a single overnight charge. **(B-O-Santa Cruz METRO)**

Comment:

While the trend is generally positive, there are risks and uncertainties in transitioning a large fleet to 100 percent ZEV. Both range and vehicle weight remains an issue. In addition, adequate charging infrastructure for large -- a large transit fleet is a concern. Having both adequate power from our local utility and charging infrastructure to charge 250 buses over a five-hour period every night will be a challenge. **(B-O-SacRT)**

Comment:

The cost of buses, the range of buses, the cost of electricity, the cost of bringing the power to our facilities, the cost of charging infrastructure for large urban systems that are space constrained that hasn't even been designed yet, are all projected out 30 years in the future to come to a conclusion that it's going to save us money. **(B-O-San Diego MTS)**

Comment:

Range of zero emission buses is highly variable. New Flyer engineering analysis shows the current state-of-the art battery electric bus range, from any manufacturer including New Flyer, is capped at 175- 225 miles in severe conditions extreme heat (115 degrees), steep terrain and aged batteries. This falls short of the typical 350 mile range capability of a CNG or diesel bus. While battery technology will improve, the range gap must be considered in a one-for-one bus replacement plan with a CNG or diesel transit bus. **(B-W-New Flyer)**

Comment:

Learning about the power level can certainly unlock the flexibility for the range. We are limited in the range of this vehicle. And if we unlock the power level, by making it a requirement I think you can find yourself with a range increase. **(B-O-SDAP)**

Comment:

Vehicle capabilities - Performance of ZEB's still does not match those of our existing buses. In order to implement ZEB vehicles into our operation we must identify specific routes suitable to their limited capabilities under all operating conditions to ensure reliable service. As noted during the Advanced Transit Vehicle Consortium (ATVC) Board meeting, March 2018, New Flyer presented how range is impacted by both battery age and ambient temperature conditions. Figure 1, below shows mileage for 40' and 60' buses under ideal test conditions; 225 and 200 miles, respectively. It also shows the range of the same buses, with aged batteries on a hot sunnier day in San Fernando. **(LA Metro)**

Comment:

ZEB ranges and reliability promised by manufacturers have not been achieved in day-to-day operations.

- Current ranges would require additional infrastructure to perform in-route charging adding considerable unfunded capital cost.
- In-route charging locations would be difficult to site and require cooperation and approval of other agencies.

- Strong potential to incur additional unfunded capital costs for additional buses to meet existing service requirements. (**City of Pasadena**)

Comment:

Therefore, buses purchased must have a range of at least 300 miles end of life (including battery degradation). The current zero emissions Buses (ZEBs) available on the market today fall significantly short of this reasonable operating range. (**Santa Cruz METRO**)

Comment:

Specifically, we are concerned that the requirement to purchase zero-emission buses is not tied to benchmarks for cost, performance, electrical infrastructure costs and funding available. For instance, electric vehicles cannot handle the mileage requirements for the vast majority of MST's routes, in a county that is 1.5 times the size of the State of Delaware. (**TAMC**)

Comment:

Majority of HTA's commuter and intercity routes are 300+ miles which would mean either purchasing more buses for the same service or restructuring the routes. Capital funding for rural agencies is limited, especially when the price tag of the recent BEV we purchased was \$940,000 (before the HVIP). Restructuring routes means more operational costs because of the extra time it takes to "deadhead" buses from the yard to the starting/ending point in the route.

For the last two years we have been told from electric bus manufacturers that the nominal range of the slow charge bus is 200 to 300 miles. HT A's newly purchased extended range Proterra E2 bus, which boasts a nominal range of 250 miles, displayed a range of 90 miles after it was fully charged. Until we get the bus in service and test it, we have no idea what the range will be after factoring in large passenger loads, mountainous terrain, and running all the standard peripherals that are becoming the standard. I would like to see real data from rural operators before setting some of the milestones that are outlined in the ICT. (**B-W-HTA**)

Comment:

Sixty-five percent of AC Transit's routes are over 200 miles. We conducted a zero-emission bus study and found only 10 percent of our routes could be served by battery electric buses, while 90 percent of our routes could serve -- could be served by hydrogen fuel cell buses. Neither one was 100 percent. (**B-O-AC Transit**)

Comment:

Electric buses cost nearly 3.5 times that of a CNG bus with ranges that far exceed that of their electric counterpart. **(Borchman)**

Comment:

The acceptability of ZEB as an alternative to less clean vehicles has been postured by lobbyists from electric bus manufacturers: actual data provided from ZEB-implemented agencies in Oregon and BAY-area, CA show that actual range is generally 1/3-2/3 of estimates posited by ZEB-manufacturers and highly dependent on terrains. These vehicles simply do not travel on one charge to complete an average route. **(Borchman)**

Agency Response:

CARB understands that not all zero-emission buses can meet all fleets' daily range requirements, but expects based on the record before it that zero-emission buses will be placed in service where suitable. The regulation includes exemptions in the event zero-emission buses are not available to meet the range and other needs of transit agencies to ensure service is not adversely affected. One of these exemptions is to address range limitations based on a depot-charging battery electric bus's range with a single charge for the applicable bus type being purchased. The exemption applies even if other options could be used to meet the daily range needs. However, BEB or depot-charging BEB is not the only technology available in the market. Fuel Cell electric buses have demonstrated the feasibility of being integrated into the transit fleet operation because FCEBs can provide similar daily mileage as diesel or CNG buses.

C-6 Weight

Comment:

Weight of batteries on a transit bus is huge, 7,500 pounds. That's the equivalent of not one, not two, but three Honda Fit automobiles. So the challenge with battery electric buses, is that you can carry batteries or passengers.

Many of the buses that have been through the Altoona test cycle, zero emission certain buses have been overloaded, front axle and gross vehicle weight. It's a challenge for the industry. **(B-O-New Flyer)**

Comment:

Weight of the best available, state of the lithium-ion batteries, from any bus manufacturer is substantial; a key factor limiting range. For a long range bus, battery weight equates to the combined total weight of not 1, not 2 but 3 cars such as the Honda Fit. The significant weight of batteries for electric propulsion

limits the total passengers a transit bus may legally carry. New Flyer strongly encourages ARB staff to review all Federal Transit Administration bus test reports, including the most recently published from all manufacturers, to note warnings of axle and gross vehicle weight overload on certain ZEBs. **(B-W-New Flyer)**

Comment:

The added weight of battery packs could limit the amount of passengers allowed on a vehicle and MORE IMPORTANTLY: the amount of ADA wheelchair-passengers on a vehicle. **(Borchman)**

Agency Response:

CARB understand there are gross vehicle weight rating (GVWR) limitations required by federal, state, local laws, regulation or ordinance for ZEBs, and that battery weight may be a limiting factor. All ZEB manufacturers are expected to comply with federal, state, or local laws, regulations, and ordinances such as Assembly Bill 1250.⁸ However, the ICT regulation recognizes potential challenges and includes exemptions if zero-emission buses for the applicable weight class category based on GVWR are not available. The exemption for the ZEB purchase requirements specified in section 2023.1(a) is available when a ZEB type for the weight class is unavailable. A ZEB type is unavailable if it has not passed the complete Altoona bus testing and has not obtained a bus testing report, or it cannot be configured to meet the requirements of the Americans with Disabilities Act (ADA). A ZEB is also considered unavailable if its purchase would cause a transit agency to violate a federal, state, or local law, regulation, or ordinance. Transit agencies would be exempted from purchasing ZEB types if their physical characteristics, including the curb weight, are violating any federal, state, or local laws, regulations, or ordinances, including local road-weight restrictions.

If the purchase of a ZEB would cause a transit agency violating any law, then the transit agency may submit a letter to CARB from its governing body that details how the physical characteristics of the ZEB would violate the law. This letter must include all citations to state and federal regulatory code sections. This exemption is necessary to avoid any disruption in transit services and conflicts with legal requirements. An approved extension of the purchase requirement would allow a transit agency to purchase conventional buses of the needed configuration until the next purchase cycle. To avoid an increase in the required minimum number of ZEBs in the given calendar year for other types of purchased buses, the exempted buses shall be excluded from the total number of new bus purchases in that year.

C-7 Funding for Interoperable Charging Equipment

⁸ Appendix N: Weight Requirements for Transit Buses in California, ICT ISOR. Available https://www.arb.ca.gov/regact/2018/ict2018/appn.pdf?_ga=2.137937136.1987654673.1557778396-1959568993.1456785342.

Comment:

New Flyer has strongly advocated for industry interoperable charging equipment, and we have forgone proprietary charging equipment. Industry charging standards comprised of SAE-J 1772, SAE-J3105, SAE-J2954, and SAE-13068 remain under development and are expected to be in place by fourth quarter 2019. New Flyer strongly encourages the State of California to require all battery-electric buses purchased using California State funding to adhere to the accepted charging interoperability standards. **(B-W-New Flyer)**

Agency Response:

The above commenter asked CARB to require all battery-electric buses purchased using California State funding to adhere to accepted charging interoperability standards. The ICT regulation does not encompass the Low Carbon Transportation Investments and Air Quality Improvement Program Funding Plan. This Funding Plan recommends how Low Carbon Transportation Investments should be used based on the annual allocation through the state budget process. This Funding Plan also includes the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), which provides a significant funding source potentially available to offset the incremental costs of ZEB purchases. ZEBs in California are also funded through many programs besides HVIP, including the Transit and Intercity Rail Capital Program (TIRCP), Low or No Emission Vehicle Program (Low-No), Low Carbon Transit Operations Program (LCTOP), and the Volkswagen (VW) Environmental Mitigation Trust funding programs. These programs were not proposed to be amended as part of the process for adopting the ICT regulation. Such amendments are outside the scope of this action. Requiring all battery-electric buses purchased to meet the ICT regulation to also meet accepted interoperability standards would impose a constraint that would not be as effective, less burdensome to affected private persons, or more cost-effective to affected private persons and equally effective, than the adopted regulations. Transit agencies may purchase buses that meet those requirements if they so choose.

C-8 Interoperable Charging Equipment in the Regulation

Comment:

Next point is charging standards. There is -- there are four charging standards in the industry, two of these are released and they're published, and two of them are still in development. By the end of 2019, those standards will be in place. It should be a requirement of -- it should be a requirement of the purchase of the zero-emission buses that the charging equipment is interoperable and available from multiple suppliers. **(B-O-New Flyer)**

Comment:

Lack of standards among ZEB manufacturers

- There is no common vehicle design for ZEBs among manufacturers which prevents competitive bidding which significantly constrains the need for cost containment and affordability.
 - Lack of charging design standards means that once a vehicle manufacturer is chosen the agency is committed having to purchase future vehicles from the same manufacturer, regardless of cost or performance.
 - There is no common/universal design yet for charging infrastructure to support the bus deployment, which means that transit agencies have no ability to share charging infrastructure.
 - A truly open, competitive bid process is thereby precluded.
- (City of Pasadena)**

Agency Response:

CARB understands charging standardization is key for the large-scale deployment of BEBs, but does not agree at this time that the regulation is the appropriate place to set such standards. Charging standards for medium- and heavy-duty vehicles are currently led by the Society of Automotive Engineering (SAE) and are expected to be completed before the first purchase requirement starts. For BEBs, it is also a common practice that multiple charging methods are applied together to reduce the risk of service cut and extend the range. To date, each ZEB manufacturer also provides multiple charging methods to meet transit agencies' needs and goals. Transit agencies also have the right to specify charging methods in their bus procurement process to ensure a truly open, competitive bid process.

C-9 Flexibility and Scalability

Comment:

However, AC Transit continues to have some concerns with the technology, the uncertainty of the scalability, and financial ability to implement this rule. **(B-O-AC Transit)**

Comment:

AC Transit's leadership in the development of zero emission bus technology underscores its commitment to transitioning to 100% zero emission buses. However, AC Transit continues to have concerns regarding the uncertainty with the scalability, the uncertainty with the technology, and, the uncertainty with the financial ability to implement this rule. **(AC Transit)**

Comment:

But clearly, one of the biggest challenges is scalability. It's not enough to just provide one, two, three, five or 10 buses, but how does a transit agency manage 100, 200, 300 buses in a division. How do we fuel those buses? How do we

recharge those vehicles? This is the challenge that has to be addressed. (**B-O-CTE**)

Comment:

Charging infrastructure and power costs - Large scale ZEB charging systems have not been fully developed nor deployed in the US. We are working with our utility partners at the local level to address how to provide sufficient power at an affordable rate to make this conversion. While we have established strong working relationships with our utilities, we have not resolved the most challenging issues in this area. These issues include:

- Reliable and Resilient electrical service to ensure all-electric transit bus service operations are not impacted. For example, customers in LADWP territory lost power and were urged to turn off high demand electrical appliances on July 6, 2018. (<http://www.latimes.com/local/lanow/la-me-ln-ladwp-heat-outage-20180707-story.html>) Metro cannot adjust our service levels as a result of extreme temperatures or impacts to the grid.
- Charging solutions for large scale, urban transit operations are not service-proven in North America. Our divisions do not have enough real estate to add plug-in chargers next to every transit bus. Furthermore, there could be delays to providing sufficient power to support our depots. Although we are encouraged by an overhead charging solution employed in the Netherlands, this has yet to be deployed in North America. (**LA Metro**)

Comment:

As we develop this plan, we are confronted with the reality that, despite our reliance on the best available information, we cannot eliminate all risks associated with our transition. The reasons for this are simple: not a single transit agency in the country has expanded their battery-electric fleet beyond the pilot phase; and, the development of battery-electric technology and associated infrastructure are subject to forces outside the control of our agency, and even, the state. This means that we do not yet know what battery-electric buses will cost to procure and operate, or how they will perform, at scale.

We cannot overstate the infrastructure hurdles we, and other transit agencies, face in the process of converting out fleet to 100% electric. Before we are able to undertake large scale vehicle replacements we must both plan for and install a different infrastructure to support and operate ZEBs. This process will be time consuming. Not only will the District need time for vehicle purchase and manufacturing, but we will also need time to process contracts for engineering, construction, and the bus infrastructure. (**SamTrans**)

Comment:

Scalability of zero-emission bus technology is also a concern. The ICT Rule proposes a fairly aggressive transition based on mandating the purchase of zero-emission vehicles. CTE strongly believes that the transition process should incorporate large-scale pilot projects. Pilot projects would not only drive down vehicle costs, particularly for hydrogen fuel cell buses, but provide valuable data on the scalability of battery-electric and fuel cell electric fleets. (CTE)

Agency Response:

CARB recognizes the challenges to transition to ZEB fleets, and that an immediate transition is not feasible. The ICT regulation provides flexibility by providing time for the technology to improve and grow to avoid adverse effects on service and ridership. The regulation also has exemptions to ensure service is not adversely affected due to infrastructure delays should they occur.

CARB continues to share the latest information about developing technologies with the transit community to enable a successful transition to zero-emission technology. For example, CARB, the Antelope Valley Transit Authority (AVTA), and the California Transit Association (CTA) jointly held a Zero-Emission Bus Technology Showcase and Symposium on February 6-7, 2019, to provide information on the State's current and future support for zero-emission transit buses, updated technical information on zero-emission technologies, associated infrastructure and scale up options, operating costs and fuels, deployment planning, and funding sources. Presentations and recordings of this event are available at <https://arb.ca.gov/msprog/ict/meeting.htm>.

In addition, Resolution 18-60 further expresses the Board's intent that the regulation not cause adverse impacts on transit service. CARB committed to:

1. An annual update on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted; and
2. A comprehensive review of program readiness, considering issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to initiating any purchase requirement. This provides the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts on transit service.

C-10 Infrastructure**Comment:**

Charging supply equipment and the installation and integration is a major consideration in the deployment of zero-emission buses. New Flyer has invested

significant resources to support the complex infrastructure integration efforts with the zero-emission buses. On-route high-power charging systems, in particular, may involve up to 25 industry stakeholders and 2-3 years from planning to commission. Grid integration and power management will inevitably be the most challenging aspect of ZEB fleet conversion for the Innovative Clean Transit Regulation. **(B-W-New Flyer)**

Comment:

The challenge is going to be is the infrastructure. We need hydrogen. We need private and public investment in that. If we can get the hydrogen, we're going to increase volume. We'll be able to reduce the cost of those buses. **(B-O-New Flyer)**

Comment:

My last point is infrastructure. Implementing battery electric buses, the technology of the bus is the easy part. It's the infrastructure, trying to get to a facility that's going to require 13 to 20 megawatts at a large facility. It's not just the charging equipment. It's the transformers. It's the switch gears. It's the metering. It's the big electric -- or pardon me, copper wire that goes to that facility. It should not be overlooked in the implementation. **(B-O-New Flyer)**

Comment:

The infrastructure, even though we have a fairly decent amount of property, the infrastructure for charging systems is going to be quite large for the small area we have. So our biggest concern is the funding sources, and what the bus will actually do. **(B-O-HTA)**

Comment:

Ability to design, implement and pay for the massive infrastructure to support 100% ZEB deployment is not adequately considered. In fact, today there is no urban transit facility with infrastructure to meet the needs of a 100% ZEB fleet. **(San Diego MTS)**

Agency Response:

Planning is a critical step for a transit agency in transitioning to ZEBs, especially for infrastructure, to account for and control costs. Transit agencies are encouraged to discuss with fuel providers, such as electric utilities or hydrogen station providers early in the planning process. In addition, implementing the Clean Energy and Pollution Reduction Act of 2015 (SB 350), statutes of 2015, chapter 547, is already providing substantial utility investments in infrastructure and in assisting fleets with infrastructure

project planning and buildout. The data collected from the approved projects will also provide additional information for future infrastructure planning.

CARB is planning to provide assistance and guidance for planning. For example, CARB co-hosted the Zero-Emission Bus Technology Showcase and Symposium with the Antelope Valley Transit Authority and the California Transit Association in February 2019 to provide information on the State's current and future support for zero-emission transit buses. The workshop provided updated technical information on zero-emission technologies, associated infrastructure and scale up options, operating costs and fuels, deployment planning, and funding sources. Stakeholders, including infrastructure providers and transit agencies, have shared the resources and their experience in scaling up BEB charging infrastructure and hydrogen fueling infrastructure.⁹

To ensure transit agencies plan proactively, the ICT regulation requires the ZEB Rollout Plan to identify each transit agency's path to achieve a 100% zero-emission bus fleet by 2040. In section 2023.1(d)(1)(C) of the ICT regulation, the Rollout Plan must include a schedule to construct facilities and infrastructure modifications or upgrades, including charging, fueling, and maintenance facilities, to deploy and maintain zero-emission buses. This schedule must specify the general location of each facility, type of infrastructure, service capacity of infrastructure, and a timeline for construction. This provision requires transit agencies to plan its infrastructure needs and buildout before the procurement of ZEBs which is essential for a successful ZEB deployment.

The ICT regulation provides exemptions in section 2023.4(c) to ensure transit service is not adversely affected. The Executive Officer will grant an exemption from the zero-emission bus purchase requirements upon request, if infrastructure construction for ZEBs is delayed. (Section 2023.4(c)(1).)

D. WORKFORCE TRAINING

This section address all workforce training related comments. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

D-1 Job Creation in Disadvantaged Communities

Comment:

We take this opportunity to highlight some of the workforce recommendations from our "Delivering Opportunity" report that reinforce many recommendations made by Jobs to Move America and others related to transit agencies' procurement, maintenance, and operation of zero-emission buses:

⁹ 2019 Zero-Emission Bus Technology Showcase and Symposium. February 6-7, 2019. Presentations are available at: <http://www.zebtechsymposium.com/>.

- Support the development of and place a high priority on projects that have robust recruiting and hiring policies targeting underserved communities, provide high-quality jobs, have robust minority-owned business procurement goals (i.e., supplier diversity), and partner with or provide support to workforce development programs aimed at underserved communities.
- Invest in skills-development programs aimed at training members of underserved communities (particularly those with barriers to employment) to fill emerging employment needs in the heavy-duty electric vehicle industry and related transportation-electrification fields.
- Track and report individual level data on the progress of efforts to train and employ members of underserved communities.
- Reference and use the US Employment Plan to evaluate and score procurement proposals with the aim of encouraging commitments to creating good jobs and improving access for people historically excluded from manufacturing jobs.

The ICT Standard can help create equitable and inclusive economic opportunities generated by zero-emission bus deployment by requiring transit agencies to prioritize the procurement of buses and related services from contractors that demonstrate how they will leverage, support, and/or create training programs to recruit, train, and hire workers from disadvantaged communities and low-income households. One way to do this is for transit agencies to assign preference points to bidders/contractors that demonstrate workforce equity efforts (including but not limited to):

- Hiring of low-income workers and other individuals with barriers to employment (through targeted or local hiring policies, or others);
- Diverse workforce demographics;
- Partnerships with skills development programs (or its own training programs) targeted at low-income workers and people with barriers to employment, such as job training and pre-apprenticeship programs; especially those that provide support services to participants (e.g. child care, transportation assistance, financial stability, etc.); and/or
- Paying of prevailing wages; providing benefits for hires, partners, and dependents (medical and dental coverage, paid vacation and sick leave, retirement savings, transportation reimbursement, childcare assistance, paid training opportunities); predictable scheduling; and opportunities for advancement for entry-level workers

BYD's community benefit agreement is a model for how to create equitable economic outcomes (like the ones listed above) in the emerging transportation electrification sector. The ICT Standard must ensure more people like Danny Alvarez—who is formerly incarcerated and now works at BYD—can access high-quality opportunities in the clean energy economy. By incorporating these recommendations, the ICT Standard would be aligning with the Transformative Climate Communities program—which is quickly becoming a social equity 'gold

standard’—and would be implementing key recommendations from CARB’s SB 350 ‘Low-Income Barriers Study: Overcoming Barriers to Zero-Emission and Near Zero-Emission Transportation and Mobility Options.’ (UCS-2)

Comment:

We commend ARB for highlighting job creation, especially as exemplified at BYD as a potential co-benefit of the Rule especially for communities facing significant barriers to employment. To strengthen language around job creation co-benefits, ARB should specify the characteristics of good jobs, as defined by previous ARB studies. Furthermore, ARB should also include examples of policies such as the US Employment Plan that have led to the types of co-benefits ARB has identified in the SB350 Barrier Report.

Section ES-8

Third, ZEB manufacturers can bring high quality jobs, ***as defined in previous ARB studies and reporting standards on co-benefits***, to California, including in disadvantaged and low-income communities, which is a unique opportunity for these communities for workforce expansion and training.

Section V-4

E. Benefits in Disadvantaged Community and Job Creation

The proposed ICT regulation is anticipated to deliver environmental benefits that include GHG and criteria pollutant emission reductions in the DAC areas where there are more transit dependent riders. In addition to reducing emissions, the ZEB industry is bringing high quality employment opportunities to California. There are several ZEB manufacturers with plants located in California, such as BYD Motors Inc., Complete Coach Works, Ebus, El Dorado National California, GILLIG, Green Power, and Proterra. As the production of ZEBs increases, so would the number of manufacturing and related jobs for DAC areas. Electricians, construction companies (such as infrastructure installers), some bus manufacturers, fuel V-5 cell and battery producers, and electric drivetrain parts and components suppliers can fall into the small business category. ***To ensure that California maximizes the job creation opportunity, CARB and transit agencies should leverage high quality jobs through the promotion of proactive policies such as the US Employment Plan and Construction Careers that provide family sustaining wages, benefits, apprenticeship and pre apprenticeship training, targeted hire in disadvantaged communities, safe working conditions, job retention, and leave policies.***

Section V/1-3

In addition to reducing emissions, the proposed ICT regulation is expected to attract ZEB industries to bring high quality job opportunities to California and to support employment in disadvantaged communities. As the demand and production of ZEBs increases, so would the number of ZEB manufacturing, operation and maintenance related jobs in California. For example, BYD, located in Lancaster, California, has a community benefits agreement (CBA) with Jobs to Move America (JMA) which will support the creation of a robust U.S. jobs program through deep investments in pre-apprenticeship and training programs. This CBA has a goal of recruiting and hiring 40 percent of its workers from populations facing significant barriers to employment, such as veterans and returning citizens. In addition, populations that have historically been excluded from the manufacturing industry, such as women and African Americans are also expected to be recruited and placed. The agreement also includes commitments from BYD to work with the JMA coalition to provide support systems for these workers to strengthen retention efforts, such as providing transportation for workers who may not have access to a car. *Considering previous missed opportunities in workforce policy, CARB should incentivize high quality job creation within evolving zero-emission transportation industries. ARB has defined high quality jobs as those with family sustaining wages, benefits, apprenticeship and pre apprenticeship training, targeted hire in disadvantaged communities, safe working conditions, job retention, and adequate leave. (ACT Coalition Partners-2-B-W-BlueGreen Alliance)*

Comment:

On behalf of the organizations listed below, we urge the California Air Resources Board ("CARB") to highlight the value of high quality job creation associated with the Innovative Clean Transit Rule ("ICT").

CARB can and should encourage transit agencies to use policy tools that have a proven track record of delivering on high quality job creation, access to these jobs for disadvantaged communities and apprenticeship and pre apprenticeship programs. We recommend that CARB encourage transit agencies to use workforce policies, such as the US Employment Plan, as part of California's transition to zero emission buses through CARB's Statement of Reasons. We propose sample language in the statement of reason as seen in the attached document.

Currently, the Initial Statement of Reason discusses how the ICT can help address the disproportionate barriers that low-income and disadvantaged communities face. We applaud CARB's efforts to both achieve equitable access to clean transportation and overcome barriers that are "magnified for those with limited financial resources." We also appreciate that CARB highlights the potential job creation benefits of the ICT and even cites Jobs to Move America's Community Benefit Agreement with BYD as a potential outcome.

However, we believe that the Initial Statement of Reasons does not recognize the link between intentional workforce policies and the job quality/ job access outcomes identified in the BYD example. We are concerned that without intentional policies, the co-benefits of "high quality job opportunities" and "employment in disadvantaged communities" described by the Statement of Reason are less likely to materialize. **(ACT Coalition Partners-2, B-W-BlueGreen Alliance)**

Comment:

We recognize CARB's leadership in helping develop recommendations and policies that can deliver co-benefits for all communities. CARB's "Low-Income Barriers Study, Part B: Overcoming Barriers to Clean Transportation Access for Low-Income Residents", UC Berkeley's "Methods to Assess Co-Benefits of California Climate Investments" developed for CARB, and CARB's "Clean Vehicle Rebates, Reporting Document" have all pointed to ways that ARB can assert proactive leadership to assist disadvantaged communities.

CARB can continue its leadership by laying the groundwork to maximize economic opportunities for low income residents. CARB should recommend transit agencies (and CARB itself) link incentives to those projects that demonstrate "economic benefits for low income residents" and by connecting these residents to good quality clean transportation jobs and the associated training and workforce development opportunities. **(ACT Coalition Partners-2, B-W-BlueGreen Alliance)**

Comment:

CARB can go further by encouraging transit agencies to adopt proven jobs policies, such as the U.S. Employment Plan that meet the goals of the SB 350 barrier study, such as access to good jobs, and investments in apprenticeship and pre-apprenticeship programs. **(B-O-JMA)**

Comment:

We support the recommendations for inclusion of community benefits and labor conditions like the U.S. Employment Plans, that are articulated in the joint comments submitted with our allies, Jobs to Move America, BlueGreen Alliance, IBEW, SMART, Sierra Club, et cetera, that were submitted this week. **(B-O-CWA)**

Comment:

I think it's hard to overemphasize how import -- important it is to set the right precedence here on this rule to include real worker and disenfranchised community considerations in the final product. **(B-O-CWA)**

Comment:

While the Innovative Clean Transit Rule has the potential to create these thousands of clean energy jobs, it is critical though that CARB continues its leadership and look to ensure that these new jobs also create careers that provide family-sustaining wages, health care, a voice for workers, and an economic opportunity for disadvantaged communities. (**B-O-BlueGreen Alliance**)

Agency Response:

As discussed on page V-4 of the ISOR, deployment of the ZEBs under the ICT regulation would result in the introduction of high-quality employment opportunities to California in manufacturing and maintenance positions. As discussed on page VII-3, the ICT regulation is expected to introduce these employment opportunities to disadvantaged communities. In California there are already eight ZEB manufacturers that provide high quality jobs. BYD has signed a community benefits agreement (CBA) with Jobs to Move America (JMA), which will support the creation of a robust U.S. jobs program, to recruit and hire 40 percent of its workers from populations facing significant barriers to employment, including veterans, women, and historically disadvantaged minority groups. Because of CARB's interest, the comprehensive review conducted on program readiness at least one year prior to initiating any purchase requirement will include an assessment of the impact of zero emission bus deployments on jobs, investments in pre-apprenticeship and the workforce training programs.

Although CARB is interested, the focus and scope of the ICT regulation are to require transit agencies to purchase zero-emission buses. It is not intended and was not proposed to address internal workforce management practices of transit agencies. Workforce development requirements are outside the scope of the proposed action, and the comment is not directed at the proposed regulation or the process by which it was adopted. To the degree that the comment suggests an alternative requirement, CARB has considered it and will examine the impact of the regulation on jobs and training during the comprehensive review. But there is no evidence before CARB that including a workforce requirement would be as effective, less burdensome to affected private persons, or more cost-effective to affected private persons and equally effective, than the regulations as adopted.

D-2 Personnel Training

Comment:

Personnel training will be required for any technology transition, which is not currently addressed in the Proposed ICT.

Traditionally, the work-force found in the transit industry includes a high degree of expertise with diesel engines, with transition now occurring because of the introduction of natural gas engines. With high demand for this knowledge in fields outside of transit, there are also numerous existing issues in attracting talent to fill maintenance and operations roles. ARB's Proposed ICT will create an added level of difficulty, by requiring a completely new type of staff knowledge, without any identified training opportunities.

A transition to ZEBs would require complete retraining on the technological operating elements of a bus, and the safety aspects. Without any existing large operation of ZEBs at existing transit facilities, many of the implications of the technology change are unknown. Gradual implementation of the technology would allow transit agencies to mitigate these risks and prepare and protect their staff. There should be a discussion within the Proposed ICT of resources available, including expansion of eligibility for existing resources to be spent for training programs, and plans for training not only the existing workforce, but also those wishing to enter the workforce, on this new technology. **(OCTA)**

Comment:

We are asking CARB to create a regulatory standard that will not only create better air quality, but also provide good clean green career pathways. Our members coming out of our apprenticeships are looking for clean energy career opportunities. And this is not only an investment in the air quality, it is an investment in clean energy workforce for us working Californians.

So we ask of you give us clean air, we ask of you to give us the green jobs, and finally implore you, please let's be bold. Our health and livelihoods as working Californians require it. And the healthy future for all of us depends on it. **(B-O-IBEW-1)**

Comment:

In fact, IBEW 569 has already launched a [sic] electrical vehicle infrastructure training program, and IBEW electricians are building -- charging infrastructure throughout the state to support the growth of zero-emission vehicles. The ICT rule will also help accelerate this industry growth. **(B-O-IBEW-5)**

Comment:

We support the reg -- the new regulation -- proposed regulation, but we see a couple of opportunities that we don't want to miss on. And one has to do with the rollout plan. The rollout plan includes a requirement for training. **(B-O-SunLine)**

Comment:

We would like to partner with ARB in establishing a rollout -- or a rollout plan that establishes the minimum training requirements for funding and accepting zero-emission technologies. **(B-O-SunLine)**

Comment:

So we would ask that the Board consider in a training session a collaboration between ARB, and Sunline, and the Center of Excellence to establish the minimum requirements for training, and make it less arbitrary than it is now, in terms of getting a Board-approved plan. **(B-O-SunLine)**

Comment:

But again, we think this is an easy thing for ARB to do to partner with Sunline on this center of excellence for training. And we implore the Board to join with us. **(B-O-SunLine)**

Agency Response:

CARB agrees that gradual implementation of the purchase requirements will enable transit agencies to manage the risks, and structured the regulation accordingly. CARB also recognizes that investment supporting California workers can expand the benefits of the regulation beyond the primary emission reductions, and deliver much-needed job training and employment opportunities to communities across the state. CARB will work with the transit community and our sister state agencies, such as the California Workforce Development Board and Employment Development Department, to support workforce development and training in the operation and maintenance of zero-emission heavy-duty vehicle technologies. CARB will seek to leverage, to the maximum extent possible, existing and scalable curriculum already utilized by early adopters of zero emission buses. The Board approved this commitment in Resolution 18-60 to provide both direction and long-term flexibility.

CARB will also conduct a comprehensive review of program readiness at least one year prior to initiating any purchase requirement and will include an assessment of the impact of zero emission bus deployments on jobs and investments in pre-apprenticeship and workforce training programs.

D-3 Funding for training

Comment:

There is a steep learning curve for transit agency staff, who may be unfamiliar with high-voltage and high-pressure systems and advanced electric-drive propulsion systems. Integrating new and complex technologies seamlessly and successfully in order to ensure the compatibility of buses, fueling stations, and where necessary, safety upgrades to maintenance facilities, is critically important. Funding for Project Management and training activities associated with pilot projects is essential. (CTE)

Agency Response:

It is important for transit agencies to first work with technology providers (e.g., bus manufacturers, hydrogen fueling station and charging station providers, etc.) to receive and identify the training needs for the new technologies. Technology providers may have tailored solutions or recommendations to those specific training needs. CARB agrees funding for project management and training activities associated with pilot projects is essential. There are statewide training funds that can be used to support ZEB related training activities. For example, the Employment Training Panel and the California Energy Commission provides funding supports for workforce training programs. CARB will continue to work with transit agencies to identify training needs and resources.

E. ECONOMIC IMPACT ASSESSMENT

This section addresses all economic impact assessment related comments. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

E-1 Total Cost of Ownership

Comment:

The most significant concern with the proposed ICT Rule is the cost impact. The increase in capital and operating costs due to the proposed rule would have potentially devastating consequences for our system, as well as for transit across the state. We fear that this additional cost burden will significantly reduce and limit our ability to provide needed transportation to the disadvantaged and low-income, transit dependent communities that we serve. MTS has a rich history of being one of the most efficient, cost effective transit systems in the country, maximizing the amount of transit service we can provide within limited, existing resources. Significantly increasing MTS's costs will result in service reductions.

MTS will be forced to trade service for proposed ICT Rule compliance and implementation costs. Reducing service will subsequently have negative effects in achieving emissions reduction goals, as less available transit will lead to increases in personal vehicle miles traveled.

We believe that the proposed rule is based on overly aggressive projections and assumptions. We believe that almost every component used in the proposed ICT's Attachment I, Cost Updates, is understated and/or overly optimistic and not consistent with the "real world" data that has consistently been provided to CARB staff by CTA, its member transit systems, and MTS. This includes everything from bus prices, daily operating ranges of ZEBs, resulting bus replacement ratios, infrastructure costs and impacts, and the cost of electricity as a fuel. In addition to the significant underestimation of the costs of the proposed rule, the supporting cost analysis also includes extremely aggressive, speculative assumptions with regard to Low Carbon Fuel Standard (LCFS) revenue in the latter years of the analysis.

Attachment I, Cost Updates, section E. Statewide Costs states that adoption of the proposed rule will result in \$1.5 billion in savings by 2050 for transit systems. However, a more detailed view of CARB staff's estimate shows that the projected costs to transit, from 2020 to 2040 (the full implementation date of the proposed rule), is actually over \$2 billion (with just under \$1 billion offset by projected, estimated LCFS revenue). Using "real world" actual data from transit systems, CTA and MTS have completed a comprehensive analysis of the costs and estimate that the proposed rule will actually cost transit systems between \$2 to 4 billion in additional costs between 2020 and 2040. Specifically for MTS, we project our incremental, additional costs between 2020 and 2040 to be in the range of \$300 - \$450 million, in today's dollars. (**San Diego MTS**)

Comment:

MST remains concerned with the specifics of what is now in print as well as the impact the associated price tag will have on local agencies like MST. You should be aware that according to ARB staff's own estimates, which include some significant assumptions we would strongly dispute, the regulation will cost transit agencies \$1.1 billion between 2020 and 2040. If you remove the Low Carbon Fuel Standards (LCFS) funding, which does not even have statutory authorization through 2040, that price tag climbs to \$2.1 billion over the same time frame. (**MST-1**)

Comment:

The ICT Proposal should therefore be updated to do the following:

- Update the economic analysis so it is focused on the actual implementation period, and does not include out years beyond the Proposed ICT

requirements. This otherwise unfairly includes potential cost decreases in those years. **(OCTA)**

Comment:

My concern today is with the staff's assumptions of what the costs of this regulation will be, because our industry professionals for the last two and a half years have been projecting much higher costs. And this regulation also assumes significant State funding that is not guaranteed.

If ARB staff is wrong, it is our riders, riders with few transportation choices, and riders living in our most disadvantaged communities that will suffer if we have to reduce service just to buy and operate zero-emission buses. This would obviously be extremely counterproductive. **(B-O-San Diego MTS)**

Comment:

The cost of buses, the range of buses, the cost of electricity, the cost of bringing the power to our facilities, the cost of charging infrastructure for large urban systems that are space constrained that hasn't even been designed yet, are all projected out 30 years in the future to come to a conclusion that it's going to save us money. **(B-O-San Diego MTS)**

Comment:

We also want to reiterate our support for the California Transit Association's recommendation and the Association's alternative, namely including a benchmarking and regulatory assessment in the actual regulation.

We believe that in order to implement a responsible transition to zero-emission vehicles without imposing negative impacts on service levels and ridership, a regulatory assessment for evaluating real-world performance and costs with benchmarks established at the time the rule is adopted is important, and allowing transit agencies to use incentive funding for regulatory compliance because existing sources are often over subscribed. **(B-O-GGBHTD)**

Comment:

Further, ARB's cost estimates are substantially below most transit industry expert's estimates. Assumptions that ZEB can eventually replace conventional buses on a 1:1 basis and ZEB life cycle operational costs could be discounted by as much as 25 percent within the next decade are speculative. In fact, ARB's cost model does not fully account for electrical charging systems. The California Transit Association estimates statewide costs for such infrastructure could be as much as \$10 billion more than ARB's estimate. Further, ARB's cost model does not contemplate resiliency planning that will be necessary for state of emergency

scenarios. Not only can forecasts mislead ARB's Governing Board about the true capital cost of the ICT, a decision to move the rule forward without accurate projections could result in the rule's failure to protect the health of the public, our state's transit agencies, and regional mobility throughout California. The negative outcome could be further compounded if there are no meaningful offramps for transit agencies to access. **(Clean Energy)**

Comment:

Altogether, the ISOR projects that total costs of the program will increase each year through 2030 before starting to decline in the years thereafter (while still representing costs that are additional to current conditions). Any cost "savings" from the ZEB mandate will not be experienced until 2038. At that point in time, the relative reduction in cost from the ZEB mandate steadily increases from 2039 through 2050 when a total savings of \$1.5 billion is projected to be achieved over 30 years of program implementation (2020 to 2050).

Allison's long experience in the commercial truck market indicates that private companies and governmental fleets are willing to expend resources if there is a palpable benefit through enhanced operation and utilization of a vehicle. Our automatic transmissions may initially cost more when compared with other technologies, but savings can be achieved through greater productivity of the vehicle. Within the private sector, the market values "payback" in much shorter timeframes than contemplated by the ZEB mandate.

Allison realizes that the ZEB mandate is in the area of governmental policy versus the competitive marketplace and thus, the "willingness to pay" issue is addressed differently. However, CARB should more fully consider the implications of a mandate which carries with it negative costs for the first 15 years of implementation and whether additional flexibilities could assist in mitigating such costs and improving the opportunities for long-term success. **(Allison)**

Comment:

You should commit to funding the cost that come in higher than our current costs, or those your staff is currently projecting. We hope you'll provide guidance to your staff on these two critical asks that I've made today. **(B-O-CTA)**

Comment:

ARB's revised proposal does not address the concern expressed by transit operators that the operating costs of ZEBs already in service have been higher than for conventional buses, primarily for electricity and maintenance. This experience contradicts CARB staff's analysis that operating cost savings over the

life of a battery electric bus would more than offset the higher up-front capital costs. **(B-W-MTC)**

Comment:

Costs: The Discussion Document states that “on a one-for-one basis in California, the operational savings can make the total cost of ownership comparable to conventional buses even without incentives.” In several workshops, multiple transit agencies have stated that this is not true. A study conducted by LA Metro, using actual data rather than the conservative assumptions used in ARB’s Transit Fleet Cost Model, shows that electric buses have higher cost of total ownership than its current natural gas fleet⁸. LA Metro did not include a cost comparison to diesel buses because they do not have diesel buses in their fleet, however it is safe to assume that they cost difference between diesel and electric buses would be even greater.

In addition to the total operating costs, significant investment must be made to purchase, install and maintain charging infrastructure to power ZEBs. This cost would be passed to customers – transit users and/or electric customers – in the form of reduced service and/or increased costs. Not only would this increase consumer costs, this could also result in stranded assets and investments into existing fueling infrastructure. **(SoCalGas)**

Agency Response:

CARB recognizes the greater initial capital cost for zero emission buses (ZEBs) and associated infrastructure but also recognizes operational savings offset these costs over the life of a bus. The data and assumptions used in the staff analysis were developed in coordination with affected stakeholders and are detailed in the Standardized Regulatory Impact Assessment (SRIA) and ISOR.

The cost analysis provided in the SRIA and ISOR includes the “worst case scenario” for funding where it assumes grant funding is not available and all capital costs are paid up front. The ISOR also demonstrated that financing or battery leasing as viable options. These options can address higher upfront costs and spread them out over several years, and the annual installments would be paid for with operational savings. CARB used an example to illustrate the financing option in Attachment B of the Supplemental 15-Day Notices.¹⁰ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and would not result in adverse changes in transit service or fares. Resolution 18-60 expresses CARB’s intent that the regulation will not adversely affect service.

¹⁰ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

CARB's analysis considered the effects of the LCFS program, and arguably underestimated it. The SRIA applied a credit value of \$100 to illustrate how the credits could supplement the transition cost. Recently, the LCFS credit price was close to \$200,¹¹ which would reduce the regulation's costs further. The LCFS regulation will continue to set carbon reduction targets beyond 2030.¹²

In addition, staff prepared "Attachment B: Supplemental To Economic Impacts Assessment" as part of the 15-day package released on November 9, 2018.¹³ This analysis is an addendum to the Initial Statement of Reasons (ISOR) for the Proposed Innovative Clean Transit (ICT) Regulation that includes further analysis of costs and adds detailed financing examples that demonstrates the regulation is feasible and will not cause reductions in service nor adverse impacts on fares. The analysis shows that in the case that incentives are not available to reduce upfront costs, financing is a viable option for transit agencies for the incremental upfront cost of purchasing BEBs by distributing the incremental cost over several years. Compared with purchasing conventional buses, even without incentives, the impact of leasing BEBs on annual cash flow is not expected to be noticeable or cause adverse changes in transit service, fares, or ridership.

Further, the ICT regulation provides a phase-in schedule for technology to improve continuously and for transit agencies to learn from a small-scaled deployment. The ICT regulation also provides various safeguards in section 2023.4(c) to ensure transit service is not adversely affected. The Executive Officer will grant an exemption from the zero-emission bus purchase requirements upon request, if the specified criteria are met, under these circumstances:

1. Setback of construction schedule of needed ZEB infrastructure (section 2023.4(c)(1));
2. Available ZEBs cannot meet transit agency's daily mileage needs (section 2023.4(c)(2) ;
3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency's daily needs (section 2023.4(c)(3));
4. A required ZEB type that has passed Altoona testing and has met all safety requirements is unavailable for purchase (section 2023.4(c)(4));

¹¹ California Air Resources Board (CARB) (2019). Weekly LCFS Credit Transfer Activity Reports. Page last reviewed March 19, 2019. Available: <https://www.arb.ca.gov/fuels/lcfs/credit/lrtweeklycreditreports.htm>

¹² See section 95484 of the Low Carbon Fuel Standard regulation at https://www.arb.ca.gov/regact/2018/lcfs18/frolcfs.pdf?_ga=2.147285424.664056872.1553549032-1959568993.1456785342. Both Tables 1 and 2 set carbon intensity targets for 2030 and subsequent years.

¹³ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Attachment B: Supplemental to Economic Impact Assessment of the Initial Statement of Reasons for the Innovative Clean Transit Regulation (posted November 9, 2018), available at: <https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf>.

5. A transit agency's governing body declares a fiscal emergency (section 2023.4(c)(5));
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5)); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5)).

The safeguards ensure that no ZEB purchases are required unless available depot charging BEBs are available to meet range and operational needs with a single charge. The exemptions would apply even if other options like charging on route or fuel cell electric buses are available. These safeguards allow for exemptions from the ZEB purchase requirement if technology does not improve sufficiently to meet a transit agency's need and ensures that more buses are not needed to provide the same level of service. If exemptions are used the estimated capital costs would be lower than estimated by staff.

E-2 Bus Capital Cost

Comment:

The majority of HTA's commuter and intercity routes are 300+ miles which would mean either purchasing more buses for the same service or restructuring the routes. Capital funding for rural agencies is limited, especially when the price tag of the recent BEV we purchased was \$940,000 (before the HVIP). Restructuring routes means more operational costs because of the extra time it takes to "deadhead" buses from the yard to the starting/ending point in the route. **(B-W-HTA)**

Comment:

New Flyer does not expect the premium, or incremental capital cost of zero emission buses to diminish in the foreseeable future. For long range buses, batteries can equate to over 35% of the material cost of a bus. Industry experts forecast battery technology and higher manufacturing volumes will drive cost improvement. However, cost improvement will likely be offset by OEMs adding additional battery capacity to meet transit's extended range requirements. The market volatility of cell chemicals, potentially unstable trade policies, and the impact both factors may weigh on the Federal Transit Administration Buy America procurement requirements are also not predictable, nor long-term forecastable. **(B-W-New Flyer)**

Comment:

The incremental cost is real. I purchased three electric buses in 2015 at 10,000 additional incremental cost. Today, that same bus is \$60,000 more for my incremental cost. **(B-O-SDAP)**

Comment:

Bus purchase prices. MTS purchases forty foot CNG / RNG buses for \$525,000. The forty foot, battery electric pilot buses have a price of \$890,000, a difference of \$365,000, 69% additional cost per bus. This comes from the competitively procured Commonwealth of Virginia contract. **(San Diego MTS)**

Agency Response:

The ISOR of the ICT regulation acknowledges a higher initial cost. The ICT regulation also provides a gradual phase-in schedule to allow for technology improvement and price reduction. The staff analysis prepared for the ICT regulation cost analysis reflects a gradually-increasing zero-emission bus range as fleets expand their zero emission fleet to meet their needs.

The regulation provides various flexibilities for transit agencies to meet their ZEB compliance obligations and has built in many safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. The Executive Officer will grant an exemption upon request, if the specified criteria are met. For example, a transit agency may receive an exemption from the requirement to purchase ZEBs under these circumstances:

When a required zero-emission bus type cannot be purchased by a transit agency due to financial hardship. A transit agency may request an exemption from the zero-emission bus purchase requirements in section 2023.1(a) due to financial hardship.

Financial hardship would be granted if a fiscal emergency is declared by a transit agency's governing body following a public hearing, or a transit agency can demonstrate that it cannot offset the incremental cost of purchasing all available zero emission buses when compared to the cost of the same type of conventional bus. The regulation provides additional grounds for relief, as discussed above.

E-3 Infrastructure Cost

Comment:

Infrastructure. MTS's costs to install six depot chargers at our bus facility is almost \$600,000, almost \$100,000 per bus, which does not include any large scale upgrades to transformers, the grid service, or other utility based pieces that a full deployment will require. (**San Diego MTS**)

Comment:

Second is the expense of both the charging infrastructure and the long-term fuel costs of both electricity and hydrogen. The far exceed the cost that we're currently experiencing with our current fleet. (**B-O-LA Metro**)

Comment:

In addition, the excessive cost of adding charging infrastructure for a fleet of 80 vehicles -when it cost us over \$1 million to install power systems to serve our current 4 electric buses - will take funding away from other vital projects. We would hate to have our transit operator lose funding for the King City maintenance facility that will eliminate the deadheading 120 miles round trip to the central maintenance and operations facility in Monterey. (**TAMC**)

Agency Response:

Charger and charger installation cost varies by technology providers and locations. CARB understands there is an initial capital cost for purchasing zero emission buses

(ZEBs) and associated infrastructure greater than for conventional buses but also recognizes operational savings offset these costs over the life of a bus. In the case that a transit agency cannot offset the higher incremental cost of deploying a ZEB and infrastructure or cannot finance the difference, the transit agency could get an exemption from the zero-emission bus purchase requirement.

In the ISOR, staff acknowledges that funding is an important tool to reduce or eliminate the upfront costs of moving to ZEBs and encourages transit agencies to voluntarily purchase ZEBs before the requirements begin. There are several available funding programs that include incentives for infrastructure as describe below.

Transit agencies have been using HVIP for ZEB purchases. The amount of a voucher for a ZEB depends on the bus length, the zero emission technology, and the location of the vehicle deployed. Additional amounts could be available to assist with needed infrastructure including up to \$30,000 for chargers, and up to \$100,000 per bus for the purchase of five or more FCEBs. For fiscal year (FY) 2017-2018, the budget allocated up to \$180 million for the HVIP program with at least \$35 million to fund ZEBs exclusively. An additional \$125 million has been allocated to the HVIP program per SB 856 for FY 2018-2019. Since HVIP's inception in FY 2009-2010 through April 2018, the program has paid for 47 ZEBs from eight transit agencies. As of April 2018, there are additional requests under HVIP for 139 ZEBs from nine transit agencies.

The Moyer Program also covers infrastructure projects. Public transit buses are eligible to receive infrastructure funding up to 50 percent of a hydrogen station or a battery charging station if a station has no public access. There will be up to an additional 10 percent (total of 60 percent) for publicly accessible hydrogen and battery charging stations and up to an additional 15 percent (total of 65 percent) for projects with solar or wind power generation systems. Eligible costs include design and engineering fees, cost of equipment, and installation costs. Unlike vehicle projects, infrastructure projects do not have to meet a cost-effectiveness limit.

As stated in the ISOR, on May 31, 2018, the California Public Utility Commission (CPUC) unanimously approved transportation electrification projects proposed by California's three major Investor Owned Utilities (IOUs), with \$738 million, including \$236 million from Pacific Gas and Electric and \$343 million from Southern California Edison, for medium and heavy-duty infrastructure, to meet the requirements of Senate Bill 350, chapter 547, statutes of 2015.¹⁴ This approval would reduce the infrastructure costs to transit agencies in those utility service areas. In addition, on May 25, 2018, CARB approved allocations for Volkswagen Environmental Trust Funds that included up to \$65 million for zero-emission transit buses.

¹⁴ *Application of San Diego Gas & Electric Company* (U 902E) for Approval of SB 350 Transportation Electrification Proposals (Cal.P.U.C. Decision 18-05-040 May 31, 2018) No. A 17-01-020 and Related Matters A 17-01-021, 17-01-022.

These programs will help transit agencies address the initial barriers. It is also reasonable to anticipate the price of infrastructure will decline and the operating costs will decrease as the technology becomes familiar.

In the case that a transit agency cannot finance the higher incremental cost of deploying a ZEB and infrastructure, the transit agency could get an exemption from the zero-emission bus purchase requirement.

E-4 Fuel Cost for ZEBs

Comment:

Additionally, our average cost of gasoline is \$2.25, for diesel a \$1.85, and for hydrogen \$7.40 a kilogram. Cost of electricity is another concern of ours. **(B-O-AC Transit)**

Comment:

Second is the expense of both the charging infrastructure and the long-term fuel costs of both electricity and hydrogen. The far exceed the cost that we're currently experiencing with our current fleet. **(B-O-LA Metro)**

Comment:

Electricity cost is very complex. It's not just about electricity of a kilowatt hour. You also have demand fees and taxes which are not advertised in your kilowatt hours. So that's not the same as miles or gallons of fuel. **(B-O-SDAP)**

Comment:

As noted by Eileen Tutt of CalETC PG&E is taking very seriously the need to support our fleet customers and commercial electric vehicles stations with rates that are adapted to their operations. We've committed at the Public Utilities Commission to present a rate to them in the near future, and we're in the process of designing that rate. **(B-O-PG&E)**

Comment:

Increased "fueling" costs

- There is an unknown cost to assess the local utilities' current power grid to accommodate powering the transit fleet.
- There is significant potential unfunded capital costs to revamp the existing power grid to support BEB infrastructure; not only is the cost unfunded, Pasadena is not eligible for most grant or dedicated funding available to other transit agencies due to its "local" funding category in Los Angeles County.

- Pasadena would be paying the regular commercial tariff rate for electricity; its current CNG fuel rate is only \$1.72/GG. (**City of Pasadena**)

Comment:

The ICT Rule does not address the extremely high cost of electricity, especially in Southern California, as well as potential shortages of availability in heavily urbanized areas. In addition to calling for a new ratemaking to provide lower rates to transit agencies operating ZEBs, we believe that the ICT Rule should include a strategy for addressing such things as availability and time of use pricing to minimize financial and operational impacts of moving toward 100 percent electrification. (**San Diego MTS**)

Comment:

The second significant concern that NREL's work documents relative to our BEB project is related to how much it is costing us to charge our BEBs with electricity.

County Connection purchases electricity for its BEBs from PG&E. Currently, PG&E does not offer us a "transit rate" for purchasing electricity for our BEBs. Moreover, to date they have indicated a plan to do so as they implement SB350. Therefore, we are currently paying standard rate payer rates. This - according to NREL - is resulting in County Connection paying - on average - \$8.75 per diesel/gallon/equivalent (dge) for the electricity from PG&E that we sue [sic] to charge our eight BEBs. During the same period of time, NREL documented that County Connection paid \$1.86 per gallon for diesel fuel. It should be noted that County Connection has been using renewable diesel for its diesel powered buses since mid 2017.

While overall, we are pleased with the operation of our BEBs, if these two concerns cannot be overcome over time, we will not be able to sustain an operation that increases the reliance on BEBs without cuts to service and/or undue increases in passenger fares. This is particularly acute when it comes to the costs of electricity. If the cost electricity does not come down substantially from \$8.75 per dge, there is no way can sustain our present levels of service - let alone improve services that would reduce Greenhouse gases - and transition further to BEBs.

In short, while we at County Connection desire to put more BEBs into service in the future, we cannot do so if the price of electricity remains at a cost where we have to cut service to pay for the price differential between electricity and renewable diesel. (**County Connection**)

Comment:

I want to just make a reference to some of the things we've heard today about the cost associated with electricity. I will just tell you that all of the utilities are ready to serve this load, and eager to serve this load. And, in, fact they're all working on rate -- rate structures that will benefit transit authorities. So they are very concerned about this. They are with it. They are on top of it, and they will address these issues. **(B-O-CalETC)**

Agency Response:

As explained in Appendix D of the ISOR, fuel costs are determined by unit fuel price and total fuel consumption. Overall, the cost of fuel (electricity or hydrogen) after accounting for the Low Carbon Fuel Standard (LCFS) credit value is less than that for comparable combustion buses.

Standard electricity rates vary by utility, schedule of demand, total customer demand, and season. Commercial customer electricity rates commonly have a demand charge on top of the electricity usage rate and both costs are included in the analysis. A demand charge is a fee paid based on the rate at which the customer draws electricity. Demand charges are levied based on the maximum electricity a customer draws at once and the time-of-use period in which the electricity is used. The cost of demand charge per mile is calculated as the cost of demand charge of a charger during the monthly billing period divided by total number of miles driven by ZEBs charged by that charger during the billing period. The cost of demand charge per mile could be higher when fewer ZEBs are utilizing the same charger to distribute the cost of demand charge across the collective miles driven by the buses being charged; however, when the ZEB fleet grows and the charger is highly utilized, the demand charges get spread out over more BEBs and miles.

Under SB 350, the Legislature provided several directives to state agencies to support GHG reduction and transportation system electrification. Among them, the California Public Utilities Commission (CPUC) is directed to oversee investor-owned utilities' (IOUs) investments in transportation electrification; IOUs can propose rate designs that favor charging electric vehicles. For example, CPUC has approved a commercial rate proposal for electric vehicles from the Southern California Edison (SCE).¹⁵ PG&E has

¹⁵ See, e.g., California Public Utilities Commission (CPUC) (2018). Summary of Decision on Transportation Electrification Program Proposals from the Investor-Owned Utilities. May 31, 2018. Available at: <https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442457607>.

also proposed a new rate that, if approved, would reduce demand charges and electricity costs for charging buses.^{16,17}

Regarding costs of fuel-cell buses, hydrogen price is affected by various factors, including station throughput, production and delivery methods, energy sources, and production rates. Unlike crude oil, there is no international price standard for hydrogen because it is not shipped and traded in a global market. Hydrogen price depends highly on station throughput.

In addition, the ICT regulation has built in many safeguards in section 2023.4 to address potential unintentional consequences and ensure transit service is not adversely affected. For example, a transit agency may receive an exemption from purchase of ZEBs when a required zero-emission bus type cannot be purchased by a transit agency due to financial hardship, or when a transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses as specified in section 2023.4(c)(5) when compared to the fuel cost of the same type of conventional internal combustion engine buses.

E-5 Stranded Assets

Comment:

Significant investments of public funds have been made to provide and support existing CNG infrastructure to meet current CARB rules.

- Pasadena has invested heavily in developing its existing CNG fueling infrastructure; including a recent expansion of its CNG facility.
- Pasadena would need to reimburse the cost of this transit asset back to its original fund source, less the depreciation, for this newly expanded facility.
(City Of Pasadena)

Comment:

Costs: The Discussion Document states that “on a one-for-one basis in California, the operational savings can make the total cost of ownership comparable to conventional buses even without incentives.” In several workshops, multiple transit agencies have stated that this is not true. A study conducted by LA Metro, using actual data rather than the conservative assumptions used in ARB’s Transit Fleet Cost Model, shows that electric buses have higher cost of total ownership than its current natural gas fleet⁸. LA Metro did not include a cost comparison to diesel buses because they do not have

¹⁶ Application of Pacific Gas and Electric Company (U 39 E) for Approval of its Commercial Electric Vehicle Rates. Filed on November 5, 2018, Before the Public Utilities Commission of the State of California. Application 18-11-003. Available at: <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M238/K227/238227315.PDF>.

¹⁷ The schedule for PG&E’s rate proposal application (A 18-11-003) is available in CPUC’s document, Assigned Commission’s Scoping Memo and Ruling, February 14, 2019. Available at: <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M266/K647/266647196.PDF>.

diesel buses in their fleet, however it is safe to assume that they cost difference between diesel and electric buses would be even greater.

In addition to the total operating costs, significant investment must be made to purchase, install and maintain charging infrastructure to power ZEBs. This cost would be passed to customers – transit users and/or electric customers – in the form of reduced service and/or increased costs. Not only would this increase consumer costs, this could also result in stranded assets and investments into existing fueling infrastructure. **(SoCalGas)**

Agency Response:

The previous Fleet Regulation for Transit Buses did not require transit agencies to convert from diesel buses to CNG buses. The ICT regulation provides a gradual phase-in to allow the industry and technology to improve. The staff analysis prepared for the ICT regulation reflects a gradually increasing zero-emission bus range based on technology evolution. The ICT regulation does not require an accelerated retirement of conventional buses with internal combustion engines. CNG infrastructure can be used so long as transit agencies are operating buses that use CNG. Further, the ICT regulation provides an exemption from ZEB purchase requirements if a transit agency declares a fiscal emergency.

E-6 Fuel Cost and Extra Revenue

Comment:

In addition, RTA has experienced significant savings by operating a CNG fleet. We have been able to take advantage of various programs that reward transit agencies for the use of alternative fuels. In fact, to date, RTA has received over \$9 million in revenue from the federal government's Alternative Fuels Excise Tax Credit, over \$1.9 million from California's Low Carbon Fuel Standards program, and over \$1.5 million in Renewable Identification Numbers (RINs) revenue under the federal Renewable Fuel Standard Program. These revenues are reinvested into RTA's system and allow us to put more buses on more roads more frequently. Losing these revenues because of a shift in fuels sources would again result in less bus service, more car usage and more air pollution. **(RTA-1)**

Agency Response:

The staff analysis compares the costs of deploying ZEBs compared to the buses that transit agencies are currently using. Both fuel consumption (a result of vehicle fuel efficiency) and fuel price affect the fuel cost. Vehicles with different fuel types and technologies have different fuel efficiencies. In general, in urban cycles with lower speeds and frequent stop-and-go driving, BEB's fuel efficiency is about five times that of diesel and CNG buses; on commuter routes, BEB fuel efficiency is about three times that of diesel and CNG buses. The average fuel efficiency, and the details of the fuel

cost data and assumptions for the ICT cost analysis, are discussed in the ISOR Appendix D¹⁸ and Appendix I¹⁹ and Form 399²⁰.

In the cost analysis in the Standardized Regulatory Impact Assessment (SRIA) for the ICT regulation, that fuel cost saving was estimated to be around \$3.5 billion from 2020 to 2043 compared to the current conditions.²¹ In the updated cost analysis in the ISOR, the fuel cost saving was estimated to be around \$3.9 billion from 2020 to 2050 (see ISOR Appendix K²² and Form 399²³).

The Low Carbon Fuel Standard (LCFS) program provides benefits for clean transportation fuels, including electricity and hydrogen. The staff cost analysis also included the value of LCFS credits for CNG, electricity and hydrogen. The benefits from the LCFS could be an extra revenue stream for these fuels. Renewable hydrogen produced by biomass is also eligible for federal tax rebates and Renewable Identification Number (RIN) credits (renewable fuel credits).

In addition, ZEBs have far fewer health impacts compared to buses with conventional internal combustion engines. Using conventional buses with internal combustion engines have societal costs, such as increased hospital and emergency room visits and missed school and work days, which are not factored in by transit agencies but are part of the overall societal cost. Future cost savings from ZEB operation could also be an additional revenue stream.

E-7 The Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) Specific Requirements

Comment:

¹⁸ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix D: Total Fuel Costs. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appd.pdf?_ga=2.194916653.1056658111.1554742789-1649277338.1553838884.

¹⁹ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix I: Cost Updates. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appi.pdf?_ga=2.186498217.1056658111.1554742789-1649277338.1553838884.

²⁰ California Air Resources Board (CARB) (2019). Proposed Innovative Clean Transit Regulation, An Amendment to the Fleet Rule for Transit Agencies, Economic and Fiscal Impact Statement, Form STD 399, June 18, 2019.

²¹ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Standardized Regulatory Impact Assessment (SRIA), Table C12, Released April 19, 2018. Available at: http://www.dof.ca.gov/Forecasting/Economics/Major_Regulations/Major_Regulations_Table/documents/CT_SRIA_ARB_4-23-18.pdf.

²² California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix K: Statewide Cost Analysis Spreadsheet. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appk-statewidecostanalysis.xlsx?_ga=2.93126173.1056658111.1554742789-1649277338.1553838884.

²³ California Air Resources Board (CARB) (2019). Proposed Innovative Clean Transit Regulation, An Amendment to the Fleet Rule for Transit Agencies, Economic and Fiscal Impact Statement, Form STD 399, June 18, 2019.

While there continues to be a need for pilot projects in order to accelerate the transition to zero-emission buses, the use of the HVIP voucher program includes restrictions that should be addressed. CTE urges CARB to allow multiple operators to submit a single application for vehicle vouchers. These consortium purchases would provide greater volumes and certainty to bus manufacturers that would result in lower vehicle prices. **(CTE)**

Comment:

While the proposed regulation is much improved, I ask for your consideration of Santa Cruz Metro's concerns relative to excluded buses, the availability of HVIP dollars, and the need for the final regulation to include a mandatory provision that the Board create a point in time in which electric bus data is collected, reviewed, and benchmarked, and which evaluate zero-emission buses against conventional buses relative to cost and performance measures, including the industry's progression towards increasing bus end-of-life range. **(B-O-Santa Cruz METRO)**

Comment:

To address these serious concerns, MTC recommends that CARB:

- Seek funding levels for HVIP that are sufficient to provide vouchers for all ZEBs procured in the state (other than those funded with VW Trust funds);
- Redirect funding from CARB's discretionary funding programs to HVIP to provide a reliable, non-discretionary source for ZEBs and related infrastructure;
- Make HVIP funds available for mandated ZEB purchases as well as early adopters.
- Retain the infrastructure enhancements for HVIP vouchers or develop another funding source for infrastructure costs.
- In addition, transit operators need to be able to lock in HVIP funds at least two years before the vouchers are needed to pay for ZEBs, so the operators know they have sufficient funds when planning procurements. As the current timely use policy requires vouchers to be cashed in within one year of award, MTC also suggests CARB extend the timely use policy to better align with actual procurement practices. **(B-W-MTC)**

Comment:

HVIP, we echo MTC and Glen Tepke's comments on HVIP in the Bay Area. It's going to be critical that we can use those HVIP funds in line with how MTC and the operators in that region replace buses. And MTC controls that process. And the federal funds in the Bay Area flow through MTC first.

And again, if you buy a because [sic] with an FTA dollar, you have to keep it a minimum number of years. And if you replace it early to do something else,

there's huge federal penalties in that. So we'd like to see an alignment with HVIP.
(B-O-County Connection)

Agency Response:

CARB has a portfolio of incentive programs that provide funding opportunities for transit buses and other vehicles, and supporting infrastructure. Each incentive program has its own statutory requirements, emission reduction goals, and eligible project types. The Carl Moyer Program is designed by statute to deliver cost-effective emission reductions. California Health and Safety code section 44283 requires that projects funded by the Carl Moyer Program meet cost-effectiveness limits, except for infrastructure projects. The core principle of the program is to achieve surplus emission reductions that are creditable to the State Implementation Plans. Other incentive programs meet different primary objectives. For example, the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) is a streamlined funding program to support advanced technologies with higher up-front costs common in the early commercialization phase. HVIP incentive amounts are not based on cost-effectiveness, but are set at levels to encourage fleets to purchase new technologies by offsetting some or all of the incremental cost. Fleets are eligible to apply for HVIP funding if they comply with all regulations at the time of application.

Most funding programs encourage early actions instead of paying for regulatory compliance; therefore, the regulation is structured in a way to provide transit agencies with the opportunity to act early and purchase ZEBs ahead of the compliance requirements to remain compliant and therefore eligible for funding.

The cost analysis in the Standardized Regulatory Impact Assessment (SRIA)²⁴ and the ISOR²⁵ reflects the “worst case scenario” for funding by not presuming any is available. The financing and battery leasing opportunities provide additional means to address higher initial costs by spreading them over several years, and the annual installments would be offset by operational savings. CARB used an example to illustrate the financing option in Attachment B of the Supplemental 15-Day Notices.²⁶ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and would not result in adverse changes in transit service or fares.

²⁴ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Standardized Regulatory Impact Assessment (SRIA), Table C12, Released April 19, 2018. Available at: http://www.dof.ca.gov/Forecasting/Economics/Major_Regulations/Major_Regulations_Table/documents/ICT_SRIA_ARB_4-23-18.pdf.

²⁵ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix K: Statewide Cost Analysis Spreadsheet. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appk-statewidecostanalysis.xlsx?_ga=2.93126173.1056658111.1554742789-1649277338.1553838884.

²⁶ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

Funding is allocated by the Legislature through an annual budget appropriation process which might include a specific sub-allocation to HVIP. The annual funding need for HVIP is determined based on historical demand. Consideration is also given to technology and market status, and other important factors as described in the Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from the Low Carbon Transportation Investments and the Air Quality Improvement Program (AQIP)²⁷, and recommendations are developed that help to shape the Funding Plan. The annual funding need for a particular vehicle type and technology is part of the Funding Plan and will be assessed based on technology and market status, and other important factors. The annual Funding Plan is evaluated and approved by the Board.²⁸

HVIP, however, is just one of the funding programs in CARB's portfolio of clean transportation incentives that can be used to purchase transit vehicles.²⁹ Other potential funding programs include the Volkswagen Mitigation Trust³⁰ and the Carl Moyer Program.³¹ The California Department of Transportation (Caltrans) offers operating and capital assistance for transit agencies through its Low Carbon Transit Operations Program (LCTOP)³², and the California State Transportation Agency funds projects through its Transit and Intercity Rail Capital Program (TIRCP)³³. Funding is also available from federal agencies, such as the U.S. Department of Energy³⁴ and the Federal Transit Administration.³⁵

Further, a comprehensive review will be conducted at least one year prior to initiating any ZEB purchase requirements of program readiness, considering factors such as costs, performance, reliability of ZEBs, and infrastructure. CARB staff is also committed to provide an annual update to the Board on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted. Both the annual update of the ICT program and the comprehensive review on program readiness

²⁷ California Air Resources Board (CARB). Fiscal Year 2017-18 Funding Plan for Clean Transportation Incentives, Part II - Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and AQIP. Released on November 9, 2017.

https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1718_funding_plan_final.pdf.

²⁸ California Air Resources Board (CARB). Low Carbon Transportation Investments and AQIP Funding Plans <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>.

²⁹ California Air Resources Board (CARB). California HVIP. <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>.

³⁰ California Air Resources Board (CARB). Volkswagen Environmental Mitigation Trust for California <https://ww2.arb.ca.gov/our-work/programs/volkswagen-environmental-mitigation-trust-california>.

³¹ California Air Resources Board (CARB). Carl Moyer Memorial Air Quality Attainment Standards Program <https://www.arb.ca.gov/msprog/moyer/moyer.htm>.

³² California Department of Transportation. Low Carbon Transit Operations Program <http://www.dot.ca.gov/drm/splctop.html>.

³³ California Department of Transportation. Transit and Intercity Rail Capital Program <http://www.dot.ca.gov/drm/sptircp.html>.

³⁴ U.S. Department of Energy, Energy Efficiency and Renewable Energy. <https://www.energy.gov/eere/office-energy-efficiency-renewable-energy>.

³⁵ U.S. Federal Transit Administration, Capital Investment Grants Program. <https://www.transit.dot.gov/CIG>.

will identify the status of ZEB technologies and will inform funding strategies related to zero-emission vehicles and infrastructure. The Board reviews and approves the funding plan based on the best information available.

E-8 Funding for Regulation Compliance

Comment:

Role of Incentives (N/A): The proposed regulation would limit access to incentive funding to transit agencies that exceed their baseline ZEB purchase requirements.

We continue to assert that the state's experience with ZEB deployments – i.e. 450 ZEBs now operating, or on order, all purchased with the help of state and/or federal incentives – the high cost of the proposed regulation between 2020 and 2040, and the role that robust transit service must play in reducing emissions from the transportation sector requires that the state remove all barriers to transit agencies accessing incentive funding. We recommend that ARB fund the transition to ZEBs, even if that requires directly funding regulatory compliance. We note that we are not alone in making this request: Californians for Zero-Emission Vehicles, an advocacy group representing ZEB manufacturers and interest groups, and BYD Motors, Inc., recently filed similar comments with you. Like the Association, these groups recognize the devastating impact that an unfunded ZEB purchase requirement could have on the vital public service our members provide. (CTA)

Multiple Comments:

The following seven commenters share the same comment regarding funding for regulatory compliance.

Incentives: The staff report supporting the proposed regulation emphasizes the importance of incentive funding to minimizing adverse impacts to transit service (see Initial Statement of Reasons, pages ES-8, III-8, VIII-26). Given the stated importance of this funding and our shared goal of protecting vital transit service, this provision would require ARB to revise its current policy disallowing the use of incentive funding to meet regulatory compliance to explicitly allow transit agencies to use incentive funding whenever they are prepared to purchase a ZEB. (ARBOC, FCRTA, GGBHTD, TCTC-2, WESTCAT-2, B-W-HTA, B-W-NCTD)

Comment:

We fully understand that ARB cannot make commitments for future funding because you do not control the State's purse strings; the Legislature does. That said, our industry has long argued that accessing the incentive funding that

ARB does have should be made much simpler and more useful to transit agencies.

Under the proposed regulation, transit agencies would only be able to access ARB's incentive funding – primarily Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project dollars – if they take early action to procure ZEBs before the purchase mandates kick in or if they procure more ZEBs than is required. Unfortunately, this will mean that transit agencies that cannot procure ZEBs early because their fleets have not reached their useful life when the purchase mandate goes into effect, or because their financial positions won't allow it, would be barred from accessing incentive funding for future ZEB procurements. **(MST-1)**

Comment:

The ICT Proposal should therefore be updated to do the following:

- Explicitly ensure that all ARB grant funding programs where ICT activities are eligible can continue to be used by transit agencies to meet the requirements put in place by the ICT Proposal. **(OCTA)**

Comment:

Given the significant fiscal constraints this rule will place on small and large operators, the Hybrid and Zero Emission Truck & Bus Voucher (HVIP) funds must be available for compliance with the rule, not just an incentive program. **(CALACT)**

Comment:

The enactment of the ICT regulation would force RTA to incur millions of dollars of unexpected costs to buy zero-emission buses (ZEBs), retrofit and upgrade our facilities, train our workforce on a new and unfamiliar technology, and install charging infrastructure. While there are incentives that might help defray some or [sic] those costs, RTA would undoubtedly be responsible for significant costs to provide an acceptable level of service. Further, the proposed ICT would remove certain incentives that would help RTA achieve a level of compliance once the rule is determined. **(RTA-1)**

Comment:

Transit agencies are concerned that once a rulemaking occurs we will no longer be eligible for the funding incentives that we currently use to offset the higher cost of ZEB purchases. **(San Diego MTS)**

Comment:

We also fully support the Association's recommendation to relax limitations on incentive funding, which currently require these dollars to be used for ZEB purchases that exceed regulatory requirements. Given the complicated nature of converting to a fully electrified fleet, it is essential that incentive funding is available to transit agencies whenever they are ready to purchase a ZEB or make investments in infrastructure. (**Samtrans**)

Comment:

The Hybrid and Zero Emission Truck & Bus Voucher (HVIP) provides a simplified and successful process for offsetting the cost of a zero emission bus. However, given the scale of the proposed transition, the strict timeline, and unknown delays in vehicle production and infrastructure implementation, the HVIP funds must be available as an incentive and compliance program. In addition, CARB must clearly request that the Legislature create an infrastructure funding program. Without a secure source for infrastructure investments in fueling/charging facilities, maintenance facilities, and storage capacity, the ability to meet the goals of this rule is questionable at best. (**AC Transit**)

Comment:

CARB must change their interpretation of the availability of HVIP to transit agencies. Currently, CARB insists that HVIP is only available to transit agencies that purchase ZEBs ahead of the Purchase Schedule/mandate. CARB needs to change the HVIP program to allow HVIP dollars to be available to any transit agency that purchases ZEBs and at any time between now and 2040, and beyond. (**Santa Cruz METRO**)

Comment:

The various individual transit operators are all on different bus replacement cycles based on when they receive the necessary federal funding to pay for replacement buses. Some of these federally defined bus replacement schedules will not allow an operator(s) to purchase "early" in terms of meeting the proposed regulation when they are replacing existing non-zero emission buses. In those cases, present policies on the use of incentive funding won't allow those transit operators to use the incentive funds. Thus, some operators are going to be financially penalized for simply adhering to federal transit vehicle procurement rules.

Given the stated importance of this funding and our shared goal of protecting vital transit service, and at the same time move forward together towards full ZEB implementation within public transit by 2040, ARB should revise its current policy disallowing the use of incentive funding to meet regulatory compliance to explicitly allow transit agencies to use incentive funding whenever they are prepared to purchase a ZEB at least through 2029. (**County Connection**)

Comment:

Further, under the proposed ICT Regulation, HVIP and LCTOP funding would not be an eligible fund source for buses mandated under the regulation. Given the current near and long-term capital needs of NVRTA the agency already plans on delaying the purchase of replacement diesel buses, with the additional cost of ZEBs with no dedicated funding NVRTA would likely have to delay purchases further. The only way that NVRTA would be able to meet the currently proposed ZEB procurement schedule is if CARB relaxed ZEB bus eligibility rules for all the grant funding that it currently administers - at least until the cost and performance of ZEBs, (inclusive of factoring the cost of building new compatible infrastructure cost) are on par with traditional transit vehicles. **(NVRTA)**

Comment:

There are currently unprecedented amounts of incentive funding in the state. Greenhouse Gas Reduction Funds (GGRF) are expected to be able to fund a portion of the near-term turnover to zero emission buses. Many of the transit agencies that have committed to zero emission buses have already used funding for early action. However, if ICT is approved and purchasing zero emission buses becomes a compliance obligation, transit agencies will no longer be eligible for incentives. Early actors that have already committed to zero emissions, such as large transit agencies, will be able to access the funds. Transit agencies that are not ready to move to zero emissions will not be able to use state incentives and their ability to access federal funds may also be at risk. **(SoCalGas)**

Comment:

Importantly, the funding should be accessible to transit agencies for funding regulatory compliance. Although CARB policy has historically adhered to a “polluter pays” principle to put guardrails between funding programs and regulatory compliance, the ICT rule’s narrow application to solely transit agencies calls for a more nuanced analysis. Previous regulations prevented access to subsidies for compliance because doing so would require the use of public state funds to bring private fleets into compliance.

As the ICT rule only applies to public transit agencies, which rely solely on fares and funding from federal, state and local sources, the concern about public funds going to private fleets is not applicable in this case. Additionally, transit agencies provide an essential public service to the state’s most disadvantaged communities, which argues strongly for the ability to continue to access state incentives to ensure that these services operate smoothly. A dedicated and reliable funding stream will ensure that funds meant to ensure service reliability and state of good repair and not diverted. For these reasons, BYD strongly urges the Board to allow transit agencies to continue to access vouchers even after the rule. **(BYD)**

Comment:

We strongly support continued funding of incentive programs as available through the life of the regulation. Programs such as HVIP are essential to assist the transition to 100% zero-emission. (**Proterra**)

Comment:

CalETC continues to support allowing transit agencies to access public funding, to the extent allowed by law, throughout their transition to a zero-emission fleet, so long as the 2040 deadline for a zero-emission transit system is not delayed. Transit agencies face unique operational and economic difficulties, and they provide an extremely important service for our communities. Regulatory and incentive programs should account for this unique situation. Should there be a viable option to allow for transit agencies to access incentive funding as they transition to ZEBs, even after purchase-requirement deadlines commence—such as modifying the criteria of the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)—we would support that option. (**CalETC**)

Comment:

In our view, the two most suitable current funding sources for the incremental costs of ZEB procurements are programs managed by CARB -the Hybrid Voucher Incentive Program (HVIP) and the Volkswagen Environmental Mitigation Trust. However, ZEBs procured to comply with the purchase requirement schedule would not be eligible for either of these sources; only ZEBs purchased earlier or in greater numbers than required would be eligible.

This policy is intended to create an incentive for early compliance, but operators do not have much discretion over when they procure buses. Buses are typically replaced every 12 to 14 years, and cannot be replaced early due to federal funding requirements. CARB's incentive funding approach will therefore result in inequitable treatment of operators based solely on the vagaries of their bus replacement cycles. For example, a large operator whose next major procurement is due in 2022, the year before the purchase requirement takes effect, could use HVIP funds for all of the ZEBs they purchase, while a similar operator whose next replacement does not start until 2029, when the ZEB requirement would be 100%, would not be eligible for any vouchers. (**B-W-MTC**)

Comment:

And speaking of incentives, I do want to respond to a number of folks who keep raising the idea that compliance incentives should be allowed through and include compliance. It's not unusual for regulated entities to call for funding for compliance. However, the point of incentives is to capture early benefits for the

public. And I think that's where we need to continue to focus when we think about incentives and encourage these entities to get in line soon, and use those incentives, get early adoption, and get us early reductions. **(B-O-Sierra Club-3)**

Comment:

One is the incentive funding that the Air Resources Board manages, the HVIP, Hybrid Voucher Incentive Program, and the Volkswagen Environmental Mitigation Trust Funds. We think those are kind of the ideal funding sources for helping the transit operators cover the incremental capital costs of complying with the regulation.

However, under the proposal, those funds could not be used for zero-emission buses that are purchased in compliance with the schedule for the purchase requirement. They only could be used if the operators are buying buses sooner or in larger quantities than are required.

And the problem with an incentive approach like that, is that incentives only work if the operators have the ability to time the purchase of their buses to take advantage of those incentives.

Operators do not have a lot of discretion over when they buy their buses. Their buses are typically replaced about every 14 years. They cannot be replaced early due to federal funding requirements. So whether an operator is able to take advantage of that incentive funding depends more on kind of the luck of the draw of when their buses are next due for replacement than it does with their, you know, willingness to buy zero-emission buses. So we think that all ZEBs that are purchased in the state should be eligible for the vouchers from one of those programs. **(B-O-MTC)**

Comment:

We are advocating that you rethink current Board policy which disallows the use of all the incentive funding you've heard about today to meet regulatory compliance. When those mandates come online, we asking for funding. Please put in the regulation provisions for funding regulatory compliance, not just incentivize our folks to get ahead. But when it's time for the folks who weren't there yet to do this, they must do it, give them the funding, please. **(B-O-CTA)**

Comment:

And while BYD is supportive of the rule, we do believe that the State should continue to provide at least some of the resources to make this rule successful. As stated in our letter we believe that the transit agencies should be able to continue to tap into programs like HVIP to reduce the cost of purchasing buses needed to comply with the rule.

Given the important role that transit agencies play in reducing vehicle miles traveled, while also serving disadvantaged communities, we must ensure that they have the resources needed to be successful in lowering greenhouse gas emissions. **(B-O-BYD)**

Comment:

And it really falls on the State legislature to work with CARB to fund pilot projects that can benchmark the success of these technologies to make them viable, and to continue the financial support by continuing HVIP funding beyond once the regulation is adopted. That is the need to help transit agencies scale up to manage their entire fleets. **(B-O-CTE)**

Comment:

We believe that in order to implement a responsible transition to zero-emission vehicles without imposing negative impacts on service levels and ridership, a regulatory assessment for evaluating real-world performance and costs with benchmarks established at the time the rule is adopted is important, and allowing transit agencies to use incentive funding for regulatory compliance because existing sources are often over subscribed. **(B-O-GGBHTD)**

Comment:

And in the reference [sic] of time, we also encourage you to increase HVIP funding for all meeting the mandate by all things. **(B-O-CALACT)**

Comment:

I just want to also hammer home that our largest priorities for this regulation is that we strongly want the regulation to succeed by providing establishing cost and performance benchmarks, a rigorous performance review, and funding for regulatory compliance. We support the overall goal of 2040. **(B-O-MST)**

Agency Response:

These comments suggest changes to funding programs and are not directed at the ICT regulation because this regulation does not govern funding requirements or policies, and those provisions were not proposed to be considered. The regulatory structure that enabled and encouraged transit agencies to procure zero-emission buses ahead of the regulatory purchase requirements would preserve that funding. For large transit agencies, the purchase requirement starts in 2023, so all transit agencies are eligible for funding prior to 2023. If transit agencies go above and beyond the regulatory requirements by making early ZEB purchases, the early purchase could also provide them additional access to funding in later years.

The ICT regulation also has built in many safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. The Executive Officer will grant an exemption upon request, if the specified criteria in section 2023.4(c) are met. For example, a transit agency may receive an exemption from the requirements to purchase ZEBs if a transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5)).

The cost analysis in the Standardized Regulatory Impact Assessment (SRIA)³⁶ and the ISOR³⁷ reflects the “worst case scenario” for funding by not presuming any is available. The funding uncertainty was analyzed in the ISOR referencing financing and battery leasing as viable options. These options can address higher upfront costs and spread them out over several years, and the annual installments would be paid for with operational savings. CARB used an example to illustrate the financing option in Attachment B of the Supplemental 15-Day Notices.³⁸ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and would not result in adverse changes in transit service or fares.

Funding is allocated by the Legislature through an annual budget appropriation process which might include a specific sub-allocation to the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP). The annual funding need for HVIP is determined based on historical demand. Consideration is also given to technology and market status, and other important factors as described in the Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from the Low Carbon Transportation Investments and the Air Quality Improvement Program (AQIP),³⁹ and recommendations are developed that help to shape the Funding Plan. The annual funding need for a particular vehicle type and technology is part of the Low Carbon Transportation Investments and Air Quality Improvement Program (Clean Transportation Incentives)

³⁶ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Standardized Regulatory Impact Assessment (SRIA), Table C12, Released April 19, 2018. Available at: http://www.dof.ca.gov/Forecasting/Economics/Major_Regulations/Major_Regulations_Table/documents/ICT_SRIA_ARB_4-23-18.pdf.

³⁷ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix K: Statewide Cost Analysis Spreadsheet. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appk-statewidecostanalysis.xlsx?_ga=2.93126173.1056658111.1554742789-1649277338.1553838884.

³⁸ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

³⁹ California Air Resources Board (CARB). Fiscal Year 2017-18 Funding Plan for Clean Transportation Incentives, Part II - Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and AQIP. Released on November 9, 2017. https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1718_funding_plan_final.pdf.

Funding Plan evaluated and approved by the Board, and will be assessed based on technology and market status, and other important factors.⁴⁰

HVIP, however, is just one of the funding programs in CARB's portfolio of clean transportation incentives that can be used to purchase transit vehicles.⁴¹ Other potential funding programs include the Volkswagen Mitigation Trust⁴² and the Carl Moyer Program.⁴³ The California Department of Transportation (Caltrans) offers operating and capital assistance for transit agencies through its Low Carbon Transit Operations Program (LCTOP)⁴⁴, and the California State Transportation Agency funds projects through its Transit and Intercity Rail Capital Program (TIRCP)⁴⁵. Funding is also available from federal agencies, such as the U.S. Department of Energy⁴⁶ and the Federal Transit Administration.⁴⁷

E-9 Funding Concern, On-going Funding Need and Availability of Funding

Multiple Comments

The following four commenters share the same comment on funding reliability.

We urge the Air Resources Board to review and compare purchase orders and actual costs associated with the purchase of CNG/Clean Diesel vehicles and Battery-electric vehicles. Battery-electric buses are more than double the cost of CNG/Clean Diesel Buses after HVIP vouchers. The HVIP program and PG&E transit budgeting are non-dedicated, temporary funding sources available to implement a costly and sometimes unreliable form of technology. Dedicated and reliable funding and incentive programs will allow for continuity of services when implementing the technology. (**ARBOC, TCTC-2, WESTCAT-2, B-W-HTA**)

Comment:

⁴⁰ California Air Resources Board (CARB). Low Carbon Transportation Investments and AQIP Funding Plans <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>.

⁴¹ California Air Resources Board (CARB). California HVIP. <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>.

⁴² California Air Resources Board (CARB). Volkswagen Environmental Mitigation Trust for California <https://ww2.arb.ca.gov/our-work/programs/volkswagen-environmental-mitigation-trust-california>.

⁴³ California Air Resources Board (CARB). Carl Moyer Memorial Air Quality Attainment Standards Program <https://www.arb.ca.gov/msprog/moyer/moyer.htm>.

⁴⁴ California Department of Transportation. Low Carbon Transit Operations Program <http://www.dot.ca.gov/dtrmt/splctop.html>.

⁴⁵ California Department of Transportation. Transit and Intercity Rail Capital Program <http://www.dot.ca.gov/dtrmt/sptircp.html>.

⁴⁶ U.S. Department of Energy, Energy Efficiency and Renewable Energy. <https://www.energy.gov/eere/office-energy-efficiency-renewable-energy>.

⁴⁷ U.S. Federal Transit Administration, Capital Investment Grants Program. <https://www.transit.dot.gov/CIG>.

It is notable, then, that the existing set-aside for ZEBs is \$35 million in FY 2017-2018, an amount that by itself would appear to be wholly insufficient to address the scope of the mandate, depending on the level of vehicle turnover. CARB cites other possible sources of funding for ZEB purchases, but the availability of such amounts is less clear and is not projected on a yearly basis to conform to the annual implementation of the mandate. For example, resources contained in the HVIP that are not specifically directed towards ZEB purchases are described as being available on a "first-come, first-served basis for all eligible technologies."

The ISOR describes other possible funding sources as the "Low or No Emission Vehicle Program" funded by the Federal Transit Administration. But this is a competitive, discretionary program. The California Low-Carbon Transit Operations Program and the Transit and Intercity Rail Capital Program are also cited as possible funding sources, but these programs do not appear to have a dedicated funding stream for ZEB purchases from 2023 onward when the mandate phases-in. Finally, CARB points to Volkswagen Environmental Mitigation Trust funding of \$423 million, along with other existing California programs targeted on transportation and air quality. But while California has indicated that it will allocate funding from these sources towards ZEB acquisition, we did not uncover a more refined analysis of whether a "gap" could occur as between such funding and actual projected needs during the years that California projects that costs will be incurred (2021 to 2038).

In sum, the ISOR does not provide an overall projection where funding for the proposed zero-emission bus requirements will come from - and what funding gaps may reasonably be projected -- especially within the first years of the program. ZEB purchase requirements begin in January 2023 for large transit agencies (with a requirement for 25% of the total number of new bus purchases) rising to a 100% purchase requirement in just six years. And while CARB has calculated projected costs versus both "baseline" and "current conditions", there is not an attempt to align projected costs of both fleet acquisition and related infrastructure with resources on a year-over-year basis to better inform the public discourse as to how the program will be implemented over time.

This is not a simple matter of regulatory cost accounting. As CARB notes - and as Allison has experienced multiple times in the marketplace - the issue of incremental cost is a major barrier to the adoption of new technologies. Thus, we believe it would be beneficial to the consideration of the final requirements if an estimate of the amount of new bus purchases (and projected costs) could be aligned with a projection of reasonably available resources on a year-by-year basis, starting with initial implementation in 2023. This would better reveal the extent of available resources with the timeframe in which transit agencies will need to make actual purchasing decisions, as well as any inherent "trade-offs" that will be necessary when the ZEB mandate is funded in lieu of other transportation projects. Apart from any benefit to the transit agencies themselves in planning future operations, this information would also be valuable to

equipment manufacturers and vendors who will need to assess and plan for the new requirements.

We recognize that this task may not be entirely straightforward. Some resources (such as the Volkswagen Environmental Mitigation Trust) are transitory and finite while other resources (such as state programs) are subject to legislative approval and funding. Thus, some level of uncertainty would be inherent in developing such a year-over-year analysis. But simply citing a net cost savings of \$1.5 billion from 2020 to 2050 in the ISOR provides little direction to either the public or private sector in assessing near-term economic feasibility and investment incentives. **(Allison)**

Comment:

To ensure that the rule succeeds, BYD would like to reiterate the need for CARB and other state agencies to identify dedicated and reliable funding streams to help offset the incremental cost between ZEBs and conventional buses, especially in the form of voucher programs such as HVIP. The strength of voucher programs is their convenience and agency staff should make it a priority to keep the redemption process as streamlined as possible. **(BYD)**

Comment:

Motiv also strongly supports the continued access and funding of incentive programs through the length of this transition. Programs like HVIP and the LCFS credits are key for transit agencies and enabling them to use these tools for the length of the transition will allow smoother planning and faster transition to 100% zero-emission solutions. **(Motiv)**

Comment:

Potential ICT creates an unfunded mandate, including the incremental increase in the cost of ZEB versus a CNG bus and cost to provide the charging infrastructure.

- Pasadena is a locally funded transit system for which there are limited financial resources.
- Pasadena is not eligible for most grant or dedicated funding available to other transit agencies due to its "local" funding category in Los Angeles County.
- Pasadena is precluded from receiving formula allocation of Federal 5307 capital funds.
- Pasadena is precluded from receiving transit allocations of State TOA, STA, or SB1 funds.
- Pasadena is precluded from obtain certain funds as a disadvantaged community (e.g., LCTOP) unless it also receives certain of the other state funding identified above. **(City Of Pasadena)**

Comment:

Need for continued financial assistance - The infrastructure and charging equipment required for full ZEB service, coupled with the higher initial vehicle purchase cost, point to the continued need for predictable and reliable additional funding as provided from current and as to be identified future funding sources. We would encourage ARB to continue to consider flexibility in its grant programs to allow for expanded funding for agencies working to convert their fleets to zero emission technologies. (**LA Metro**)

Comment:

Maintain Financial Incentives: Ongoing incentive funding is needed to assist transit agencies in transitioning to the new ZEB requirements. An unfunded mandate will only take money away from other transit projects that are aimed at the ARB's objective of reducing emissions by reducing vehicle miles traveled in single-occupant vehicles. The last thing this ZEB regulation should do is lead to a reduction in bus services that puts our low-income riders back into older and high-polluting cars. (**TAMC**).

Comment:

Funding is not identified to bridge the gap between existing technology and zero-emission buses, which could directly impact existing transit service.

The Proposed Innovative Clean Transit Regulation (Proposed ICT) would create a new unfunded mandate for transit agencies, without the identification of sufficient resources to compensate for the increased costs needed to implement the proposed purchase requirement. For the Orange County Transportation Authority (OCTA), it is estimated that it would cost an additional \$442 million, at current cost estimates, to convert its fleet to zero-emission technology. This is more than double what it would cost to replace the fleet with traditional fuel vehicles. In addition, it is estimated that to replace OCTA's fixed route buses, it would cost as much as \$39 million in infrastructure costs based on the estimates provided by ARB in the Proposed ICT. This cost could be more for hydrogen fueling infrastructure. These estimates do not include other costs including those associated with training, increased fuel costs, and right-of-way needs. The bus replacement estimate assumes the cost differential between existing compressed natural gas (CNG) buses, and the need to increase the fleet size to integrate zero-emission buses (ZEB). OCTA's buses must meet a 300 mile range. Replacing a CNG bus with a ZEB, powered by current electric battery technology, is not a straight one-to-one comparison. Instead, because ZEBs cannot meet existing fleet range requirements, transit agencies will have to expand their fleet to comply with the purchase requirement and maintain existing service.

Already, OCTA has budgeted funding from existing sources, including the Low Carbon Fuel Standard, Transportation Development Act, State Transit Assistance, cap-and-trade, SB 1 (Chapter 5, Statutes of 2017) and federal transit sources, to maintain existing service levels. These funding sources are the only funding identified in the regulation to help transit agencies meet the requirements of the ICT Proposal, beyond state grant sources which transit agencies cannot access after regulatory requirements are in force and/or are subject to annual appropriations by the Legislature. **(OCTA)**

Comment:

However, there are continued concerns about the Proposed ICT's focus on mandatory purchase requirements, insufficient identification of funding to meet the requirements, lack of regulatory language requiring a regular assessment of technology and cost benchmarks to ensure the new buses are meeting their stated goals, and an emphasis on uniform standards statewide, rather than flexibility to consider an agency's specific technology and cost dynamics. **(OCTA)**

Comment:

The ICT Proposal should therefore be updated to do the following:

- Identify funding sources beyond existing sources already being used for transit operations purposes, to close the cost gap between the requirements of the Proposed ICT and current technology. **(OCTA)**

Comment:

NVTA's main concern is funding. Based on the Vine's existing replacement schedule and the current cost differential of Battery Electric Buses compared to standard diesel buses, the projected cost to NVTA would be an additional \$16.8 million through 2040. That is equal to approximately two times the agency's current fixed route annual operations. Additionally, NVTA would need to spend approximately \$2.8 million on charging stations and other EV enhancements over the same time period. **(NVTA)**

Comment:

Maintain Financial Incentives: Ongoing incentive funding is needed to assist transit agencies in transitioning to the new ZEB requirements. An unfunded mandate will only take money away from other transit projects that are aimed at the ARB's objective of reducing emissions by reducing vehicle miles traveled in single-occupant vehicles. The last thing this ZEB regulation should do is lead to a reduction in bus services that puts our low-income riders back into older and high-polluting cars. **(TAMC)**

Comment:

In communicating these risks and our approach to managing them, we align ourselves with the comments submitted to you by the California Transit Association at various points in this regulatory proceeding. The Association has voiced concerns about the cost and performance of ZEBs, the uncertainty surrounding funding availability, and the challenges of infrastructure buildout. We, therefore, support several of their long-standing recommendations, which are not yet reflected in the proposed regulation. (**SamTrans**)

Comment:

Sufficient funding levels continue to be critical to the successful transition to zero-emission fleets. CARB staff's analysis of the proposal acknowledges that up-front capital costs - for the buses and especially for the required charging or fueling infrastructure - will be higher than for conventional buses. MTC staff estimates that these incremental costs for the Bay Area alone will be roughly \$1.9 billion through 2040. CARB's analysis projects that these incremental costs will be more than offset by reduced operating costs for ZEBs, but early adopter transit agencies argue that that conclusion is not supported by their experiences with ZEB operating and maintenance costs.

Even if CARB's analysis is correct and ZEBs will save money in the long run, there is still a need for additional funding for the incremental capital costs, as operating cost savings would not begin to accumulate until after the buses are in service. CARB staffs proposal suggests that existing federal and state transit funding programs are sufficient, but current funding sources for transit capital projects, such as FTA formula funds, the Transit and Intercity Rail Capital program or the Low Carbon Transportation Operations Program, are already oversubscribed, so relying on those sources for the higher costs of ZEBs and required infrastructure is unrealistic and would diminish funding for other important needs.

The proposal also points to funding programs that are dedicated to clean vehicle technology projects, such as CARB's Heavy Duty Zero Emission Pilot Deployment Program or FTA's LoNo program, but funding from these programs is very limited relative to the demand, which makes getting a grant somewhat akin to winning the lottery - great, but unlikely. If ZEB purchases are to become routine events, transit operators need reliable, recurring funding sources rather than the uncertainty and volatility of discretionary funding programs. (**B-W-MTC**)

Comment:

We strongly support continued funding in incentive programs such as HVIP and VW, as well as the SB 350 transportation electrification for infrastructure funding. **(B-O-Proterra)**

Comment:

One is related to funding. Most of the funding sources provided for right now in the regulation are either existing sources or they're competitive grants, or one-time appropriations by the legislature. These are not funding sources that we could depend on year to year, or we are already committing those funds to our existing transit fleet operations.

We would hope to see in future iterations a more detailed strategy for finding a long-term sustainable funding source for this purpose, and also a more clear definition that the competitive grants and other incentive funding that is under the control of the ARB can be accessed through the life of the regulation rather than just for early action. **(B-O-OCTA)**

Comment:

The higher price of ZEV transit vehicles are currently offset by a number of funding opportunities that are both helpful and essential in supporting the transition to zero-emission transit bus fleets. We would request that these programs be continued and made as flexible as possible into future. **(B-O-SacRT)**

Comment:

Please let's continue to ensure that there is sufficient incentive funding available for these vehicles, and off-ramps and flexibility in the cases that transit agencies truly cannot meet the requirements. **(B-O-CALSTART)**

Comment:

If the staff believes that those assumptions are correct, then the regulation should guarantee that to us, either with benchmarks for performance that would give us relief if they're not met, or provide for the funding that's so necessary in order to do it. **(B-O-San Diego MTS)**

Comment:

HTA is very rural, as some of you may know. And our -- some of our biggest concerns are funding. That's always a battle for us when we go for funding. This new electric bus purchase took us over two years to acquire. Several different funding sources. **(B-O-HTA)**

Comment:

The other thing that is going to be critical is making sure that as you look both to the rule and you look for broadly, that the funding is there to be able to make all this happen. And that includes funding that's spread widely across operators, because each system is unique, each system will have its own obstacles to overcome. But also funding that goes deep to allow us to go through the kinds of learnings that we're facing right now where we're trying to get this technology and move it to scale. **(B-O-Foothill Transit)**

Comment:

Finally, the transit agencies are going to need an ongoing funding source from those sources outlined in the presentation, and we urge the Board and we know the Board will continue to work in that direction. **(B-O-LA Metro)**

Comment:

However, AC Transit continues to have some concerns with the technology, the uncertainty of the scalability, and financial ability to implement this rule. **(B-O-AC Transit)**

Comment:

The rule provides limited-term incentive funding but no dedicated funding to offset the cost of a much more expensive technology. **(Borchman)**

Agency Response:

CARB recognizes the challenges transit agencies are facing to transition to ZEB fleets, and the commitments that transit agencies, local government agencies, and the State must make. The staff cost analysis did not include grants or funding, but recognizes that zero-emission vehicles are more expensive upfront but provide operational savings in lower fuel and maintenance costs. CARB understands there is no dedicated funding except for the credit value from the LCFS program. Even though ZEB technologies have advanced rapidly in recent years, continued improvements in ZEB costs and performance are still needed to facilitate the transition to full zero-emission technologies. Staff will provide the Board with a comprehensive review of costs and performance of ZEBs at least one year prior to the start of the purchase requirements. Per Resolution 18-60, CARB staff is also committed to provide an annual update to the Board on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted.

The Legislature appropriates funding. To distribute appropriated funding each fiscal year, CARB staff submits a proposed Low Carbon Transportation Investments and Air Quality Improvement Program (Clean Transportation Incentives) Funding Plan to the Board for approval.⁴⁸ The Funding Plan serves as the blueprint for expending the Clean Transportation Incentives funds appropriated to CARB in the State budget by the Legislature. The plan establishes CARB's priorities for the funding cycle, describes the projects CARB intends to fund, and sets funding targets for each project. The major funding source for ZEBs is the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) and Low NOx Engine Incentives, which are the cornerstone of advanced technology heavy-duty incentives in the funding plan.

Both the annual update of the ICT program and the comprehensive review on program readiness will identify the status of ZEB technologies and will inform funding strategies related to zero-emission vehicles and infrastructure. The Board reviews and approves the funding plan based on the best information available.

The cost analysis in the Standardized Regulatory Impact Assessment (SRIA)⁴⁹ and the ISOR⁵⁰ reflects the "worst case scenario" for funding by not presuming any is available. The funding uncertainty was mentioned in the ISOR referring to financing or battery leasing as viable options. These options can address higher upfront costs and spread them out over several years, and the annual installments would be paid for with operational savings. CARB used an example to illustrate the financing option in Attachment B of the Supplemental 15-Day Notices.⁵¹ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and would not result in adverse changes in transit service or fares. Resolution 18-60 expresses the Board's intent that the regulation will not cause adverse impacts on transit service.

The ICT regulation also provides various flexibilities for transit agencies to meet their ZEB compliance obligations and has built in many safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. In section 2023.4(a), "It is the intent of this section to

⁴⁸ California Air Resources Board (CARB). Low Carbon Transportation Investments and Air Quality Improvement Program (AQIP) Funding Plans website. Available at: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>. Accessed April 17, 2019.

⁴⁹ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Standardized Regulatory Impact Assessment (SRIA), Table C12, Released April 19, 2018. Available at: http://www.dof.ca.gov/Forecasting/Economics/Major_Regulations/Major_Regulations_Table/documents/ICT_SRIA_ARB_4-23-18.pdf.

⁵⁰ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix K: Statewide Cost Analysis Spreadsheet. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appk-statewidecostanalysis.xlsx?_ga=2.93126173.1056658111.1554742789-1649277338.1553838884.

⁵¹ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

ensure transit service is not adversely affected.” With this intent and regulatory design, transit agencies may request an exemption from the zero-emission bus purchase requirements. The Executive Officer will grant an exemption upon request, if the specified criteria in section 2023.4(c) are met. For example, a transit agency may receive an exemption from the requirements to purchase ZEBs under these circumstances:

1. Setback of construction schedule of needed ZEB infrastructure (section 2023.4(c)(1));
2. Available ZEBs cannot meet transit agency’s daily mileage needs (section 2023.4(c)(2);
3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency’s daily needs (section 2023.4(c)(3));
4. A required ZEB type that has passed Altoona testing and has met all safety requirements is unavailable for purchase (section 2023.4(c)(4));
5. A transit agency’s governing body declares a fiscal emergency (section 2023.4(c)(5));
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5)); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5)).

E-10 Funding for Infrastructure

Multiple Comments:

The following five commenters present similar points about HVIP funding for infrastructure.

Comment:

In addition, the HVIP is an equitable and efficient process for offsetting the cost of a zero emission bus. However, CARB must express its support for creating an infrastructure funding program. This program should also be available to small operators to finance the rollout plans. Without a secure source for infrastructure investments in fueling/charging facilities, maintenance facilities, and storage capacity, the ability to meet the goals of this rule is doubtful. (**CALACT, ARBOC, TCTC-2, WESTCAT-2, B-W-HTA**)

Comment:

The Hybrid and Zero Emission Truck & Bus Voucher (HVIP) provides a simplified and successful process for offsetting the cost of a zero emission bus. However,

given the scale of the proposed transition, the strict timeline, and unknown delays in vehicle production and infrastructure implementation, the HVIP funds must be available as an incentive and compliance program. In addition, CARB must clearly request that the Legislature create an infrastructure funding program. Without a secure source for infrastructure investments in fueling/charging facilities, maintenance facilities, and storage capacity, the ability to meet the goals of this rule is questionable at best. **(AC Transit)**

Comment:

To double-down on working closely with the CPUC and the Energy Commission to ensure that there are sufficient incentives in the infrastructure for the electrification, both getting the service to the site, and the chargers done, and the rates that work from the perspective of the fleet operators. **(B-O-CALSTART)**

Comment:

While the reliance on the Hybrid and Zero-Emission Truck & Bus Voucher (HVIP) as incentive funding for vehicle purchases is a viable option, CTE's experience in developing rollout plans has highlighted the need for infrastructure funding. Developing scalable infrastructure to charge/fuel a large fleet of zero-emission buses is a daunting technological challenge, but an even bigger fiscal challenge. This is particularly the case as it relates to building hydrogen fueling stations, which typically are more expensive for small-scale deployments, but prove to be very scalable and cost effective in support of 25 or more buses. Regardless of the technology, funding to address fueling and maintenance facility needs will grow as operators transition to zero-emission technologies. The lack of a funding source will impede transit operators' ability to adhere to the purchase mandate timelines. **(CTE)**

Comment:

We also ask you to consider that if incentive funding isn't available to transit agencies when they need it, an agency might have no alternative but to keep an older, higher pollution/emissions vehicle in service because they lack the resources to move forward with a zero-emission bus purchase and its attendant electric charging or hydrogen storage/fueling infrastructure costs. In that regard, we feel that ARB must express its support for creating an infrastructure funding program. **(MST-1)**

Comment:

As this process develops we do not yet know how environmental approvals, engineering advances, construction and funding sources overseen by external stakeholders, will unfold over the long-term. To manage these risks, the District will use the data collected from our pilot, observe other transit agencies to update

our assumptions, modify our plan, and ultimately deliver on our commitment to a 100% battery-electric bus fleet. It is critical that our investment in cleaner vehicle technology does not inadvertently harm the transit service we provide to our community. Of particular concern are the inadequate funding sources for infrastructure development available and our Agency's own limited funds. In order to achieve the goal of conversion in a fiscally responsible way we must be methodical and thoughtful, especially as it relates to the infrastructure we install. **(SamTrans)**

Comment:

The infrastructure, even though we have a fairly decent amount of property, the infrastructure for charging systems is going to be quite large for the small area we have. So our biggest concern is the funding sources, and what the bus will actually do. **(B-O-HTA)**

Comment:

Funding for charging, fueling and maintenance infrastructure is of particular concern. Zero-emission conversion has high initial infrastructure investment requirements, as the electric substations and hydrogen fueling equipment are installed for the first buses in service. Over time, the marginal costs of these improvements will be reduced, but operators will need financial assistance to begin their fuel source transition. Further, because the charging and fueling infrastructure for ZEBs is a prerequisite, and not ancillary, to ZEB purchasing, additional funding sources for this purpose need to be identified early in the process for operators to be successful in meeting the deadlines for transition to zero-emission fleets.

HVIP vouchers currently include a small enhancement (additional funds) for infrastructure costs, but CARB staff is proposing to eliminate the enhancement after FY2018-19 to streamline HVIP administration. There are currently no other CARB funding programs that could help cover ZEB-related infrastructure costs. The California Public Utilities Commission recently approved PG&E's expenditure of \$236 million on transportation electrification, but these funds will likely be spent on a variety of transportation sectors besides transit. **(B-W-MTC)**

Agency Response:

As shown in the economic analyses of the regulation, CARB recognizes the incremental capital cost for purchasing zero emission buses (ZEBs) and associated infrastructure is greater than for conventional buses, but also recognizes there are operational savings over the life of a bus.

CARB recognizes the challenges the infrastructure may present. The regulation has an exemption to address infrastructure delays and another one to address situations where the cost of deploying ZEBs and associated infrastructure cannot be offset or cannot be financed by the transit agency. CARB also acknowledges that funding is an important tool to reduce or eliminate the upfront costs of ZEB and related infrastructure. The ICT regulation is structured to encourage transit agencies to voluntarily purchase ZEBs before the requirements begin and to take advantage of funding.

As committed to in the ISOR, CARB will conduct a comprehensive review at least one year before any purchase requirement for program readiness, considering factors such as costs, performance, reliability of ZEBs, and infrastructure. CARB would consider adjusting the requirements based on the outcome of this review.

The ISOR also discussed the incentive programs that are available to offset the incremental cost of zero-emission technologies.⁵² First among these was the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP). Transit agencies have been using HVIP for ZEB purchases. The amount of a voucher for a ZEB depends on the bus length, the zero emission technology, and the location of the vehicle deployed. Additional amounts could be available to assist with needed infrastructure including up to \$30,000 for chargers, and up to \$100,000 per bus for the purchase of five or more FCEBs. For fiscal year (FY) 2017-2018, the budget allocated up to \$180 million for the HVIP program with minimum of \$35 million set aside to fund ZEBs exclusively. An additional \$125 million has been allocated to the HVIP program per SB 856 for FY 2018-2019. Since HVIP's inception in FY 2009-2010 through April 2018, the program has paid for 47 ZEBs from eight transit agencies. As of April 2018, there are additional requests for HVIP for 139 ZEBs from nine transit agencies.

The Moyer Program for incentive funding also covers infrastructure projects. Public transit buses are eligible to receive infrastructure funding up to 50 percent of a hydrogen station or a battery charging station if a station has no public access. There will be up to an additional 10 percent (total of 60 percent) for publicly accessible hydrogen and battery charging stations and up to an additional 15 percent (total of 65 percent) for projects with solar or wind power generation systems. Eligible costs include design and engineering fees, cost of equipment, and installation costs. Unlike vehicle projects, infrastructure projects do not have to meet a cost-effectiveness limit.

As stated in the ISOR, on May 31, 2018, the California Public Utility Commission (CPUC) unanimously approved transportation electrification projects proposed by three major Investor Owner Utilities (IOUs), with \$738 million including \$236 million from Pacific Gas and Electric and \$343 million from Southern California Edison on medium and heavy-duty infrastructure, required under Senate Bill 350, chapter 547, statutes of 2015.⁵³ This approval would reduce the infrastructure costs to transit agencies in those

⁵² See ISOR, p. 41.

⁵³ *Application of San Diego Gas & Electric Company* (U 902E) for Approval of SB 350 Transportation Electrification Proposals (Cal.P.U.C. Decision 18-05-040 May 31, 2018) No. A 17-01-020 and Related Matters A 17-01-021, 17-01-022.

utility service areas. In addition, on May 25, 2018, CARB approved allocations for Volkswagen Environmental Trust Funds that included up to \$65 million for zero-emission transit buses.

E-11 Funding for Fuel Cell Electric Buses

Comment:

The HVIP program as presently configured, also needs to maintain additional incentives associated with fuel cell electric and hydrogen fueling technologies until sufficient volumes of production enable price parity with battery-electric buses. We will need both electric-drive technologies to meet the state's emission and carbon reduction goals, while also ensuring that transit agencies will be able to fulfill their operating and service requirements. (CTE)

Agency Response:

CARB agrees that all zero-emission technologies are valuable means of reducing emissions and that incentive funding is important for the success of these regulations. CARB also recognizes the cost for a fuel cell electric bus (FCEB) is higher than that of a battery electric bus (BEB). For fiscal year (FY) 2018-19, the HVIP voucher amount for a 40' FCEB is \$300,000, which is double the voucher amount for a 40' BEB.⁵⁴ The voucher amount will be higher if a vehicle is operated in a disadvantaged community.

On October 25, 2018, the Board approved the FY2018-19 Funding Plan for Clean Transportation Incentives, which identified six key areas of interest that align with the proposed areas of focus over the next three years.⁵⁵ One of the key areas is for fuel cell electric transit bus pilot projects. CARB will continue to work with stakeholders to explore the potential projects, if funding is provided by the Legislature in the forthcoming fiscal years. CARB will also continue to evaluate the need to provide higher funding amounts for FCEBs when the funding priorities are reviewed. CARB's Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and Air Quality Improvement Program (AQIP) provides a detailed set of recommendations on the need for heavy-duty funding over the next three years.⁵⁶

⁵⁴ California HVIP (2018). FY18-19 Voucher Tables – October 2018. Available at: <https://www.californiahvip.org/wp-content/uploads/2018/11/HVIP-FY18-19-Funding-Tables-11-19-2018.pdf>.

⁵⁵ California Air Resources Board (CARB) (2018). Proposed Fiscal Year 2018-19 Funding Plan for Clean Transportation Incentives for Low Carbon Transportation Investments and the Air Quality Improvement Program. Released September 21, 2018. Available at: https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1819_funding_plan.pdf?_ga=2.189725227.1056658111.1554742789-1649277338.1553838884.

⁵⁶ California Air Resources Board (CARB) (2017). Fiscal Year 2017-18 Funding Plan for Clean Transportation Incentives, Part II - Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and AQIP. Released November 9, 2017. https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1718_funding_plan_final.pdf.

E-12 Harmonization of Funding Requirements and Other Specific Funding Requirements

Comment:

The only thing I would suggest, and I know that staff is already considering this, has to do with the incentive programs. And as the presentation showed, incentives are -- there's a lot of incentives out there, and incentives are going to be a prime way to -- to get a lot of these buses out there and in use.

And so to the extent possible, we'd like to see some harmonization of the requirements, as they apply to transit buses. And then also to consider including maintenance, training, and some infrastructure as available funding within those incentive programs just to make sure that purchase of these buses are still going to be attractive to transit agencies and the costs don't outweigh their short-term benefits.

And then lastly, I'd just like to remind the Board that as -- to think about the surplus emission reduction provisions. This was an issue we had with Carl Moyer several years ago, where, as you get to lower emission requirements, the cost effectiveness gets harder to justify. And so we just need to keep that in mind going forward, that there is a cost effectiveness issue, and then make sure the incentive programs account for that and still allow these buses to be funded to the maximum extent possible. **(B-O-CAPCOA)**

Agency Response:

CARB has a portfolio of incentive programs that provide funding opportunities for transit buses and other vehicles, and supporting infrastructure. Each incentive program has its own statutory requirements, emission reduction goals, and eligible project types. The Carl Moyer Program is designed by statute to deliver cost-effective emission reductions. California Health and Safety code section 44283 requires that projects funded by the Carl Moyer Program meet cost-effectiveness limits, except for infrastructure projects. The core principle of the program is to achieve surplus emission reductions that are creditable to the State Implementation Plans. Other incentive programs meet different primary objectives. For example, the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) is a streamlined funding program to support advanced technologies with higher up-front costs common in the early commercialization phase. HVIP incentive amounts are not based on cost-effectiveness, but are set at levels to encourage fleets to purchase new technologies by offsetting some or all of the incremental cost. Fleets are eligible to apply for HVIP funding if they comply with all regulations at the time of application. Funding to support HVIP has been appropriated annually by the Legislature and allocated by the Board as part of the Funding Plan for Clean Transportation Incentives. A variety of other incentive programs can provide funding for buses, including the Volkswagen Environmental Mitigation Trust, AB 617 Community Air Protection Incentives, Alternative and Renewable Fuel and Vehicle

Technology Program administered by the California Energy Commission, Low Carbon Transit Operations Program administered by Caltrans, and the Transit and Intercity Rail Capital Program administered by the California State Transportation Agency. Some programs include funding opportunities for maintenance and operating costs, training, and infrastructure.

E-13 Funding for Small or Rural Agencies

Multiple Comments:

The following four commenters present similar points regarding funding for small or rural agencies.

Funding Considerations: We urge the Air Resources Board to consider the vast difference between agencies considered small to both the Federal Transit Administration and California Department of Transportation but not the Air Resources Board. These agencies are traditionally rural or non-profit/ADA providers with inequitable funding in comparison to “other” large operators pooled into the same definition by the Air Resources Board. These agencies have much smaller staffing capacities and current transit employment trends, such as driver and maintenance staff shortages are exacerbated in smaller communities. These agencies often have much larger routes and service areas. Rural transit systems and ADA/non-profit providers face unique challenges that are not considered in the regulation as it exists today due to vague definitional standards. (**ARBOC, TCTC-2, WESTCAT-2, B-W-HTA**)

Multiple Comments:

The following five commenters present similar points regarding funding for small or rural agencies.

In addition, the HVIP is an equitable and efficient process for offsetting the cost of a zero emission bus. However, CARB must express its support for creating an infrastructure funding program. This program should also be available to small operators to finance the rollout plans. Without a secure source for infrastructure investments in fueling/charging facilities, maintenance facilities, and storage capacity, the ability to meet the goals of this rule is doubtful. (**CALACT, ARBOC, TCTC-2, WESTCAT-2, B-W-HTA**)

Comment:

This regulation highly favors affluent urban areas and their public transit systems with no acknowledgement of funding differences/FO and DAR miles traveled in rural areas. (**Borchman**)

Agency Response:

The commenters asserted a “small” transit agency may face staffing challenges from deployment of the ICT regulation as they have more limited resources as compared to a “large” transit agency. CARB acknowledges such potential challenges. Therefore, in the ICT regulation, small transit agencies have later compliance dates and less stringent

requirements to provide more time for them to learn from the experience of large transit agencies. If available ZEBs lack adequate range to meet small transit agencies' needs or where an agency cannot afford ZEBs, the regulation provides exemptions.

CARB acknowledges the additional resources transit agencies may need to conduct the Rollout Plan and is committed to provide useful information and help. For example, CARB teamed up with Antelope Valley Transit Authority and California Transit Association to hold a Zero-Emission Bus Technology Showcase and Symposium on February 6-7, 2019, to provide useful information on starting up a small ZEB fleet, planning, infrastructure scale up, personnel training, etc. Presentations and event recordings are available at <https://arb.ca.gov/msprog/ict/meeting.htm>.

Transit agencies have been using HVIP for ZEB purchases. The amount of a voucher for a ZEB depends on the bus length, the zero emission technology, and the location of the vehicle deployed. Additional amounts could be available to assist with needed infrastructure including up to \$30,000 for chargers for battery-electric buses, and up to \$100,000 per bus for the purchase of five or more FCEBs. For fiscal year (FY) 2017-2018, the HVIP budget is \$180 million, with \$35 million reserved for ZEBs. An additional \$125 million was allocated to HVIP under Senate Bill 856, statutes of 2018, chapter 30, for FY 2018-2019. Since HVIP's inception in FY 2009-2010 through April 2018, the program has paid for 47 ZEBs from eight transit agencies. As of April 2018, there were additional requests for HVIP funding for 139 ZEBs from nine transit agencies. These requests have been approved. In addition, the HVIP program is "first come, first serve" and not a competitive program. This nature provides small, rural transit agencies equal opportunities to access the funding.

The Moyer Program also covers infrastructure projects. Public transit buses are eligible to receive infrastructure funding up to 50 percent of a hydrogen station or a battery charging station if a station has no public access. There will be up to an additional 10 percent (total of 60 percent) for publicly accessible hydrogen and battery charging stations and up to an additional 15 percent (total of 65 percent) for projects with solar or wind power generation systems. Eligible costs include design and engineering fees, cost of equipment, and installation costs. Unlike vehicle projects, infrastructure projects do not have to meet a cost-effectiveness limit.

The above-mentioned programs will help transit agencies smooth out the initial barriers. It is also reasonable to anticipate the incremental costs of vehicles and infrastructure will decline and the soft cost related to learning curve will decrease.

E-14 Transit Service and Ridership

Comment:

The Legislature requires that state agencies avoid unnecessary or unduly burdensome regulation. As such, ARB may not propose regulations unless it has determined no alternative to its own proposal would be "as effective and less burdensome to affected private persons and equally effective in implementing the

statutory purpose or other provision of law.” (Govt. Code, § 11346.5(a)(13).) To adopt a regulation, ARB must likewise affirm and explain, with “supporting information,” that “no alternative” it has considered “would be more effective and less burdensome to affected private persons than the adopted regulation, or would be more cost effective to affected private persons and equally effective” in meeting the proposal’s legislative objective. (Govt. Code, § 11346.9(a)(4) [emphasis added].)

The proposed regulation will affect “private persons.” Specifically, if grant funding is inadequate to cover the high upfront capital costs, then transit agencies will be forced to increase fares or decrease transit service, and “private persons” will experience increased costs and reduced availability of public transit. The impact to “private persons” of the proposed regulation would be particularly acute for low-income persons and persons from minority communities who overwhelmingly comprise the transit customer base. Consider, for example, that the 2012 American Communities Survey found that the average income for a transit rider is \$15,281 in the City of Los Angeles; 71 percent of transit riders in Los Angeles are Hispanic. In the Cities of San Diego, San Francisco and Sacramento, the average income of transit riders is \$18,143, \$42,230, and \$30,227, respectively. These income levels are far below the average in these cities and significantly less than the income levels of all commuters.

Under these circumstances, ARB bears the burden of demonstrating no alternative would be “as effective and less burdensome to affected private persons and equally effective in implementing the statutory purpose or other provision of law.” (Govt. Code, § 11346.5(a)(13).) Likewise, before considering the proposed regulation for adoption, ARB must demonstrate, with “supporting information,” that “no alternative” that the Board has considered “would be more effective and less burdensome to affected private persons than the adopted regulation, or would be more cost effective to affected private persons and equally effective” in meeting the proposal’s legislative objective. (Govt. Code, § 11346.9(a)(4).)

The legislative objective (or, “statutory purpose”) of the proposed regulation can be found in the text of SB 32, which states:

[i]n adopting rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions authorized by this division, the state board shall ensure that statewide greenhouse gas emissions are reduced to at least 40 percent below the statewide greenhouse gas emissions limit no later than December 31, 2030 (Health & Saf. Code, § 38566.) Thus, the legislative objective underlying the proposed regulation is to ensure GHG emissions will be “reduced to at least 40 percent below the statewide greenhouse gas emissions limit no later than December 31, 2030,” in a manner that is technologically feasible and cost-effective. (Id.; see also ISOR at X-1 [“The proposed ICT regulation is designed to reduce criteria pollutants, toxic

air contaminants, and GHG emissions from the public transit sector, and to reduce community and regional air pollution.”].)

Although the Alternatives Analysis in Section IX of the ISOR includes some findings concerning the above statutes, those analyses do not contain supporting information for the conclusions drawn. For instance, ARB asserts that Alternative 2 (a proposal for a less stringent zero-emission bus purchase requirement) “will result in less emission reduction benefits in early years compared with the proposed purchase requirement.” (See ISOR, IX-11.) However, ARB has not shown that sufficient funding will be available to allow transit agencies to achieve the more demanding requirement without increased costs or decreased services. In the absence of such information, there is no basis for a conclusion that Alternative 2 would be less effective than ARB’s proposal. As such, ARB’s alternatives analysis does not include the evidence and discussion required under Sections 11346.5 and 11346.9.

ARB should consider the Association’s Alternative, which is identified in Part I(B) above. This alternative would be more than “equally effective in implementing the statutory purpose.”(Govt. Code, § 11346.5(a)(13).) The Association’s Alternative makes only modest changes to the waiver [sic] of certain ZEB purchasing requirements, and would be equally effective in implementing the statutory purpose of the proposed regulation. The Association’s Alternative also makes several common sense changes to the proposed regulation to lessen its burden on transit agencies and to ensure that the regulation is achieving its intended goals, including strengthening ZEB performance review standards, modifying the definitions of “large” and “small” transit agencies to reflect real-world conditions, relaxing current limitations on funding for the purchase of ZEBs, and others. The Association’s Alternative, would thus be equally effective in meeting CARB’s statutory objectives, while at the same time reducing cost impacts to regulated entities, and thus, affected private persons.

As a result of the foregoing, ARB should not on the current record proceed to a final action because it cannot, among other things, comply with Section 11346.9(a)(4) of the Government Code. If ARB intends to pursue the proposed regulation, the record should demonstrate ARB has addressed the issues raised by the Association. **(CTA)**

Comment:

Mandating technologies that aren't proven yet could have unintended consequences. Transit agencies have commented in workshops and in some of their comment letters that if they prove to not be operationally or economically feasible, transit agencies will be forced to reduce service, raise fares, or both. In short, if ARB gets this wrong, then transit agencies and those that rely on transit are the ones who are going to suffer. **(B-O-SoCalGas)**

Comment:

Any type of regulation that improves -- increases our costs will require us to reduce that frequency, raise local taxes, or decrease increased fares to our passengers, perhaps having an unintended consequence on those VMTs. **(B-O-MST)**

Comment:

If ARB staff is wrong, it is our riders, riders with few transportation choices, and riders living in our most disadvantaged communities that will suffer if we have to reduce service just to buy and operate zero-emission buses. This would obviously be extremely counterproductive. **(B-O-San Diego MTS)**

Comment:

This is an unfunded mandate that will require significant public resources to fund this new and evolving technology. Costly mistakes will impact the poorest of the poor, the transit dependent, in the way of service reductions and poor performing equipment. Let us all share in the goal of getting this right. **(B-O-Santa Cruz METRO)**

Comment:

Unintended consequence will be a reduction in transit service.

- Current funding for Pasadena's transit operations is static with no new funding sources identified for future transit expansion.
- Any increase in unfunded capital cost and additional operating cost for ZEB deployment will directly reduce the current level of transit services due to the need to reduce hours of operation and potentially eliminate routes. Not only is the increase in capital costs unfunded, Pasadena is not eligible for most grant or dedicated funding available to other transit agencies due to its "local" funding category in Los Angeles County. **(City Of Pasadena)**

Comment:

Without an existing source of money to make these purchases, our agency would be forced to redirect existing funding currently used for revenue service. This would most likely result in reduced service levels in Riverside County, taking buses off the roads and providing less incentive for residents to leave their cars at home and take public transit. The net result could mean more cars on the roads emitting additional pollutants into our air. This is in direct conflict with one of the main goals CARB has identified for the ICT, which is to "support the near-term deployment of zero-emission buses where the economics are viable and where transit service can be maintained or expanded." **(RTA-1)**

Comment:

The attractiveness of this system to continue attracting ridership is dependent upon the continued ability to obtain over-the-road coaches that can reliably operate in the Ventura County environment including negotiation of significant grades at freeway speeds. In addition, due to the large number of bicycles used to access the service, it is routinely necessary to utilize both front-mounted bicycle racks as well as the lower cargo area found on motor coaches. **(VCTC)**

Comment:

FCRTA is a rural transit operator with high mileage routes and with varying performance of ZEB's, implementation has been affected by the "in-service" range of the vehicle and the extra driver training required in order to maximize the range. **(FCRTA)**

Comment:

Some systems in rural California received as little as \$34,000 from FTA and limited financial support from State and local governments: this mandate has the potential to limit and/or stop services in less affluent areas. **(Borchman)**

Comment:

The impact of this regulation on a public good that seeks to limit road congestion and single-occupancy vehicle reliance could lead to services cut - having the opposite, intended consequence. **(Borchman)**

Agency Response:

In adopting the ICT regulation, the Board stated its intent to ensure the regulation would not reduce service. The regulation contains safeguards to ensure bus service is not adversely impacted and to avoid additional costs on transit agencies. The Board, in Resolution 18-60, directed the Executive Officer to apply these exemptions to ensure there are no adverse impacts to service.⁵⁷ Although these exemptions could result in fewer ZEBs than otherwise required, the regulation will reduce emissions more than the other alternatives.

The emission reductions of the ICT regulation and the alternatives were presented in Figure 2, Figure 3, and Table 6 of the Updates to the Emissions Inventory Methods and

⁵⁷ California Air Resources Board (CARB) (2018). Resolution 18-60, p. 10. Available at: https://www.arb.ca.gov/board/res/2018/res18-60.pdf?_ga=2.96768671.1056658111.1554742789-1649277338.1553838884.

Results for the Proposed Innovative Clean Transit Regulation.⁵⁸ The cumulative emission reductions from 2020 to 2050 of the ICT regulation and alternatives relative to current conditions are summarized below:

Scenario	GHG (MMT CO ₂ e)	NOx (tons)	PM _{2.5} (tons)
ICT Regulation	19	7,030	39.4
Alternative 1 (higher ZEB purchase requirement than the ICT regulation)	26	8,005	53.7
Alternative 2 (low NOx CNG bus requirement)	0	4,278	0

Although Alternative 1 could theoretically provide more emission reductions and health benefits starting in early years, it is infeasible for the reasons discussed in the ISOR. It is also more burdensome, inapposite to these comments. The ICT regulation is the least burdensome among the analyzed alternatives while providing greater emission reductions benefits.

In addition, in the Supplemental to Economic Impacts Assessment of the 15-Day package of the ICT regulation, CARB staff includes detailed financing examples that demonstrates financing bus purchases is a viable option for transit agencies to purchase buses.⁵⁹ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and will not cause reductions in service nor adverse impacts on fares.

The ICT regulation also provides various optional flexibilities for transit agencies to meet their ZEB compliance obligations, and exemptions in section 2023.4(c) to ensure transit service is not adversely affected. The Executive Officer will grant an exemption from requirements to purchase ZEBs upon request, if the criteria in section 2023.4(c) are met. A transit agency may receive an exemption if:

1. There is a setback of the construction schedule for ZEB infrastructure (section 2023.4(c)(1);
2. Available ZEBs cannot meet the transit agency's daily mileage needs (section 2023.4(c)(2) ;

⁵⁸ California Air Resources Board (CARB) (2018). Attachment C: Updates to the Emissions Inventory Methods and Results for the Proposed Innovative Clean Transit Regulation, Posted November 9, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/15dayattc.pdf?_ga=2.193781293.1056658111.1554742789-1649277338.1553838884.

⁵⁹ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency's daily needs (section 2023.4(c)(3);
4. A required ZEB type that has passed Altoona testing and has met all safety requirements is unavailable for purchase (section 2023.4(c)(4);
5. A transit agency's governing body declares a fiscal emergency (section 2023.4(c)(5);
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5).

As CARB committed in the ISOR, it will conduct a comprehensive review, at least one year prior to initiating any purchase requirement, will consider program readiness, costs, performance, reliability of ZEBs, and infrastructure. CARB would consider adjusting the requirements based on the outcome of this review.

E-15 Cost Effectiveness

Comment:

The ICT Initial Statement of Reasons (ISOR) states that 39 percent of the state's greenhouse gas (GHG) emissions come from the transportation sector. However, the ISOR neglects to mention that in 2015, transit emissions account for less than one half of one percent (0.462%) of the state's GHG emissions. Per the ICT cost analysis, battery electric buses cost \$770,000 per bus, which is \$330,000 more than a conventional bus. Turning over the statewide fleet of 14,000 buses would cost over \$10 billion, with the total incremental cost exceeding \$4 billion. This cost is solely for the buses and does not include infrastructure, which will significantly increase the overall cost. LA Metro quoted that the costs for their battery charging systems represented 20% of the total zero emission program cost. This is a high price tag for what will amount to minimal emission reductions. Emission reduction efforts and investments should focus on high polluting sectors. This is particularly important as the Los Angeles Times recently reported (July 23, 2018) that transportation greenhouse gas emissions have increased since 2013. This is an alarming trend as the state has invested approximately \$1.7 billion in Low Carbon Transportation Incentives, specifically to reduce transportation emissions. To effectively reduce transportation emissions, efforts and incentives should focus on high polluters. (**SoCalGas**)

Comment:

As stated above the cost to replace the statewide bus fleet would be over \$10 billion, plus infrastructure. Transit agencies have thoroughly studied the use of zero and near-zero emission natural gas buses running on renewable gas and

have found using the latter provides significant emissions benefits at a much lower cost. LA Metro conducted a cost and emissions analysis on zero and near-zero emission buses and found that "...the use of Renewable Natural Gas (RNG) and transition to low NOx buses, will be more effective at reducing in-basin PM, total CO₂, total GHGs, and total NOx from the LAMTA fleet over the next 40 years than transition to either electric or fuel cell buses...This approach will also be less expensive than transition to either electric or fuel cell buses." With billions of dollars going into reducing transportation emissions, while emissions are increasing, now is the time to be prudent with programs and incentives to reduce emissions cost effectively. **(SoCalGas)**

Comment:

As MTS considers the magnitude of the costs to full ZEB deployment within this proposed rule, the cost benefits to achieving zero emissions for MTS are even more diminished based upon the already near-zero emissions footprint of MTS. Given this, for MTS the actual cost per pound of Green House Gas (GHG) that would be reduced with the implementation of this proposed ICT Rule is disproportionate and exorbitant. **(San Diego MTS)**

Agency Response:

The staff analysis of a low-NOx engine and renewable fuel strategy is included in the ISOR as an alternative. As a starting principle, the greenhouse gas reductions from renewable natural gas, even in transit buses, is not attributable to the ICT Regulation because those reductions were previously accounted for in the Low Carbon Fuel Standard and Renewable Fuel Standards regulations.⁶⁰ The competitive costs of renewable natural gas are also due to these regulations. Renewable natural gas is commercially available at a price comparable to fossil natural gas in California due to the credits under these regulations.

The staff analysis showed this alternative results in an overall cost increase due to the incremental cost of low-NOx engines compared to the life-cycle operational savings from zero-emission buses. The costs and benefits of this alternative (Alternative 2) were evaluated in the Standardized Regulatory Impact Assessment (SRIA) and were shown in Appendix B of the ISOR. From 2020 through 2043, the low-NOx engine (Alternative 2) was estimated to cost \$241 million more relative to the "current conditions."⁶¹ In the

⁶⁰ California Air Resources Board (CARB) (2018). Public Hearing to Consider Proposed Amendments to the Low Carbon Fuel Standard Regulation and to the Regulation on Commercialization of Alternative Diesel Fuels. Staff Report: Initial Statement of Reasons. Date of Release: March 6, 2018. Available: <https://www.arb.ca.gov/regact/2018/lcfs18/isor.pdf>.

⁶¹ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason. Appendix B-1: Original SRIA Submitted to DOF. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appb-1.pdf?_ga=2.64420399.1056658111.1554742789-1649277338.1553838884.

updated analysis in Form 399,⁶² between 2020 and 2050, transit agencies are estimated to incur \$1.3 billion in cost increases, and \$2.8 billion in cost-savings, resulting in an estimated net cost-savings to transit agencies of \$1.5 billion under the ICT regulation. For the low-NOx engine (Alternative 2), transit agencies are estimated to incur \$0.38 billion in cost increases, but no cost-savings, resulting in an estimated net cost of \$0.38 billion for the same time period.⁶³

In the analysis, CARB attributed no costs or benefits to using renewable natural gas (RNG) in the ICT regulation because they are correctly attributed to the LCFS regulation.

CARB agrees that using RNG to replace fossil natural gas (NG) can help reduce emissions and associated emissions from fossil NG extraction and storage. However, natural gas-fueled buses, including natural gas vehicles (NGVs) fueled by RNG, still produce tailpipe emissions that affect local air quality, so this technology has limited comparability to zero-emission technology.

Zero-emission technologies are crucial in addressing the state's long term air quality issues and meeting climate protection goals, as reflected in the 2016 Mobile Source Strategy. Transit buses and how they operate are well suited to zero-emission technology. They are usually operated in urban centers often at low speeds with a lot of stop-and-go driving cycles, which are optimal for electric drivetrains and conducive to regenerative breaking. This sector is a favorable setting for the technology to develop and improve so it can meet the needs of other heavy-duty vehicle sectors and advance the transition to clean transportation and freight systems.

E-16 Standardized Regulatory Impact Assessment (SRIA)

Comment:

The SRIA does not meet applicable standards. One of the fundamental assumptions of the SRIA is that “the incremental costs to transit agencies of the proposed ICT regulation could be offset without relying on financing options” due to the availability of grant funding. (See SRIA at 41.) According to the SRIA, “grant funding can reduce or eliminate most of the initial capital costs of the proposed ICT regulation” such that transit agencies who experience increased costs will not pass those costs on to individuals through decreases in service or increases fares. (See SRIA at 41.) On the basis of this assumption, the SRIA concludes that there are no direct costs incurred by individuals as a result of the proposed regulation. (Id.) However, ARB’s analysis of available funding shows that it falls well short of covering the estimated cost of the proposed regulation,

⁶² California Air Resources Board (CARB) (2019). Proposed Innovative Clean Transit Regulation, An Amendment to the Fleet Rule for Transit Agencies, Economic and Fiscal Impact Statement, Form STD 399, June 18, 2019.

⁶³ California Air Resources Board (CARB) (2019). Proposed Innovative Clean Transit Regulation, An Amendment to the Fleet Rule for Transit Agencies, Economic and Fiscal Impact Statement, Form STD 399, Table 4 in the Form 399 Attachment. June 18, 2019

and consequently, fails to demonstrate that transit agencies will not have to reduce transit service and/or increase fares to comply with the proposed regulation.

ARB estimates that the cost of the proposed regulation through 2030 and 2040 will be \$605.7 million and \$1.1 billion, respectively. To arrive at these estimates, ARB built a complex cost model that rests on a series of optimistic assumptions, including bus purchase costs, bus maintenance costs, fuel costs, fuel efficiency, and charger install costs. We have particular concern about the assumption used in ARB's cost model that includes Low Carbon Fuel Standard (LCFS) credits for transit agencies through 2050 when, in fact, LCFS is presently only statutorily authorized through 2030. When the model is updated to reflect the true sunset date for LCFS, the estimated cost of the proposed regulation through 2040 climbs to \$2.01 billion. This higher cost estimate does not include changes to any of the other assumptions listed above, which would meaningfully increase the cost of the proposed regulation.

ARB identifies five potential funding sources. Taken together, however, these are clearly not sufficient to ensure that transit agencies will not be compelled to increase fares or decrease service as a result of the proposed regulation.

The Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project ("HVIP") provides point-of-sale vouchers to partially offset the incremental cost of zero- and near-zero emission trucks and buses. These vouchers, which are funded through an annual appropriation by the State Legislature, are issued to public and private fleet owners on an [sic] first-come/first-serve basis. In FY 2017-18, HVIP made a total of \$188 million available to fleet owners, with at least \$35 million set aside for zero-emission bus deployment, specifically. (SRIA at 41.) In FY 2018-19, HVIP made an additional \$125 million available to fleet owners. While the current funding capacity of HVIP is substantial, this capacity is not specifically earmarked to zero-emission bus deployment, and the program itself relies on annual appropriation by the State Legislature, which provides no guarantee of future funding. Moreover, the capital costs of the proposed regulation are estimated to be at least \$74 million in the year 2020 alone, and as much \$989 million through 2032. (SRIA at 37, Table C12.) The currently available – and therefore, knowable – funding in HVIP is plainly inadequate to meaningfully offset these costs so as to ensure no changes in service or increased fares.

Pursuant to SB 350 Clean Energy and Pollution Reduction Act of 2015, the California Public Utilities Commission approved over \$750 million in funding for investments in infrastructure projects in the service territories of Southern California Edison and Pacific Gas & Electric that support the deployment of zero-emission vehicles. (See *id.* at 42.) Of this total, transit agencies in the SCE and PGE service territories are guaranteed a combined minimum investment in infrastructure projects of \$52.5 million. These funds, however, are available for

only a five-year period. (See *id.* at 42.) Again, this is plainly inadequate in light of the \$989 million of estimated costs through 2032. (*Id.* at 37, Table C12.)

The Volkswagen Environmental Mitigation Trust (“Mitigation Trust”) provides California approximately \$423 million to fund specified eligible actions to mitigate the lifetime excess NOx emission caused by Volkswagen’s emission test defeat device. Of this total, \$130 million is specifically earmarked for transit, school and shuttle buses and supporting infrastructure. No more than 50% of this funding, or \$65 million, can be used for any one vehicle type (e.g. transit buses or shuttle buses). Guidelines for this funding have not been developed yet.

The Low Carbon Transit Operations Program (“LCTOP”) is claimed to provide an unidentified amount that “will support new or expanded bus or rail services, expand intermodal transit facilities, and may include equipment acquisition, fueling, maintenance and other costs to operate those services or facilities . . .” (*Id.* at 42.) Yet, an unidentified amount that “may” be used to offset ZEB purchases, maintenance, and other costs cannot be relied upon to offset the increased costs to transit agencies.

Finally, the Transit and Intercity Rail Capital Program (“TIRCP”) provides competitive grants of unidentified amounts “to fund transformative capital improvements that will modernize California’s intercity, commuter, and urban rail systems, and bus and ferry transit systems, to significantly reduce GHG emissions, vehicle miles traveled, and congestion.” (*Id.* at 43.) Again, an unidentified amount that may or may not be used to offset the regulation’s initial capital costs, and which is not guaranteed to all transit agencies because it must be competitively granted, cannot be relied upon to meaningfully offset transit agencies capital costs.

ARB estimates that the cost of the proposed regulation through 2030 and 2040 will be \$605.7 million and \$1.1 billion, respectively. When their model is updated to reflect the true sunset date for LCFS of 2030, the estimated cost of the proposed regulation through 2040 climbs to \$2.01 billion. Although the SRIA claims that “grant funding can reduce or eliminate most of the initial capital costs of the proposed ICT regulation” and that, as a result, transit agencies will not pass on those costs to individuals through changes in services or increased fares, (*id.* at 41 [emphasis added]), the available grant funding identified in the SRIA falls well short of the proposed regulation’s estimated costs. The HVIP guarantees only \$35 million for ZEBs, much of which has already been committed, and only for FY 2017-18; SB 350 guarantees \$52.5 million for infrastructure projects that support zero-emission bus deployments in the SCE and PGE service territories, but not for ZEB purchases and only for a five year period; the Mitigation Trust provides a maximum of \$65 million for zero-emission transit buses and charging infrastructure; the LCTOP provides an unidentified amount, which “may include” ZEB costs; and, similarly, the TIRCP provides an unidentified amount that may or may not be used to fund ZEB-related activities.

Accordingly, the conclusions in the SRIA that transit agencies will not pass on costs to customers due to the availability of grant funding are not be [sic] supported by “facts, evidence, documents, [or] testimony,” (Govt. Code, §§ 11346.5, subds. (a)(8)), are “mere speculation,” (WSPA, supra, 57 Cal.4th at 428), and are contradicted by the record evidence. **(CTA)**

Agency Response:

The statewide cost analysis of the ICT regulation in the SRIA used the best information to estimate costs during the analysis period but did not include grants or other funding opportunities except for LCFS credit value. Appendix H of the ISOR explains how many credits could be generated and the potential value for various technologies and fuel pathways for transit buses.⁶⁴ For example, according to the previous LCFS regulation (prior to its 2018 amendment), a battery electric bus could generate \$0.15/kwh and \$0.14/kwh in 2016 and 2020, respectively, if using the solar electricity pathway. Therefore, the cost analysis that omitted potential credits and incentive funding presents a worst-case scenario from the funding perspective. However, the SRIA included a discussion of how grant funding can reduce or eliminate most of the initial capital costs of the ICT regulation and the costs would be lower than estimated. In the SRIA, staff used \$100 per credit to illustrate how the LCFS credit value could supplement the transition cost, though recent LCFS credit price is close to \$200 per credit.⁶⁵ The commenter is also incorrect about the legislative authority of LCFS and the LCFS program will not sunset in 2030.⁶⁶

To ensure transit service is not adversely affected by the ICT regulation, exemptions are allowed and can help transit agencies deal with unforeseeable circumstances beyond their control. The ICT regulation allows exemptions in five areas: (1) delay in bus delivery when caused by setback of construction of infrastructure for the ZEBs; (2) when available ZEBs cannot meet a transit agency’s daily mileage needs; (3) if available ZEBs do not have adequate gradeability performance to meet the transit agency’s daily needs for any bus in its fleet; (4) when a required ZEB type for the applicable weight class is unavailable for purchase; and (5) when a required ZEB type cannot be purchased by a transit agency due to financial hardship.

⁶⁴ California Air Resources Board (CARB) (2018). Appendix H: Low Carbon Fuel Standard (LCFS) Program and Examples. Available https://www.arb.ca.gov/regact/2018/ict2018/apph.pdf?_ga=2.56769513.217144606.1555215395-2124256164.1542392963

⁶⁵ California Air Resources Board (CARB) (2019). Weekly LCFS Credit Transfer Activity Reports. Page last reviewed March 19, 2019. Available: <https://www.arb.ca.gov/fuels/lcfs/credit/lrtweeklycreditreports.htm>

⁶⁶ See section 95484 of the Low Carbon Fuel Standard regulation at https://www.arb.ca.gov/regact/2018/lcfs18/frolcfs.pdf?_ga=2.147285424.664056872.1553549032-1959568993.1456785342. Both Tables 1 and 2 set carbon intensity targets for 2030 and subsequent years.

To further demonstrate the feasibility of the exemptions, CARB also published an attachment (Attachment B: Supplemental to Economic Impact Assessment) to the proposed amendment on November 9, 2018, to solicit public comments through November 26, 2018.⁶⁷ Attachment B, which is an addendum to the Initial Statement of Reasons (ISOR) for the Proposed Innovative Clean Transit (ICT) Regulation, includes further analysis of costs and adds detailed financing examples that demonstrates the regulation is feasible and will not cause reductions in service nor adverse impacts on fares.

In chapter VIII of the ISOR, staff acknowledges a higher upfront capital cost for ZEBs but also shows that annual operating costs are lower, resulting in a total cost of ownership that is comparable to or lower than conventional buses. The cost analysis in Attachment B shows the annual costs of the regulation reflect higher initial costs for ZEBs and associated infrastructure without grant funding or financing.

In summary, this analysis shows that in the case that incentives are not available to reduce upfront costs, financing is a viable option for transit agencies for the incremental upfront cost of purchasing BEBs at some level by distributing the incremental cost over several years. Compared with purchasing conventional buses, even without incentives, the impact of leasing BEBs on annual cash flow is not expected to be noticeable, would not result in adverse changes in transit service or fares, nor would result in a change in rider behavior. Finally, in the case that a transit agency cannot finance the higher incremental cost of available battery electric bus, the transit agency could get an exemption from the zero-emission bus purchase requirement and would have no additional cost to consider.

F. CONSIDERATION OF ALTERNATIVES

This section addresses comments on consideration of alternatives. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

F-1 Alternatives in General

Comment:

Clean Energy continues to hold real concerns over the proposed Innovative Clean Transit (ICT) rulemaking. While it is evident that the Air Resources Board (ARB) staff is determined to move aggressively toward a zero-emission ICT

⁶⁷ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.233340766.1515285130.1551900613-1959568993.1456785342.

rulemaking, we and many other transit property stakeholders maintain our position that the staff analysis supporting the rule is overly optimistic and underestimates the potential public health, societal, and economic costs that could result from faulty analysis. Compounding the pain, the ICT does not have adequate benchmarking and regulatory assessment mechanisms to ensure transit properties up and down the state have the flexibility to successfully operate and fulfill their mission of transporting people for work, school, health or leisure. Further, we find the proposed ICT to be devoid of its obligation under Government Code Section 11346.S(D)(13) to fully consider alternatives to ZEBs.

Clean Energy strongly encourages ARB's Governing Board to direct staff to perform an alternatives analysis prior to rule adoption. Further, Clean Energy urges the Governing Board to require a regulatory assessment with benchmarks prior to any ZEB purchase requirement. The Governing Board should, at the very least, give itself the authority to scale back the rule if ARB staff's ZEB projections on cost, operational reliability and technology readiness fall short. Further, the Governing Board should ensure that transit properties are resilient during a state-of-emergency and allow transit properties to meet their ZEB purchase requirements with near zero emission strategies powered by renewable fuels if ZEB strategies fail to meet key benchmarks required for full ZEB adoption.
(Clean Energy)

Comment:

The proposed regulation would allow waiver of 2023 and 2024 purchase requirements if large numbers of ZEBs are purchased early (i.e., 1,000 or more ZEBs by December 31, 2020; 1,150 or more ZEBs by December 31, 2021). The proposed regulation also provides an option to implement zero-emission mobility programs in lieu of purchasing ZEBs. Under this option, bicycles, zero-emission cars or other zero-emission vehicles less than 14,000 GVWR (operated directly or through contract with a transit agency) can offset ZEB purchase requirements using a zero-emission passenger mile metric. Requests for delays and extensions may also be available.

Allison encourages CARB to retain these flexibilities in the final rule and to consider whether additional options may be available to ZEB purchase mandates. While CARB did consider alternative concepts to the ZEB mandate, including less-stringent ZEB purchase requirements and performance targets, the proposed regulation does not include these concepts or provide for additional discretion in local transit agency purchasing decisions.

Specifically, with reference to a less-stringent zero-emission bus purchase requirement, staff indicated that 'it is expected that large-scale ZEB deployments can accelerate the cost reductions in ZEBs due to the economies of scale and the maturity of the ZEB supply chain.' But while such an observation could be correct on a macro-economic level, there does not appear to be anything within

the supporting record which documents the extent and timing of these cost reductions. Instead, the discussion of alternative concepts is largely conclusory and non-specific.

CARB's rulemaking process would be assisted by a more fulsome discussion of its underlying rationale for rejecting regulatory alternatives and solicitation of additional comment. Realizing that CARB may want to proceed in the near-term on the proposed regulation, additional comment could be solicited after CARB moves to a final order, allowing for subsequent reopening of the final regulation. Alternatively, CARB could provide for a future review of the program occurring prior to imposition of the "second phase" of the ZEB purchase mandate in 2026. (Allison)

Comment:

We would have liked to have seen a full environmental analysis for you to consider prior to the rule. The L.A. County Metro did a similar study with a third-party analyst, who found that the near-zero pathway was far superior for NOx and greenhouse gas emissions almost a decade earlier and far more cost effective. (B-O-Clean Energy-1)

Agency Response:

Multiple alternatives have been discussed with stakeholders publicly, including the performance-based approach suggested by CTA. The third Transit Agency Subcommittee meeting (held on October 26, 2016) was dedicated to the discussion of the performance-based approach. Staff identified considerations of alternatives as part of the decision making process including:

Health and Environment Benefits

- Protect public health
- Reduce NOx, PM, GHG emissions
- Reduce other environmental risks

Regulation and Incentive

- Support existing programs
- Promote new actions, no double counting
- Ensure equal treatment of transit fleets
- Ensure regulation is implementable and enforceable, and results are quantifiable
- Impacts on funding opportunities

Disadvantaged Community (DAC)

- Ensure DAC benefits, and equitable benefits distribution

Transit Agency

- Improve transit efficiency
- No service cut
- Enhance mobility, first/last-mile connectivity

Industry

- Provide clear market signal for zero emission transit
- Build on past investments in zero emission technologies
- Building economic scale for zero emission buses

Staff further discussed any proposed regulatory concept should be achievable and emission reductions from new measures must be real, quantifiable, verifiable, and enforceable. In developing the proposed regulation, staff considered the above and other factors, and analyzed potential alternatives. This included the performance-based approach. Overall, alternatives were examined from a broad range of perspectives to ensure the feasibility and other statutory mandated criteria are met and only the remaining relevant alternatives were included in the ISOR and SRIA.

CARB also prepared an environmental analysis (EA) under the requirements of its certified regulatory program under CEQA⁶⁸ that analyzed potential alternatives (. The EA, included as an appendix to the Staff Report prepared for the proposed regulations (i.e., the proposed project, concluded implementation of the regulatory action may result in significant adverse environmental impacts. Mitigation measures were made a condition of approval. The Board responded to comments (including this one; see Appendix 7, below), made findings required under CEQA, and adopted a statement of overriding considerations for this regulatory action. Compared to the alternatives, the ICT regulation would be the most effective in accelerating zero-emission technology advancement, would provide a feasible phase-in schedule, and would achieve the most GHG and criteria pollutant emission reductions.

CARB found that “no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing law. The Board has not identified any reasonable alternatives that would lessen any adverse impact on small business.”⁶⁹ All the analysis was performed based on the best data available. The Board also directed in Resolution 18-60, staff to provide to a comprehensive review or program readiness at least one year before the purchase requirement starts.⁷⁰ As zero-emission technologies improve and the market changes rapidly, the comprehensive review will provide an opportunity to evaluate all issues. The issues could be different than anticipated today.

F-2 Performance-Based

Comments:

Reasonable alternatives were not considered: ARB is required to examine alternatives to a proposed regulation. Government Code Section 11346.5(D)(13) reads as follows:

⁶⁸ Cal. Code Regs., tit. 14, §15251 , subd. (d).)

⁶⁹ Reso. 18-60, p. 9.

⁷⁰ Reso. 18-60, p. 10.

A statement that the adopting agency must determine that no reasonable alternative considered by the agency or that has otherwise been identified and brought to the attention of the agency would be more effective in carrying out the purpose for which the action is proposed, would be as effective and less burdensome to affected private persons than the proposed action, or would be more cost effective to affected private persons and equally effective in implementing the statutory policy or other provision of law.

CARB staff's conclusion that a performance-based regulation alternative is 'not feasible' is incorrect, because it is inconsistent with the fact that the current 'Fleet Rule for Transit Agencies' has an existing performance-based standard for fleet NOX emissions and has proven successful. Such a standard could easily be extended to other parameters, such as GHG emissions, petroleum reduction, and diesel PM emissions. Unfortunately, this obvious performance-based approach was not considered or evaluated by CARB staff. Thus, it appears that CARB staff has failed to meet its burden under Government Code §11346.5(a)(13) of showing that 'no reasonable alternative was considered ... more effective ..., less burdensome ... more cost effective.

In addition, and as stated above, LA Metro conducted a study to compare the zero and near-zero emission alternatives. The study, commissioned by a transit agency, found that near-zero technologies with RNG would be more effective at reducing emissions and less expensive, or in other words, less burdensome. However, the ISOR states “...no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing law.” Therefore, as LA Metro has concluded that there is an alternative that would more effective and less burdensome, ARB did not fully examine reasonable alternatives and therefore did not fulfill this requirement. SoCalGas recommends that ARB first conduct a thorough analysis of feasible alternatives, including a true performance-based standard, before proceeding with this regulation. We urge ARB to assess a true performance standard or alternative compliance method in lieu of the proposed regulation. A true performance based standard can potentially achieve comparable emission reductions at a fraction of the cost and should be assessed per Government Code Section 11346.5(D)(13). (**SoCalGas**)

Comments:

ARB should pursue performance standards rather than a technology mandate: As stated in previous comment letters, SoCalGas strongly recommends a flexible approach based on performance standards to allow transit fleets to deploy advanced, clean technologies that address state environmental needs while providing transit agencies operational flexibility and choice. ARB previously stated that “ARB would develop and propose a variety of approaches and mechanisms to support the transition to a suite of innovative clean transit options.”¹ The measure then goes on to explain that the proposal may require a

“binding” commitment from transit providers for transitioning to zero-emission buses and other technologies” (emphasis added).² However, the proposed regulation, as currently drafted, is a strict technology mandate with no flexibility. Setting a “one size fits all” mandate for a technology that is not fully tested or suitable for all transit duty cycles, will force transit agencies to either purchase buses that don’t serve their needs or wait for the technology to be developed. This would result in the state forgoing emission reductions that can be achieved today, with existing, advanced technologies.

The Discussion Document states “California has made significant progress and is on track to meet the Assembly Bill 32 goals of reducing greenhouse gas (GHG) emissions to the 1990 level by 2020. However, we need to continue making progress beyond 2020 to meet the following goals:

- Federal health-based ambient air quality standards (key milestones in 2023 and 2031).
- 40 percent reduction in GHG emissions from 1990 levels by 2030.
- 80 percent reduction in GHG emissions from 1990 levels by 2050.
- 50 percent petroleum reduction target by 2030.
- Continued reductions in criteria pollutants and toxic air contaminants to protect public health.”

Each of these goals can easily be translated into fleet-wide average performance standards for transit agencies, similar to what has already been done under the CARB “Fleet Rule for Transit Agencies” that sets fleet-wide average NOx and diesel PM emission standards.³ Further, transit agencies operating “near zero” natural gas buses and using renewable natural gas (RNG) are already meeting a 90% reduction in NOx, a 100% reduction in petroleum use, a 100% reduction in diesel PM, and up to a 400% reduction in GHG depending on the RNG source. Thus, transit agencies operating on natural gas can, under a properly designed performance based regulation, meet and exceed the goals established in the Discussion Document and in a shorter timeframe than a technology mandate. (SoCalGas)

Comment:

If the goal of the ICT is to address environmental goals, CARB should identify a ‘clean’ target of emissions and allow each transit agency the flexibility to achieve that target as quickly and as efficiently as possible. Directing all agencies to move to ZEBs without attention to the wide variety of services we each provide misses the point. All agencies have specific characteristics that make our service areas unique. Given the different terrain of each service area -in distance, service frequency, and geography -presenting a ‘one technology fits all’ approach is neither practical nor likely to yield maximum emission savings.

Instead, we believe a rule based on a performance standard is optimal, allowing transit fleets to deploy advanced clean technologies that address state environmental needs while providing transit agencies operational flexibility and choice. That flexibility not only allows multiple technologies to move toward cleaner transit services, but it also avoids the over-dependence on one technology which could prove problematic. **(RTA-1)**

Comment:

Provide Technological Flexibility: It is impossible to know what technological advancements will arise within the next five years, much less the next 10 years. ARB should set a performance-based goal rather than a technology-based goal, one that allows natural gas vehicles (particularly those that are carbon negative) or other vehicles that meet the emissions goals, rather than hang its hat on the technology of today. **(TAMC)**

Agency Response:

Fundamentally, the ICT regulation is performance based. It requires zero-emission buses, without regard to what kind of technology that is, and provides credits for mobility options that also reduce transportation emissions with specifying particular approaches. To the extent the comment requests inclusion in the regulation of combustion-based technology that uses renewable natural gas as an asserted environmental benefit commensurate with zero-emission technology, this would not account for the fact that emission reductions from renewable natural gas have been previously claimed under the Low Carbon Fuel Standards program. Regulatory provisions that equated zero-emission technology with renewable natural gas technology would not be as effective in carrying out the purpose of the regulation at developing and deploying zero-emission technology. A regulation that continues to enable combustion technology is contrary to the goal of eliminating combustion emissions.

F-3 Low NOx and Renewable Natural Gas

Comment:

ARB staff chose not to fully examine both zero and near-zero emission alternatives by stating in the ISOR that "no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing law. However, LA County Metro performed a comparative study on zero and near-zero emission technologies which found that near-zero emission technologies fueled by renewable natural gas would be more effective at reducing emissions and at a much lower cost to implement. Since ARB opted not to fully evaluate all viable alternatives Clean Energy recommends that ARB conduct a thorough alternatives analysis for the proposed ICT prior to its adoption to comply with existing law.

As stated above, LA Metro conducted a study to compare the zero and near-zero emission alternatives. The study, commissioned by a transit agency, found that near-zero technologies with RNG would be more effective at reducing emissions and less expensive. However, the ISOR states ‘ ... no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing law.’ In other words, ARB did not fully examine reasonable alternatives and therefore did not fulfill its obligation under Government Code Section 11346.S(D)(13).

Clean Energy recommends that ARB conduct a thorough alternatives analysis for the proposed ICT prior to its adoption to comply with existing law. (**Clean Energy**)

Comment:

Waiting for technologies to develop leaves emission reductions on the table. To impact climate change, it is important to achieve as much emission reductions as quickly as possible. Waiting for developing technologies means emissions reductions are not being achieved during the waiting period. Low NOx engines with RNG, which are available, can achieve emission reductions today.

Comparing the emission reductions, the LA Metro study found that the deployment of buses using Low NOx engines with RNG over a 40-year period would reduce GHG emissions by 72 percent compared to its existing fleet. Meanwhile, deployment of electric buses would reduce GHG emissions by 52 to 53 percent over the same timeframe. This is because RNG significantly reduces GHG emissions, there are GHG emissions associated with the electric grid, and largely because there is a delay in the ability to begin deploying zero emission buses in mass. Reducing emissions early ultimately leads to more emission reductions. (**SoCalGas**)

Comment:

Sunset on older diesel buses still in service: Under the proposed regulation, existing diesel users would only be required to upgrade their existing buses to 2010 diesel engines until they purchase ZEBs per their rollout schedule. This is not equitable and grossly counterproductive to the goals of the program. The most significant and fastest emission reductions available can be achieved by converting buses to “near zero” technologies as soon as possible. At a minimum, any buses being turned over should be treated similarly. Under the proposed regulation, natural gas users are required to upgrade to an engine certified to near-zero emissions. Additionally, all new fuel contracts must be for renewable fuel only. For a limited time, this should be applied to all buses being turned over by transit agencies, until they are able to move to ZEBs. This same standard should be applied to transit agencies that have diesel engine vehicles. They should upgrade to buses with engine that are certified to the same CARB

optional low NOX standard. The emissions savings would be significant and there would be no loss of reliability in terms of performance. **(SoCalGas)**

Comment:

Emission reductions should be the focus of the regulation: The average carbon intensity of renewable natural gas (RNG) is 60-80 percent lower than diesel and can have a carbon intensity (CI) up to 400 percent lower than diesel - carbon negative values far below any other fuel/technology. This is possible because RNG mitigates emissions that would have escaped to atmosphere if not captured. ARB awarded AMP Americas, a renewable energy company, a CI score of -254.94 grams of carbon dioxide per megajoule (g CO₂e/MJ), which is the lowest ever issued by ARB. In comparison, the California electric grid has an energy efficiency ratio corrected CI value of approximately 20 g CO₂e/MJ. **(SoCalGas)**

Comment:

Emission reductions should be the focus of the regulation: Additionally, LA Metro's recent study found that "...the use of RNG and transition to low NOx buses, will be more effective at reducing in-basin PM, total CO₂, total GHGs, and total NOx from the LAMTA fleet over the next 40 years than transition to either electric or fuel cell buses...This approach will also be less expensive than transition to either electric or fuel cell buses." Existing natural gas technologies combined with the use of renewable natural gas achieve more emission reductions at a faster rate and at a lower cost than ZEBs. A long-term technology mandate for ZEBs leaves significant emission reductions on the table, while the technology is still being developed. ARB should focus on emission reductions rather than a technology mandate of ZEBs. This can be done by providing alternative compliance based on emission reductions. **(SoCalGas)**

Comment:

Flexibility for transit agencies: As the technology is still being developed, transit agencies need flexibility in achieving emission reductions, particularly in the early years. The proposed regulation should be performance based to provide maximum flexibility to transit agencies. If CARB proceeds with a technology mandate, it should not be so aggressive until the technology is developed, particularly when Low NOx engines operating on RNG is available. **(SoCalGas)**

Comment:

ICT can help to meet Short Lived Climate Pollutant (SLCP) goals: ICT can help to meet Short Lived Climate Pollutant (SLCP) goals SLCPs, such as methane and black carbon, have a much higher global warming potential than other greenhouse gases. Reductions of these emissions are critical for curbing climate

change. ARB's SLCP Strategy states, "While reducing CO2 emissions limits climate change over the long term, reducing emissions of SLCPs will effectively slow the rate of climate change in the near-term. Therefore, the best path forward is to emphasize parallel strategies for reducing SLCP and CO2 emissions."

In its SLCP Strategy, ARB has a goal to reduce methane emissions by 40 percent. The SLCP Strategy proposes the capture of biogas to be used as a transportation fuel, injected into natural gas pipelines, and used to generate on-site renewable electricity and heat. Increasing the use of renewable gas as a transportation fuel would not only reduce methane emissions from organic waste streams, but also reduce black carbon by displacing diesel in older, conventionally fueled heavy-duty vehicles. Renewable natural gas in transit buses, which in many cases already have natural gas infrastructure in place, is an effective way to quickly achieve methane reduction to meet the state's goal. **(SoCalGas)**

Comment:

Emission reductions should be the focus of the regulation: Any fuel and technology capable of meeting the emission performance goals established by ARB should be an option for transit operators to retain and maximize operational flexibility, control and reduce costs, and ensure no service curtailments or interruptions. As an example, the average carbon intensity of RNG is 60-80 percent lower than diesel. Based on the source, RNG can have a carbon intensity (CI) up to 400 percent lower than diesel, and can be carbon negative, as RNG mitigates emissions that would have otherwise occurred. ARB recently awarded the company, AMP Americas, a renewable energy company, a CI score of -254.94 grams of carbon dioxide per megajoule (g CO2e/MJ) for RNG, which is the lowest CI score ever issued by ARB for any fuel or technology. In comparison, the California electric grid has an energy efficiency ratio corrected CI value of approximately 20 g CO2e/MJ. Clearly, RNG can meet and exceed the greenhouse gas emission reductions resulting from the use of electricity and should be an option for transit fleet operators in any new regulation. **(SoCalGas)**

Comment:

ICT should support the State's Short-Lived Climate Pollutant (SLCP) goals: SLCPs, such as methane and black carbon, have a much higher global warming potential than other greenhouse gases. Reductions of these emissions are critical for curbing climate change. ARB's SLCP Strategy states, "While reducing CO2 emissions limits climate change over the long term, reducing emissions of SLCPs will effectively slow the rate of climate change in the near-term. Therefore, the best path forward is to emphasize parallel strategies for reducing SLCP and CO2 emissions."

In its SLCP Strategy, ARB has a goal to reduce methane emissions by 40 percent. The SLCP Strategy proposes the capture of biogas to be used as a transportation fuel, injected into natural gas pipelines, and used to generate on-site renewable electricity and heat. Increasing the use of renewable gas as a transportation fuel would not only reduce methane emissions from organic waste streams, but also reduce black carbon by displacing diesel in older, conventionally fueled heavy-duty vehicles. Renewable natural gas in transit buses, which in many cases already have natural gas infrastructure in place, is an effective way to quickly achieve methane reduction to meet the state's goal. **(SoCalGas)**

Comment:

Low Nox Engines are in use and readily available today: The Discussion Document proposes that agencies include Low NOx engines be included in purchases if they are available. As stated above, Cummins Westport Inc. has two product offerings that meet the 0.02-gram NOx standard in both 9- and 12-liter sizes. The requirement should be modified as the availability of these engines are not in question. **(SoCalGas)**

Comment:

Furthermore, we are concerned that the regulation leaves natural gas buses out of the zero emission vehicle options, particularly because Monterey County is now installing a waste to energy facility that will make such vehicles carbon-negative – a net positive impact on air quality because they take methane gas out of the atmosphere. **(TAMC)**

Comment:

The only point I'd like to add is that RNG buses, as far as costs go, are a \$1.122 per less -- per mile less than battery electric buses based on purchase and maintenance. This includes capital, fuel, maintenance, infrastructure and mid-life overhaul. So as cost is considered, we do ask that this be included for your deliberations. **(B-O-Clean Energy-2)**

Comment:

First, we believe the agencies are required under Government Code section 11346.5(d)(13) to perform a full environmental analysis of alternatives to the staff's proposal. This exercise is of particular importance because so many transits have converted their facilities to run on natural gas to help clean the air at ARB's request. These properties are also able to easily adopt near zero natural gas engines that not only provide zero equivalent performance on NOx emissions, deep reductions in greenhouse gas emissions that are competitive, if not better, than -- they are also be able to preside -- provide a cost effective

alternative that may not require such financial constrain on the state. (**B-O-Clean Energy-1**)

Comment:

RNG and low-NOx engines are available today. RNG has the lowest carbon intensities in the LCFS. And a Southwest Research Institute study showed that in duty cycles the low-NOx -- some transit duty cycles some low-NOx en -- excuse me -- the low-NOx engine produced undetectable levels of NOx.

We believe that a performance-based standard with options and off-ramps should be considered, and we have proposed this in workshops and in formal letters.

Government code section 11346.5(d)(13) requires agencies adopting regulations to assess reasonable alternatives that quote, "Would be as effective and less burdensome to the affected private persons than the proposed action or would be more cost effective to affected private persons.

By not assessing a performance standard, ARB staff did not meet this requirement to assess reasonable alternatives. L.A. Metro did a study in 2015, they looked at if they turned over their entire fleet with low-NOx engines in RNG versus turning over their entire fleet with battery electric vehicles, that not only would it be significantly less cost to turnover their fleet to low-NOx engines and RNG, but you would actually achieve more total emission reductions over a 40-year period. And we urge CARB staff to assess this alternative in the next round of the proposal. (**B-O-SoCalGas**)

Agency Response:

When analyzing the environmental and other impacts of the proposed regulation and potential alternatives, the baseline includes existing regulations and trends that influence the types and carbon intensities of transportation fuels consumed in California. The major regulations and trends include programs like the Advanced Clean Cars program that promotes the market for electric passenger vehicles, and the LCFS program. The LCFS accounting policy is described in the ISOR from the 2015 Rule re-adoption ISOR (<https://www.arb.ca.gov/regact/2015/lcfs2015/lcfs15isorisor.pdf>). The fact that renewable natural gas (RNG) and renewable diesel (RD) are commercially available at a comparable price with their fossil counterparts in California is attributed primarily to the LCFS program. The GHG emission reduction benefits and costs from the production and use of RNG and RD is therefore also attributed to the LCFS program. Renewable natural gas producers generate credits that can be sold for those who need the credits to comply with the LCFS regulation for use as a transportation fuel

in a wide range of vehicles. This information was presented to stakeholders in developing the proposed regulations.⁷¹

The staff analysis of a low-NOx engine and renewable fuel strategy is similar to the LA Metro study and is included in the ISOR as an alternative. The staff analysis showed the alternative results in an overall cost increase due to the incremental cost of low-NOx engines when the overall cost of the approved regulation results in overall cost savings because of operational savings. Introduction of low-NOx engines has a relatively small increase in costs and no operational savings. Natural gas buses do not have high vehicle fuel efficiency of zero-emission buses. The staff analysis attributed no costs or benefits to using RNG because they are correctly attributed to the LCFS regulation. The LA Metro analysis claimed the benefits of using RNG are attributable to the transit agency, did not reflect its higher cost without the LCFS regulation, and represents no additional emission reduction benefit outside of the LCFS program. The GHG emission reduction benefit has been accounted for by the LCFS program and cannot be double-counted when evaluating benefits of the Proposed Project. CARB's analysis does not double count the GHG benefits and shows the low-NOx engine alternative has a lower capital cost but results in an overall cost increase with no new GHG benefits.

Natural gas fleets are not required to upgrade or repower. The low-NOx requirement applies to new purchase only. In addition, the low-NOx requirement applies to all fuel types as soon as the engine becomes available for a given fuel. Currently, the 12-Liter engine example does not apply to transit buses because it is not certified for bus use.

Emission reductions are an important focus, but not the only focus of these regulations. The regulations also promote zero-emission technology for transit buses as a "beachhead" to further develop the technology for other heavy-duty applications and reduce costs. (See ISOR, ch.II(C.)(3.), "Zero-Emission Bus as the Beachhead of Zero-Emission Technology.")

F-4 California Transit Association (CTA)'s Alternative

Comment:

The Association believes the technical recommendations described above would dramatically enhance the proposed regulation. As such, ARB should consider an alternative under which ARB would adopt the proposed regulation with the following amendments.

Collectively, the following proposals are referred to as the 'Association's Alternative.'

- **Strengthening Performance Review:**

⁷¹ See summary of the third Working Group Meeting held on August 29, 2016, https://www.arb.ca.gov/msprog/bus/wg_summary_8_29.pdf.

- **Establishing Benchmarks:** The inclusion of language that would establish benchmarks for ZEB cost and performance and funding availability. These benchmarks should be sourced from the inputs and assumptions used by ARB staff in the Original SRIA, Draft Environmental Analysis and Cost Update.
- **Relationship between Benchmarks and ZEB Purchasing Requirements:** The inclusion of language that would require ARB to temporarily halt the ZEB purchase requirement if real-world ZEB cost and performance and funding availability are misaligned with the benchmarks established in the proposed regulation.
- **Waiver of Certain ZEB Purchasing Requirements:** Section 2023.1, subdivisions (b)(1) and (b)(2) should be replaced with the following requirements:
 - **Subdivision (b)(1):** The ZEB purchase requirements for calendar year ending December 31, 2023, would be waived if California transit agencies collectively have at least eight hundred (800) zero-emission buses purchased or in active bus fleets by December 31, 2020, as determined by the Executive Officer based on the reporting data for calendar year 2020 required by section 2023.8.
 - **Subdivision (b)(2):** If the 2023 ZEB purchase requirement is waived under Subdivision (b)(1), the ZEB purchase requirements for calendar year ending December 31, 2024, would be waived if California transit agencies collectively have at least one-thousand and two hundred (1,200) zero-emission buses purchased or in active bus fleets by December 31, 2021, as determined by the Executive Officer based on the reporting data for calendar year 2021 required by section 2023.8.
- **Modification of Definition of “Large Transit Agency,”** under Section 2023(b)(29)
 - “Large Transit Agency” means a transit agency operating in an UZA with population of at least 200,000 with at least 100 vehicles in annual maximum service
 - For the purposes of this section, a transit agency that is otherwise defined as a small transit agency shall be considered a large transit agency, if the following conditions are met:
 - The agency operates in either the South Coast and San Joaquin Valley air basins
 - The agency operates more than 65 vehicles in annual maximum service
- **Modification of Definition of “Small Transit Agency,”** under Section 2023(b)(49):
 - “Small Transit Agency” means a transit agency that satisfies either of the following conditions:
 - The transit agency operates in an UZA with population less than 200,000

- The transit agency operates fewer than 100 vehicles in annual maximum service
- **Role of Incentives:** Provisions would be added to the proposed regulation requiring ARB to fund the transition to ZEBs.
- **Purchase Definition:** Section 2023.1(a)(5) would be replaced with the following language:
 - A new bus is considered purchased when a Notice to Proceed or Purchase Order is issued to the manufacturer and a transit agency's funds are identified, committed and encumbered.
- **ZEB Bonus Credit:**
 - Section 2023.3(d) would be augmented to expand the schedule to include one bonus credit for conversions to battery-electric placed in service on or before December 31, 2017 and which remained in service as of January 1, 2018.
 - In addition, in crediting ZEB deployments that exceed ZEB purchase requirements, ARB would provide the same level of credit for conversions to battery-electric as purchases of standard battery-electric buses, and one-half credit for electric trolleybuses placed into service between January 1, 2018 and December 31, 2020.
- **Excluded Buses:** The proposed regulation would be amended to include language requiring a technology assessment of these ZEB types in 2026 to evaluate commercial availability and operational readiness based on data gathered from real-world deployments of these ZEB types prior to the inclusion of these vehicles in the regulation.
- **Provisions for Extension/Exemption of a Zeb Purchase:** Section 2023.4(c)(4)(B)(3) would be replaced with the following language:
 - The cost or performance characteristics of the zero-emission bus would result in a transit agency violating any federal, state, or local laws, regulations or ordinances.
- **Compliance Option for Joint ZEB Groups:** The requirement that transit agencies share an MPO, RTPA or air basin to form a joint zero-emission bus group would be removed. (CTA)

Agency Response:

CARB agreed with CTA's recommendations on the definitions of large transit agency, small transit agency, and purchase; and incorporated these changes in the final ICT regulation. CARB rejected the rest of the CTA's proposal for three reasons: (1) CTA's proposal does not provide the level of comprehensiveness to assess technologies; (2) CTA's proposal does not provide the same level of safeguards for transit agencies; and (3) CTA's proposal does not provide the same level of emission reduction benefit.

CARB does not agree to place the performance review in the regulation and establish benchmarks because it provides no tailored approach to meet individual transit agencies' needs. Rather, it could halt all agencies' progress should one performance metric falter. In addition, the Comprehensive Review covers broader metrics than the CTA proposal, and may provide a better assessment of technology performance.

CARB does not agree with CTA's proposal on waiver (the word "discharge" is used in the final ICT regulation) thresholds. The discharge thresholds in the ICT regulation were derived from CARB's conversations with transit agencies in 2018. Therefore, CARB believes the ICT regulation reflects the achievable purchase trend and provides greater early emission reduction benefits.

CARB does not agree with CTA's proposal to include the role of incentives in the regulation because CARB already has a mechanism in place to assess the funding priority each year and committed in Resolution 18-60 to require an annual update on progress. This update will address development and deployment of zero-emission bus technologies, status of California incentive funding program, CARB's collaboration with transit agencies, manufacturers, infrastructure providers, and other state agencies to promote zero-emission bus technologies, and any potential changes to the regulatory requirements that may be warranted.

CARB does not agree with CTA's proposal on giving out more bonus credits by extending the eligibility time period. In the ICT regulation, bonus credits are only given out to the ZEBs placed in the fleet early to test the technologies and produced early emission reduction benefits. Extending the eligibility period will further delay future ZEB purchases without a corresponding benefit.

CARB does not agree with CTA's proposal on conducting a technology assessment in 2026 of other types of buses because the Comprehensive Review and annual update together will provide comparable information to the Board for consideration of further changes, if needed.

It is redundant for CTA's proposal to include cost as part of the exemption in section 2023.4(c)(4)(B)(3) because the ICT regulation does not require early retirement of buses.

CARB also does not agree with CTA's proposal on allowing a Joint Group to be formed by transit agencies without (1) a federal or state funding relationship; (2) sharing of charging infrastructure; or (3) local or regional environmental benefits. The ICT regulation ensures that when a Joint Group is formed there are benefits in pooling resources together and ensuring the delivery of local and regional environmental benefits.

None of these alternatives 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.

F-5 Hybrid Approach

Comment:

Clean Energy shares the goals of ARB to further reduce emissions throughout the state's transit properties. Where we diverge in approach is on technology. While ARB is pushing to move transit only to a full ZEB outcome, we believe a more hybrid approach is warranted. Because no one can credibly argue that ZEB technology can fully meet today's transit properties needs with existing battery or fuel cell technology or state that ZEB technologies will be ready in time to aggressively implement ZEB purchase requirements outlined in the ICT, we believe ARB should have performed a full comparative analysis as required by Government Code Section 11346.5(D)(13). Unfortunately, ARB staff opted not to perform this analysis by making a statement that has yet to be validated. Furthermore, the historical narrative that celebrates transit properties that chose to adopt ZEB strategies within the text of the proposed ICT ignores the significant tax payer dollars spent and herculean effort made by transit properties that switched away from diesel to 100 percent natural gas operations. These transit players didn't demonstrate a few buses and run the rest of their fleet on diesel. They made a complete transitional change to a new technology that was proven and cost-effective. Rather than allow such transit properties to harness their existing infrastructure and adopt near zero emission strategies powered by renewable natural gas that can deliver ZEB-like performance, these transit properties are now being forced to abandon their operations for a strategy that has yet to be fully commercialized and install costly infrastructure that will present significant challenges and costs that are largely unforeseen. Furthermore, there is little consideration of resiliency and little consideration of what to do if ARB staff's projections are overly optimistic and prevent transit properties to fulfill their core mission: to move people.

With recent articles alerting us to extended smog days in the South Coast not seen for 20 years, finding more cost-effective ways to combat mobile source air pollution over costly ZEB strategies may be warranted. **(Clean Energy)**

Agency Response:

In developing the ICT Regulation, CARB solicited input on potential alternatives, as described in Chapter IX, Evaluation of Regulatory Alternatives, in the Initial Statement of Reasons. CARB discussed the reasons for rejecting them, and in the Standardized Regulatory Impact Assessment analyzed the potential economic impacts of higher purchase requirements and purchase requirements for low-NOx compressed natural gas buses with a requirement to purchase renewable natural gas.⁷² CARB concluded that none of the alternatives would be less burdensome and as effective in carrying out the goals of the regulation to reduce emissions from transit buses.

⁷² SRIA, p. 60, et seq.

Regarding the need to address pollution from all transportation sectors, CARB notes that transit buses are not the only vehicles being transitioned to zero emission technologies. CARB's Mobile Source Strategy discusses the overall goal of reducing transportation emissions.⁷³ While discussing the problems that the ICT regulation is intended to address, the ISOR identified the need to reduce GHG emissions from the transportation sector, especially from heavy-duty vehicle applications.⁷⁴ The ISOR further identifies that zero-emission technologies are essential to help achieve California's air quality and climate protection goals. Cleaner combustion can be paired with the zero-emission technologies as a short-term solution. However, while carbon dioxide accounts for 84% of statewide GHG emissions,⁷⁵ cleaner combustion is not the end goal. Precisely because of the challenges for our air quality, this and other regulations are necessary to transition to a zero-emission transportation sector.

The approved regulation is phased-in because of the significant up front costs and to allow time for the technology to develop and transit agencies to incorporate zero-emission technology into their fleets at a pace that allows the technology to meet their needs. The regulation requires the purchase of low NOx engines if available for combustion buses starting in 2020 and phases in ZEB purchases as a fraction of bus purchases in 2023 for large transit agencies and 2026 for small transit agencies. The regulation provides a gradual phase-in schedule for zero emission buses and safeguards to allow continued purchases of combustion buses if ZEBs are not suitable to meet their needs. CNG infrastructure and CNG buses can still be used past 2040.

G. ENVIRONMENTAL ANALYSIS

The responses to these comments are in the "*Responses to Comments on the Draft Environmental Analysis for Innovative Clean Transit Regulation*," which was approved by the Board on December 4, 2018, and is incorporated in the FSOR as Appendix 7.

H. COMMENTS ON SPECIFIC REGULATORY PROVISIONS

This section addresses comments on specific regulatory provisions. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

⁷³ See <https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm>.

⁷⁴ Chapter II.C of the ISOR. Available https://www.arb.ca.gov/regact/2018/ict2018/isor.pdf?_ga=2.231805020.217144606.1555215395-2124256164.1542392963

⁷⁵ Figure II-1: 2015 California Total GHG Emissions by GHG Category and by Economic Sector of the ISOR. Available https://www.arb.ca.gov/regact/2018/ict2018/isor.pdf?_ga=2.231805020.217144606.1555215395-2124256164.1542392963

H-1 Definitions

H-1-1 Definition of Bus Purchase

Comment:

The proposed regulation requires ZEBs to be “*delivered within two years from the initial date of a Notice to Proceed*” (NTP) to count as purchases under the ZEB purchase requirement. From discussions with ARB staff, we understand that the two-year delivery requirement was added to prevent a transit agency from attempting to count as purchases, options that would not be manufactured and delivered to the agency for many years. Having consulted with the leading Original Equipment Manufacturer (OEM), we believe this provision offers a solution to a problem that does not exist. That is, an OEM would not agree to manufacture an option (codified in an NTP) far in advance of delivery, because the price of components and raw materials could change, leading to an uncertain profit margin for the bus.

Additionally, it is common knowledge among transit agencies nationwide that deliveries of ZEBs and associated infrastructure are routinely – sometimes, chronically – late, a problem that can only be addressed by the OEMs, not transit agencies. **(CTA)**

Comment:

A bus should still count towards an agency's purchase requirement, even when the bus fails through no fault of the transit agency. **(OCTA)**

Agency Response:

CARB agrees and updated the definition of bus purchase in the ICT regulation and removed the two-year delivery requirement from the initial date of a Notice to Proceed. However, the purchase definition is also updated to ensure funding for bus purchase is encumbered to provide certainties on implementation. A ZEB purchase must remain in service for five years to continue to be counted as a purchase to ensure the expected emissions reductions from the purchase occur. In the event that a bus is in an accident and is repaired or replaced under warranty or by other means the original purchase will continue to count as a bus purchase even though the originally purchased ZEB was replaced.

H-1-2 Definition of Large and Small Transit Agencies

Comment:

The proposed regulation defines a large transit agency as “a transit agency with a fleet size of one-hundred (100) or more buses)” and a small transit agency as

“a transit agency with a fleet size of fewer than one-hundred (100) buses.” The proposed regulation defines a bus as “a rubber-tire vehicle designed to transport passengers by road with gross vehicle weight (GVWR) greater than 14,000 pounds, but does not include a trolley bus...” The practical impact of the definition of a bus is that it counts both standard transit buses and cutaway vehicles toward fleet totals.

These definitions appear to have been promulgated by ARB staff for simplicity, but they are ultimately problematic, because they are misaligned with the definitions for small and large agencies used by the Federal Transit Administration (FTA) to determine the eligible uses of critical federal funding sources, like Chapter 53 of Title 49 U.S.C. 5307 funding (FTA 5307).

For background, FTA defines large agencies as those operating in Primary Urbanized Areas (UZAs) with populations greater than 200,000 and at least 100 vehicles in annual maximum service; and, defines small agencies as those operating in UZAs with populations less than 200,000 or those with fewer than 100 vehicles in annual maximum service. Understanding this is critical, because small agencies have long-been afforded, and have taken advantage of, the opportunity to use FTA 5307 funding to fund operations. FTA has deliberately provided this flexibility to these agencies in recognition that many of them operate in rural and/or suburban areas, and lack access to local funds and ancillary revenue that supports basic service needs. Should the regulation maintain the current definitions for small and large transit agencies, several agencies recognized as small by FTA would become large agencies for ARB's purposes and would be forced to comply with the more aggressive ZEB purchase requirement schedule. This more aggressive schedule would likely require these small agencies to redirect their FTA 5307 funding from operations to meeting the ZEB purchase requirement, possibly undermining lifeline transit service.

To avoid conflicts with federal funding programs that could jeopardize the provision of transit service, particularly for small agencies, we urge ARB to defer to the Association and its members on the appropriate definition of large and small transit agencies.

We recommend that ARB replace Section 2023 (b) (29) in the proposed regulation with the following:

- Large Transit Agency” means a transit agency operating in an UZA with population of at least 200,000 with at least 100 vehicles in annual maximum service

We recommend that ARB replace Section 2023 (b)(49) in the proposed regulation with the following:

- Small Transit Agency” means a transit agency that satisfies either of the following conditions:
 - The transit agency operates in an UZA with population less than 200,000

- The transit agency operates fewer than 100 vehicles in annual maximum service
- For the purposes of this section, a transit agency that is otherwise defined as a small transit agency shall be considered a large transit agency, if the following conditions are met:
 - The agency operates in either the South Coast and San Joaquin Valley air basins
 - The agency operates more than 65 vehicles in annual maximum service. **(CTA)**

Comment:

ARB Staff's Change in Fleet Size Definition Remains Problematic. We have addressed the issue of fleet size and ARB's proposed changes in definition in earlier comments and we urge the Governing Board to ensure consistency with FTA's definitions. Specifically, under today's ARB transit rule, large fleets are defined as transit agencies with 200 or more buses, excluding cutaway vehicles toward fleet totals. The proposed definition of large transit fleet is 100 or more vehicles and counts both standard transit buses and cutaway vehicles toward fleet totals. Clearly, these definitions have been promulgated by ARB staff for simplicity and greater inclusion of transit properties required to follow a more aggressive ZEB adoption schedule. Unfortunately, this decision to change the definitions of large and small transit fleets will be misaligned with the definitions for small and large agencies used by the Federal Transit Administration (FTA) to determine the eligible uses of critical federal funding sources, like Chapter 53 of Title 49 U.S.C 5307. We strongly recommend that the Governing Board support the California Transit Association's request that ARB staff adopt definitions established by the FTA which are as follows:

- A large agency shall be defined as a transit agency operating in a primary urbanized area with population of at least 200,000 with at least 100 vehicles in annual maximum service
- A small agency shall be defined as a transit agency, if any of the following conditions are met:
 - The agency operates in a primary urbanized area with a population less than 200,000; or,
 - The agency operates fewer than 100 vehicles in annual maximum service. **(Clean Energy)**

Comment:

METRO's Recommendation: For the purpose of the CARB Regulation, and for determining a large transit agency versus a small transit agency, change the CARB interpretation of small transit agencies to match the FTA interpretation:

- a. All transit agencies operating in Primary UAs of <200,000 population, and

- b. All transit agencies operating in UAs of >200,000 population that operate 100 or fewer buses, including Demand Response vehicles, and excluding paratransit vehicles. (**Santa Cruz METRO**)

Comment:

MST urges the Board to reconsider the definition of a “small operator” and instead use a definition that transit operators are familiar with and which is currently used in federal and state programs. The proposed regulations define a small operator as any operator with fewer than 100 buses. MST urges the Board to rely on the current federal definition that specifies a small operator as having less than 100 buses during peak operations. (**MST-1**)

Comment:

CALACT urges the Board to reconsider the definition of a “small operator” and use a definition that transit operators are familiar with, and is currently used in federal and state programs. The current federal and state definition specifies a small operator as having less than 100 buses during peak operations or deployment. The definition as proposed in this regulation inevitably includes vehicles with marginal to no usage. Many vehicles in a fleet reported in the National Transit Database (NTD) may not be regularly used: some may only be used during emergencies or during fleet maintenance, may be retired, or may be vehicles that have met their useful life. The definition in the current ICT regulation relies on NTD data that includes the aforementioned vehicles not normally used in operations. This inconsistency may force agencies, who are defined as small operators in terms of federal and state funding and regulatory compliance, to be subject to the same implementation deadlines as operators with much more solid and substantial funding and resources. As such, historically small operators would face a much more onerous and inequitable implementation deadline which may have unintended consequences on operators and services within an agency. (**CALACT**)

Comment:

The proposed regulations define a small operator as any operator with less than 100 buses. Western Contra Costa Transit Authority urges the Board to rely on the current federal definition that specifies a small operator as having less than 100 buses during peak operations. The number “100” is nominal and does not accurately portray the size of an operator as a whole. Many vehicles in a fleet may not be regularly used: some may only be used during emergencies or during fleet maintenance, may be retired, or may be vehicles that have met their useful life. We urge CARB not to rely solely on NTD data for the total number of buses because these numbers can represent total buses on the lot including buses

being sold or disposed that have met their useful life and back up vehicles used for emergencies. (**WESTCAT-2**)

Comment:

Small Operator Definition: As an agency that operates 4 vehicles during peak operations but has 8 vehicles total, we urge the Board to reconsider the definition of a "small operator" and use the definition employed by federal and state programs for compliance purposes. The proposed regulations define a small operator as any operator with less than 100 buses. Trinity County Transportation Commission urges the Board to rely on the current federal definition that specifies a small operator as having less than 100 buses during peak operations. The number "100" is nominal and does accurately portray the size of an operator as a whole. Many vehicles in a fleet may not be regularly used: some may only be used during emergencies or during fleet maintenance, may be retired, or may be vehicles that have met their useful life. We urge CARB not to rely solely on NTD data for the total number of buses because these numbers can represent total buses on the lot including buses being sold or disposed that have met their useful life and back up vehicles used for emergencies. (**TCTC-2**)

Comment:

Small Operator Definition: Additionally, we urge the Board to reconsider the definition of a "small operator" and use the definition employed by federal and state programs for compliance purposes. The proposed regulations define a small operator as any operator with less than 100 buses. ARBOC Specialty Vehicles, LLC urges the Board to rely on the current federal definition that specifies a small operator as having less than 100 buses during peak operations. The number "100" is nominal and does accurately portray the size of an operator as a whole. Many vehicles in a fleet may not be regularly used: some may only be used during emergencies or during fleet maintenance, may be retired, or may be vehicles that have met their useful life. We urge CARB not to rely solely on NTD data for the total number of buses because these numbers can represent total buses on the lot including buses being sold or disposed that have met their useful life and back up vehicles used for emergencies. (**ARBOC**)

Comment:

Just as important is the definition of a small operators within the proposed regulation. County Connection urges ARB to use a definition that is used consistently throughout transit regulation and funding. That definition is the current federal definition that specifies that small operator is one that has less than 100 buses in peak service. Under the proposed regulation, ARB staff have used a different definition of a small operator that is unique and not used anywhere else for transit regulation or funding. If this unique definition is used, there will be California transit operators that are defined as small operators by

the federal government and Caltrans, but defined as a large operator by ARB. This potential conflict in small vs large definition will be confusing at best and likely counter-productive. It should be noted that even if ARB uses a traditional definition of a small operator which is what we ask, all California transit operators are getting to full ZEB fleets by 2040 under the proposed regulation. (**County Connection**)

Comment:

Just as important is the definition of a small operators within the proposed regulation. County connection urges ARB to use a definition that is used consistently throughout transit regulation and funding. That definition is the current federal definition that specifies that small operator is one that has less than 100 buses in peak service. Under the proposed regulation, ARB staff have used a different definition of a small operator that is unique and not used anywhere else for transit regulation or funding. If this unique definition is used, there will be California transit operators that are defined as small operators by the federal government and Caltrans, but defined as a large operator by ARB. This potential conflict in small vs large definition will be confusing at best and likely counter-productive. It should be noted that even if ARB uses a traditional definition of a small operator which is what we ask, all California transit operators are getting to full ZEB fleets by 2040 under the proposed regulation. (**County Connection**)

Comment:

Small Operator Definition: As an agency that operates 18 vehicles during peak operations but has 37 vehicles total, we urge the Board to reconsider the definition of a "small operator" and use the definition employed by federal and state programs for compliance purposes. The proposed regulations define a small operator as any operator with less than 100 buses. Humboldt Transit Authority urges the Board to rely on the current federal definition that specifies a small operator as having less than 100 buses during peak operations. The number "100" is nominal and does accurately portray the size of an operator as a whole. Many vehicles in a fleet may not be regularly used: some may only be used during emergencies or during fleet maintenance, may be retired, or may be vehicles that have met their useful life. We urge CARB not to rely solely on NTD data for the total number of buses because these numbers can represent total buses on the lot including buses being sold or disposed that have met their useful life and back up vehicles used for emergencies. (**B-W-HTA**)

Comment:

CalAct supports the new definition of a small operator that was just proposed by the CARB staff, and encourage the Board to adopt this definition that is consistent with federal and State programs. The new definition would allow

operators to maintain a continuity of services to vulnerable Californians who rely on transportation for access to education, employment, medical, and other life-sustaining services. **(B-O-CALACT)**

Comment:

And finally, I would just like to thank the staff's proposal on the definition of a small operator that showed up in the slides today. It's very consistent with how the Federal Transit Administration and even Caltrans defines what a small operator is versus a large operator.

A different definition from CARB on who is a small operator could be confusing and actually counterproductive. **(B-O-County Connection)**

Agency Response:

CARB agrees in large part with these comments. In response CARB revised the definitions for "Large Transit Agency" and "Small Transit Agency" to a definition that is more commonly used by transit agencies to remain consistent with federal requirements for funding buses.

H-1-3 Types of Vehicles Considered in the Fleet Size Determination

Comment:

Cutaways should not be counted towards fleet size due to lack of availability, field testing and the unknown performance of these type of shuttles for agencies like ours serving vulnerable populations. (MBTA)

Agency Response:

CARB agrees. The definition of "Fleet Size" was replaced with the a new definition for "Annual Maximum Service" in connection with updated definition of large and small transit agencies. The annual maximum service excludes demand response buses.

H-1-4 Definition of Bus Useful Life

Comment:

The definitions included in the Proposed ICT must account for fleet differences.

The Proposed ICT includes several common definitions which set the basis for the regulation. However, a number of these definitions may differ based on the agency. For instance, while the definition of "useful life" is based on what is needed to meet federal requirements (12 years), many transit agencies, including OCTA, have extended out their useful life to allow the agency to maximize the funding dedicated for operations purposes. The Proposed ICT should be amended in this case, to account for any agency-specific differences that may exist. (OCTA)

Agency Response:

The approved regulation does not require any ZEB purchases until a transit agency makes a new bus purchase. The FTA requires a minimum useful life when FTA money is used for purchasing a bus. If such minimum life is not met, a transit agency may have to pay back some of the funding based on the residual value. Therefore, the ICT regulation does not require a transit agency to retire its buses before the fulfillment of such minimum useful life as required by the FTA. However, a transit agency may choose to use an FTA-funded bus longer than its minimum useful life, as OCTA has suggested. The ICT regulation would not be less burdensome or more effective if it imposed requirements based on each agency's bus retention policy or practices.

H-1-5 Definition of Cutaway

Comment:

CALACT also supports the proposed definition of a cutaway bus. These vehicles are the workhorse of small transit systems due to their lower capital and operating costs. These vehicles are produced in a wide variety of sizes, and the proposed definition specifying vehicles weight of 14,000 pounds to 26,000 pounds is appropriate. In addition, the rule recognizes that a commercially available zero emission cutaway bus is currently not available. **(CALACT)**

Comment:

ARBOC Specialty Vehicles, LLC also supports the proposed definition of a cutaway bus. These vehicles are the workhorse of small transit systems due to their lower capital and operating costs. These vehicles are produced in a wide variety of sizes, and the proposed definition specifying vehicles weight of 14,000 pounds to 26,000 pounds is appropriate. In addition, the rule recognizes that a commercially available zero emission cutaway bus is currently not available. **(ARBOC)**

Comment:

Cutaway Definition: Western Contra Costa Transit Authority also supports the proposed definition of a cutaway bus. These vehicles are the workhorse of small transit systems due to their lower capital and operating costs. These vehicles are produced in a wide variety of sizes, and the proposed definition specifying vehicles weight of 14,000 pounds to 26,000 pounds is appropriate. In addition, the rule recognizes that a commercially available zero emission cutaway bus is currently not available. **(WESTCAT-2)**

Comment:

Cutaway Definition Trinity County Transportation Commission also supports the proposed definition of a cutaway bus. These vehicles are the workhorse of small transit systems due to their lower capital and operating costs. These vehicles are produced in a wide variety of sizes, and the proposed definition specifying vehicles weight of 14,000 pounds to 26,000 pounds is appropriate. In addition, the rule recognizes that a commercially available zero emission cutaway bus is currently not available. **(TCTC-2)**

Comment:

Specifically-we have noted that while the currently proposed regulation excludes "cutaway" type vehicles until 2026, its scope refers to all buses with a Gross

Vehicle Weight rating of over 14,000 lbs., except for trolley buses. For greater clarity, we proposed that ARB be explicit in similarly exempting all “body and frame” type buses (cutaways) regardless of weight class. Rural agencies such as MBTA rely heavily on larger cutaway buses as a cost effective solution for providing fixed route services in our communities, not just for providing door to door services. In particular, the F-550 based cutaways weighting 19,500 lbs. are the backbone of our fleet. The 14,000 lbs. threshold, if implemented, would place the type of vehicles we utilize under the scope of the regulation.” **(MBTA)**

Agency Response:

CARB agrees with the comments. The ICT regulation includes a later phase-in date for cutaway, over-the-road, double decker, and articulated buses as described in section 2023.1(c). The ICT regulation also provides sufficient lead-time for transit agencies, especially for small transit agencies to plan ahead of time, take advantage of available funds, and purchase ZEBs. In addition, the ICT regulation provides flexibility for transit agencies to comply with the ZEB purchase requirements, as well as providing exemptions to defer from ZEB purchase requirements under circumstances that are beyond transit agencies’ control.

H-1-6 Definition of Hybrid Systems

Comment:

Allison would also ask that CARB clarify new definitions proposed as part of 13 CCR §2023 with respect to hybrid systems and to take into account the overall performance characteristics of hybrid engine/powertrain combinations with reference to required NOx emission performance. **(Allison)**

Agency Response:

CARB agreed that more clarification should be provided about hybrid system under the Low-NOx requirements and modified the regulation. The new language in sections 2023.6(a)(1) and (2) clarifies that a hybrid bus would only be required to have a low NOx engine if the hybrid propulsion system in combination with the engine was certified to the Low-NOx engine standard.

H-2 ZEB Purchase Requirements

H-2-1 Concept of ZEB Purchase Requirement

Comment:

ZEB Purchase Requirements (Section 2023.1 (a)(1)): The proposed regulation maintains a ZEB purchase requirement as the primary mechanism for facilitating widespread transit electrification. We continue to believe that a ZEB purchase

requirement is inappropriate, because it fails to take into consideration the diverse financial positions and operational needs of transit agencies. (CTA)

Comment:

MST continues to believe that facilitating a transition to cleaner transit buses is best done by allowing transit agencies to craft individualized zero emission bus (ZEB) deployment plans that are consistent with their unique financial and operational requirements; however, we also recognize the value in providing ARB staff with constructive feedback on the proposed regulation as currently drafted. We believe this feedback better ensures that if you proceed with a purchase mandate, the worst impacts to transit service will be minimized. (MST-1)

Comment:

We also know that some of the smaller buses we use for specialty services, like microtransit or neighborhood shuttles are still very range limited. And the development of ZEVs in this market may lag behind their larger brethren. We appreciate the work that has been done by your staff in preparing the proposal presented today. We believe our concerns as a transit agency have been heard and addressed. The proposal sets a reasonable time frame to transition to ZEV -- ZEVs appropriate incentives and options to address the unknowns that could delay our best efforts in transition. (B-O-SacRT).

Agency Response:

For the reasons discussed in the ISOR and explained here, CARB concluded that any alternative that did not require ZEB purchases, such as a low-NOx engine requirement as described in the ISOR, would not be as effective in carrying out the purposes of the regulation and less burdensome or more cost effective to private persons, or more effective.

CARB recognizes transit agencies are different and also believes that the delivery of emission reductions needs assurance. The ICT regulation balances these two considerations. The requirements of the ICT regulation differ based on fleet size to address the differences. The ICT regulation provides sufficient lead-time for transit agencies, especially for small transit agencies, to plan ahead of time, take advantage of available funds, and purchase ZEBs. In addition, the ICT regulation provides flexibility for transit agencies to comply with the ZEB purchase requirements, as well as providing exemptions to defer from ZEB purchase requirements under circumstances that are beyond transit agencies' control. These exemptions and other flexibilities ensure transit service is not adversely affected by the regulation.

CARB does not believe it is the most effective way to reduce emissions by allowing individual transit agencies to set their own timeline. This would be less effective in

carrying out the purpose of the regulation. However, CARB does agree that there needs to be a roadmap to deploy ZEBs developed by each individual transit agency. Therefore, the ICT regulation requires each transit agency to develop a ZEB Rollout Plan to identify (1) a goal of full transition to ZEBs by 2040; (2) types of ZEB technologies to deploy; (3) a schedule of infrastructure construction and upgrade; (4) bus (both ZEB and conventional) purchase or lease schedule; (5) conventional bus conversion schedule, if applicable; (5) a description of how ZEBs will be deployed in disadvantaged communities; (6) training plan and schedule; and (7) identification of potential funding sources.

The goal of the Rollout Plan is to ensure the transit agencies determine the best strategy for their own unique situations. The Rollout Plans would require transit agencies to plan ahead of time, familiarize themselves with zero-emission technologies before the purchase requirements starts and to learn about potential challenges and available solutions to achieve a smooth transition.

H-2-2 Retain Purchased ZEBs for Five Years

Comment:

NVTA is concerned with the requirement that zero emission buses must be retained for at least five (5) years from the date of being placed in active service. From NVTA's experience with the New Flyer gas electric hybrids there could very well be an instance where a bus performs in such a poor manner as to require retirement earlier than five (5) years. NVTA would like to see a provision allowing for a waiver of the five (5) year requirement on zero emission buses. (NVTA)

Comment:

The Proposed ICT currently states that a bus only counts towards an agency's purchase requirement if it remains in service for at least five years. However, the only reason an agency would remove a bus from service prior to the bus meeting its useful life is if the bus was unable to safely be operated along an agency's routes, or if the bus was in an accident which prevented further operation. This could be due to a multitude of factors beyond the transit agency's control. If the bus is removed from service, this would also create challenges in a transit agency's ability to replace the bus using federal funding since the bus was unable to meet the federal standards related to useful life. The Proposed ICT should recognize the original intent of the transit agency in complying with the regulation, and count these buses towards a Proposed ICT purchase requirement. (OCTA)

Agency Response:

The regulation requires transit agencies to retain ZEBs for a minimum of 5 years after the ZEB purchase requirements begin to ensure that the expected emission reductions

occur. This also ensures that short term leases such as one for 3 years, would not count as a bus purchase each time the lease is renewed. For this reason, a ZEB purchase must remain in service for five years to continue to be counted as a ZEB purchase. In the event that a bus fails and is repaired or replaced under warranty or other means within the 5-year period, the replacement ZEB will still count as a ZEB in the fleet and the transit agency would remain in compliance with the ZEB purchase requirements.

H-2-3 ZEB Purchase Schedule

Comment:

We are aware that various stakeholder groups, comprising the Advanced Clean Transit Coalition, support accelerating the ZEB purchase requirement schedule to claim ZEB deployments at more transit agencies sooner. We recommend that ARB resist calls to accelerate the ZEB purchase requirement schedule and, instead, maintain the ZEB purchase requirement schedule in the proposed regulation. **(CTA)**

Comment:

The ZEB purchase requirements that form the core of the ICT proposal would take effect in 2023 for large operators and 2026 for small operators. If the funding issues discussed above can be addressed, these dates should provide sufficient lead time for operators large and small to plan procurements and line up needed funding. For operators that are able to procure ZEBs prior to the start dates, they would allow those operators to take advantage of the HVIP and VW funding opportunities. They should also allow more time for ZEB prices to continue to come down due to greater economies of scale, reducing the incremental cost of procuring ZEBs compared to conventional buses. **(B-W-MTC)**

Comment:

Nevertheless, ARB staff should be commended for acknowledging that the once-2020 purchase requirement start date was too soon to be practical for agencies, given the current state of ZEB technology and the reality of 18- to 24-month procurement cycles. We appreciate that ARB staff has also recognized that there are unique financial and administrative challenges faced by small agencies that justify delaying the purchase requirement for these agencies until 2026. Importantly, this delay will also allow small transit agencies to learn from the experiences of large agencies on effective ZEB deployment. **(CTA)**

Comment:

Regulation start date and schedule: The regulation start date and schedule is far too aggressive for technologies that are not yet proven. While there have been purchases and deliveries of zero emission transit buses, there have yet to be any

documented successes for large scale fleet conversions that would warrant such an aggressive schedule. Given your proposed timetable that requires a zero-emission bus (ZEB) rollout plan in 2020 for large transit agencies and 2023 for small transit agencies, large transit agencies would essentially have one year to decide on what type of ZEB pathway to take based on data that shows sub-par performance, uncertain capital costs (buses and infrastructure), and unstable electrical costs. It would not be prudent to force a technology on transit agencies without better results in the field and while competing ZEB technologies are being developed. In addition, the infrastructure issues attendant to Battery-Electric buses (e.g. charging equipment) have also proven to be less-than-ready. The ICT regulation should take this uncertainty into account and allow transit agencies more timeline flexibility. **(SoCalGas)**

Agency Response:

The required ZEB percentage increases gradually with time to reflect continued technology improvements, availability of longer ranges of battery electric buses, and to allow time to expand infrastructure and train more technicians. Also, the initial ZEB purchase requirements in calendar year 2023 and 2024 would be discharged, if California transit agencies collectively purchase at least 850 and 1250 ZEBs statewide by December 31, 2020 and 2021, respectively. These targets are likely to be met by transit agencies. The later starting date for small transit agencies combined with the discharge of the initial ZEB purchase requirements provide transit agencies sufficient lead-time to plan ahead of time, take advantage of available funds, and purchase ZEBs early.

H-2-4 Delayed Compliance for Small Transit Agencies

Comment:

The later purchase mandate should also benefit small operators, allowing them to take advantage of lower vehicle prices as demand increases and supply chains mature. **(MST-1)**

Comment:

Delayed Compliance: Trinity County Transportation Commission strongly supports the delayed compliance for small operators with adopting the rollout plans and purchase mandates. As a small operator, additional time will be needed to secure funding for developing and adopting the rollout plans. Implementation of Innovative Clean Transit may require our agency to purchase and build new storage facilities to meet infrastructure requirements of electric charging stations. The additional time needed to develop the rollout plans support the need for the later purchase mandate timeline. The later purchase mandate should also benefit our agency to take advantage of lower vehicle prices as demand increases and supply chains mature. **(TCTC-2)**

Agency Response:

CARB agrees with the comments. A later starting date for small transit agencies allows them to further take advantage of available incentives and learn from experiences of large transit agencies. In addition, small transit agencies are more likely to serve remote communities with long rural routes, so additional time provides them more opportunity to purchase longer-range battery electric buses as their technology develops further or to purchase fuel cell electric buses at a time their costs should be lower.

H-2-5 Extension of Compliance Requirements of Small Transit Agencies

Comment:

Pasadena opposes the Innovative Clean Transit (ICT) rule as currently proposed for small transit agencies. Further, Pasadena requests that the rule not apply at all to small agencies until after the Zero Emission Bus (ZEV) technology, particularly battery electric buses, has advanced to a point where charging between manufacturers is universal; the miles provided from a single charge is exponentially higher than what is currently documented; the reliability has improved significantly, such that additional spare buses will not be required to be able to support the use of ZEBs; and the technology has been proven to be as, if not more, reliable than CNG buses when used in revenue service in the variety of geographic settings and climates in California.

Other than the designation of large or small fleet and the related timing for implementation, the proposed rule assumes that all transit agencies are otherwise the same. This is not the case for Pasadena's local transit system, the resources for which are so limited that the deployment of ZEB technology as currently proposed is not possible without having to fundamentally alter and significantly reduce the level of transit service currently provided to the public.

Some small transit agencies such as Pasadena limit their risk and expense by depending on and learning from the large transit agencies that have had ample opportunity to test new technology. It is too soon to implement the regulation statewide for all size or types of transit agencies, such that CARB is unable to obtain an accurate and complete picture of transit agencies' current experience with ZEBs and initial review of technology readiness. Currently, large agencies that are attempting to deploy ZEBs are experiencing difficulty in having operable and reliable vehicles delivered, have experienced high costs of charging infrastructure in very limited applications, and have far exceeded estimated operating expenses for utility costs. Pasadena does not have the capacity to experiment with this technology. **(City of Pasadena)**

Agency Response:

CARB agrees in significant part. The regulation provides a later starting date for small transit agencies to allow them to further take advantage of available incentives and learn from the experiences of large transit agencies. Additional time for small transit agencies also provides them more opportunity to purchase longer-range battery electric buses as their technology develops further. Additionally, CARB will conduct a comprehensive review of program readiness at least one year prior to the initiation of any purchase requirement. At a minimum, the review will address the following issues: costs, performance, reliability of ZEBs and corresponding infrastructure, workforce training, and the availability and barriers to deployment of zero-emission buses of different types. CARB would then have information on which to consider adjusting the requirements accordingly based on outcome of this review. Further delay in adopting the regulation, extending the starting date of the ZEB purchase requirements for transit agencies, or setting future performance measures as requirements in the regulation would ignore the rapid technology development, would delay the deployment of zero-emission buses where well-suited, and impairs enforceability. Further, the ICT regulation has built in many safeguards in section 2023.4 to address potential unintentional consequences for situations that are beyond transit agencies' control.

H-2-6 Require Vehicle Grid Integration

Comment:

Olivine also reinforces its earlier feedback provided both at the June 13, 2018, workshop and via public comment.

- Vehicle to Grid Integration (VGI) is crucial to manage electricity (fuel) costs. Several transit districts expressed concern over or shared their experience with high electricity costs. Olivine's analysis has shown that electricity costs can be managed via intelligent charge control algorithms and/or bi-directional power flow. These strategies enable a variety of grid engagement opportunities, including direct wholesale electricity market participation and joining virtual power plant aggregations like the Olivine Green Community. VGI functionality needs to be a default component of all Battery Electric Bus (BEB) deployments.
- VGI functionality should be required in BEB and/or charging infrastructure procurements. The costs associated with enabling VGI functionality are small compared with the large capital required for both buses and infrastructure. The marginal increase associated with VGI functionality will have a quick payback period from electricity (fuel) cost savings. (**Olivine**)

Agency Response:

CARB agrees vehicle grid integration (VGI) could provide benefits to both the electricity grid and to fleets of zero-emission buses including battery electric buses; however, this technology is still developing and costs to implement it are uncertain. California Public

Utilities Commission (CPUC) efforts under the Senate Bill 350 (SB 350), on the other hand, would also minimize transportation electrification costs through different efforts including new rate design. These efforts would help transit agencies to manage their electricity costs. CARB also agrees that transit agencies should have the option to work with utilities to implement the best charging methods based on individual situations regarding infrastructure and electricity rates. It would be at a transit agency's discretion to incorporate VGI if available to manage the electricity costs. The regulation does not prohibit this. The ICT regulation would not be equally effective and more cost-effective to private persons or less burdensome, or more effective and equally or less burdensome, if it imposed requirements to purchase VGI rather than leaving it to transit agency discretion.

H-2-7 DGS Should Require Vehicle Grid Integration

Comment:

Department of General Services procurement efforts should require VGI and V2G functionality in the selection of battery electric buses and charging infrastructure by the State. **(Olivine)**

Agency Response:

This comment is not specifically directed at CARB's rulemaking action. This comment should be directed to Department of General Services.

H-2-8 Further Delay for CNG Fleets

Comment:

Given that some transit properties opted to change their entire operational system to accommodate natural gas less than [sic] two decades ago to further clean the air, we would encourage ARB providing these transit agencies with greater flexibility on the ZEB adoption timeline. Specifically, these properties should automatically be allowed to delay ZEB purchase requirements until 2025 regardless of the collective ZEB purchase of buses statewide. **(Clean Energy)**

Agency Response:

The ICT regulation allows a gradual transition for transit agencies. Only the large transit agencies need to start purchasing ZEBs in 2023. Purchase requirements for small transit agencies do not start until at least 2026. Even for the large transit agencies, the 2023 and 2024 purchase requirements are likely discharged due to the statewide effort. Pushing the initial program start date to 2025 regardless would ignore the use of best available control technology and delay air quality and climate protection benefits.

H-3 Discharge of the Initial ZEB Purchase Requirements

H-3-1 Support The Discharge Requirements

Comment:

Additionally, the inclusion of waivers for early compliance is a welcome addition to the proposal and could motivate operators to collaborate on procurements to meet the minimums to achieve the waivers. **(B-W-MTC)**

Agency Response:

CARB agrees with this comment and appreciates the support.

H-3-2 Reduce the First ZEB Purchase Discharge Threshold and Increase the Second One

Comment:

Waiver of Initial Zero-Emission Bus Purchase Requirements (Section 2023.1 (b)(1) and 2023.1 (b)(2)): The proposed regulation provides an opportunity to delay the start date for the ZEB purchase requirement faced by large transit agencies, if the number of ZEBs in operation and/or on order at the end of 2020 and 2021 reach 1,000 and 1,150, respectively. We appreciate the inclusion of this provision, as it represents a creative approach by ARB staff to permitting the leaders in transit electrification to continue to lead, while also encouraging other agencies to explore deploying ZEBs early.

We support this provision and recommend that ARB replace Section 2023.1 (b)(1) and 2023.1 (b)(2) in the proposed regulation with the following:

- The zero-emission bus purchase requirements for calendar year ending December 31, 2023, are waived if California transit agencies collectively have at least eight hundred (800) zero-emission buses purchased or in active bus fleets by December 31, 2020, as determined by the Executive Officer based on the reporting data for calendar year 2020 required by section 2023.8.
- If the 2023 zero-emission bus purchase requirement is waived as a result of the implementation of section 2023.1(b)(1), then the zero-emission bus purchase requirements for calendar year ending December 31, 2024, are waived if California transit agencies collectively have at least one-thousand and two hundred (1,200) zero-emission buses purchased or in active bus fleets by December 31, 2021, as determined by the Executive Officer based on the reporting data for calendar year 2021 required by section 2023.8.

These recommendations reflect the Association's best estimates for realistic ZEB purchase thresholds, based on the self-reported procurement schedules of our members and expected funding availability as of summer 2018. Without these adjustments, the ZEB threshold number for 2020 is too high and would translate into a de facto ZEB purchase requirement in 2023. **(CTA)**

Comment:

Still requires more discussion about the 1,000 and 1,150 targets. These targets seem too high. Keep in mind, transit agencies have twenty years to get to a 100% purchase. Assuming a statewide fleet of 10,000 buses, and assuming a relative straight-line basis, agencies will need to purchase over 500 buses a year between 2020 and 2040. Considering that bus battery technology (range) needs to improve substantially, CARB should assume fewer ZEB purchases in the

earlier years and larger ZEB purchases in the out-years, as bus range improvements are made by the ZEB manufacturers. (**Santa Cruz METRO**)

Comment:

Additionally, we believe the 2021 Waiver for Early Compliance that would waive the 2024 purchase requirement should be greater than 1,150 buses. We recommend this number increased to at least 1,250 zero-emission buses. The California Air Resources Board's numbers show there are already 787 buses on the road, on order, or awarded. There are also several financial opportunities agencies can utilize in the next few years to purchase hundreds of additional zero-emission buses. For example, \$35M of the \$180M in HVIP funding for FY17/18 was designated for zero-emission buses. At these funding levels, with an incentive of \$165,000 per bus (including the additional incentive funding for buses in disadvantaged communities), this program would fund more than 200 zero-emission bus purchases. Similar total HVIP funding has been appropriated for next year.

Before the 2nd Waiver for Early Compliance targets in 2021, we will see 3 years of HVIP funding. If HVIP funding remains consistent, this funding source alone could bring in 600 buses, greatly exceeding the 1,150 bus target.

Additional sources of funding include the Volkswagen mitigation money, \$130M of which has been allocated for school, transit, and shuttle buses. If, for example, the allocation is awarded evenly between the three categories, \$43M could be allocated to fund over 250 zero-emission buses (assuming similar HVIP incentive values). (**UCS-2**)

Agency Response:

CARB updated the threshold numbers to discharge the ZEB purchase requirements to 850 zero-emission buses purchased or in active bus fleets by December 31, 2020, and to 1,250 ZEBs by December 31, 2021 from 1000 and 1150, respectively. These changes reflect a transit survey conducted by staff that identified the number of existing ZEBs and those that are on order, awarded funding, or are planned as the appropriate targets approved by the Board. With this information, CARB concluded that the above thresholds appropriately balanced incentivizing early purchases of ZEBs, preserving opportunities for funding, and reducing emissions.

H-3-3 Increase Both ZEB Purchase Discharge Thresholds

Comment:

In addition, the rule should create more ambitious near-term targets to meet for the waiver of requirements for the first two years. Pushing transit agencies to

deploy more buses now will only amplify the benefits of this regulation. (**ACT Coalition Partners-1**)

Agency Response:

CARB updated the threshold numbers to discharge the ZEB purchase requirements to 850 zero-emission buses purchased or in active bus fleets by December 31, 2020, and to 1,250 ZEBs by December 31, 2021. These changes reflect a transit survey conducted by staff that identified the number of existing ZEBs and those that are on order, awarded funding, or are planned as the appropriate targets approved by the Board. With this information, CARB concluded that the above thresholds appropriately balanced incentivizing early purchases of ZEBs, preserving opportunities for funding, and reducing emissions. Higher thresholds would impose undue burdens on transit agencies for early planning, purchasing, infrastructure construction, and other predicates to incorporate ZEBs into their fleets.

H-3-4 Expand the ZEB Purchase Discharge Requirements to Future Years

Comment:

The Proposed ICT should extend the "waiver of purchase requirement" framework into future years.

Currently, the Proposed ICT only allows for a waiver of the purchase requirement if a statewide target is met in the years of 2020 and 2021. This concept should continue into future years, aligned with each agency's rollout plan. This would prevent a transit agency from being subject to an arbitrary purchase requirement, and allow additional flexibility for an agency to purchase a bus when necessary. In either case, a transit agency would still have to submit a rollout plan for transitioning its fleet to zero-emission by 2040, maintaining that statewide target. The ARB would also have an opportunity to set statewide targets each year based on actual data and need, rather than simply implementing a one-size fits all requirement. This concept should at least be considered in the years leading up to the 2029 100 percent purchase requirement mandate. (**OCTA**)

Agency Response:

The purpose of the discharge provision in section 2023.1(b) is to encourage earlier investments and to provide flexibility to comply with the ZEB purchase requirements with the help of available funds. This provision is consistent with the overall strategy of the ICT regulation that considers a combination of incentives and regulatory measures to provide a strong market signal for zero-emission technology deployment. Extending the requirements of section 2023.1(b) may unintentionally relax the purchase requirements in areas that are in need of emission reductions, and does not harvest benefits in gaining ZEB operating experience.

The ICT regulation as adopted accommodates individual transit agency plans. It provides several exemptions and only requires purchases according to agencies' routine purchase schedules. This structure maximizes flexibility for all transit agencies, , and accommodates operational changes by agencies according to their own needs. The commenter's proposal would be more burdensome and less effective.

H-4 Purchase of Special Bus Types

H-4-1 Retain Later Phased-In for Special Types of Buses

Comment:

Currently, there are no viable electric or fuel cell powered cutaway vehicles available. Thus, it [sic] this time it would not be prudent to include cutaways in the initial timeframe of proposed regulation. Therefore, County Connection strongly supports the ARB staff recommendation to defer the regulation on to cutaway vehicles until 2026. Similarly, we support the ARB staff definition of a cutaway as put forward on page 37 of Article 4.3 in Appendix B-2 of the proposed regulation.

Thus, County Connection urges ARB to retain these two staff recommendations despite some reservations expressed by a number of advocates in the environmental community. **(County Connection)**

Comment:

NVTA is pleased to see CARB addressed our and other transit agencies' concerns to exclude cutaways and other vehicles that cannot meet the requirement from the draft rule. ARB's proposal to exclude these vehicles from the rule until such time OEMs can make Altoona-tested zero emission versions available on the market, ensures that implementation of the ICT Regulation will not impair service to our community's most vulnerable populations. **(NVTA)**

Comment:

Finally, we also support exclusion of zero-emission cutaways and smaller buses, over-the-road coaches, and articulated buses until 2026 or until such vehicles have completed Altoona testing. **(B-W-MTC)**

Comment:

We strongly urge the CARB Board to support the current plan to delay the time frame when agencies must replace cutaway vehicles. **(B-O-CALACT)**

Comment:

The cutaways we are very pleased with where the staff is going with those. As you heard from Tiffani Fink and Jim Wilson, those are a specialized vehicle that often serve a very specialized population. And the longer we wait to start those vehicles, the better we'll do it. If we do it early, the stakes are going to be made most likely that will be harmful to the very population they're trying to serve. **(B-O-County Connection)**

Comment:

The medium-duty cutaway certainly has its challenges, like you've heard here today. So I do support the rule for leniency on that particular class vehicle. **(B-O-SDAP)**

Agency Response:

CARB agrees with the comments and appreciates the support. The ICT regulation retains a later starting compliance year for the types of buses that are in pre-commercialization stage, including cutaway, over-the-road, double decker, and articulated buses as described in section 2023.1(c). The purchase requirement for these buses starts January 1, 2026 or after passing the Altoona testing and obtaining a bus testing report, whichever comes later, to ensure buses that are eligible for funding are commercially available.

H-4-2 Performance Review Before Purchase of Special Types of Buses

Comment:

Excluded Buses (Section 2023.1 (c)): The proposed regulation excludes cutaway buses, over-the-road buses and articulated buses from the ZEB purchase requirement until January 1, 2026 and until the applicable ZEB type has passed and obtained an Altoona bus testing report as required by Title 49 of the Code of Federal Regulations (CFR) Section 665.13. We appreciate and support this provision, which acknowledges that electric technology for these bus types is still nascent and, if included under the ZEB purchase requirement too soon, would have devastating impacts on transit services serving the disabled, the elderly as well as commuters. We also appreciate that the performance review discussed under "Benchmarking and Regulatory Assessment" offers ARB staff's commitment to assessing the state of the technology for these non-standard buses before they are included under the purchase mandate.

Our support for this provision notwithstanding, we recommend that ARB look beyond the Altoona bus testing report as proof that a vehicle is ready for revenue service, and include language within the regulation requiring a technology assessment of these ZEB types in 2026 to evaluate commercial availability and operational readiness based on data gathered from real-world deployments of these ZEB types prior to the inclusion of these vehicles in the regulation. **(CTA)**

Comment:

The Proposed ICT should only include cutaways, articulated buses, and over-the-road coaches into the regulation after a complete cost and technology assessment is completed.

OCTA appreciates efforts by the ARB to defer the inclusion of various bus types under the purchase requirement until those buses have undergone more rigorous testing. However, under the current Proposed ICT, these buses are automatically included under the purchase requirement in 2026, or once they complete Altoona testing, whichever is later. While none have been Altoona-tested, and therefore are not eligible for federal funding, more substantive analysis is still needed to ensure that these buses can meet various agencies' operational needs. This is of heightened concern with cutaway buses, which are used to fulfill critical American with Disabilities Act (ADA) paratransit services, if the buses are not able to meet an agency's operational requirements, this may not only lead to impacts to paratransit service, but could impact a transit agency's compliance with ADA. **(OCTA)**

Comment:

Instead of setting a date certain of January 1, 2026, subject to vehicles passing Altoona testing, consider making January 1, 2026 the date at which CARB, the Board, will review the state of the market for cutaways, over-the-road coaches and articulated buses and then set a date for possible inclusion, subject to the findings.

Such findings should include "real world" testing of ZEBs in the working environments of various transit properties, not Altoona data, and an evaluation of the data based on yet to be developed performance expectations. Such findings should also include a minimum of two vehicle manufacturers in each category and a discussion about reasonable vehicle pricing. **(Santa Cruz METRO)**

Comment:

Although the current version of the Innovative Clean Transit Regulation provides that the regulation not become effective until there is an electric over-the-road motor coach approved by the FTA Altoona Test Center, a more substantive analysis is needed to ensure the motor coaches can meet the various agencies' operational needs including those mentioned above. Therefore, VCTC requests that the over-the-road coaches not be included in the regulation until a more thorough technology assessment can be completed. **(VCTC)**

Comment:

CalETC recommends cutaways and non-standard buses be included in the Proposed Regulation, with purchase requirements beginning for these buses two years after at least two commercially-available vehicles have completed Altoona testing. This will encourage vehicle manufacturers to manufacture and test the vehicles because they know there will be demand from transit agencies once the vehicles are commercially available; and will also give transit agencies time to plan for transitioning non-standard buses to zero-emissions. **(CalETC)**

Comment:

We also appreciate the movement in the past year to make the transition more doable for our agency, which includes the limited exemption for over-the-road coaches in the purchase requirement. Golden Gate Transit provides service through Sonoma, Marin, San Francisco, and Contra Costa counties. To cover this geographically diverse area, our buses must have the ability to travel 400 miles on one fueling.

This exemption allows for a viable solution to be developed for meeting our daily operational requirements. However, we believe the Altoona testing standard should be revisited, because Altoona testing conditions oftentimes fail to reflect -- fail to reflect the wide diversity and service requirements. And we want to make sure that any zero-emission over-the-road coach we buy will not fail in meeting our customers' needs. **(B-O-GGBHTD)**

Comment:

The cutaways. On our intercity routes all of our routes are well over 250 to 300 miles. Just one direction is over 150 miles. So right now I don't think there's anything out there that is defined under cutaway to go that distance. We're yet to see what the true numbers come out of the new bus we got. So as soon as we get it in service, we'll -- we'll know what we've got for charging and what routes it will be able to be used on. **(B-O-HTA)**

Agency Response:

The ICT regulation has a later starting compliance year for types of buses whose technology is not as developed as standard buses. These include cutaway, over-the-road, double decker, and articulated buses as described in section 2023.1(c). The reason for such deferral is because the ZEB technologies for these special types of buses are not as advanced as the regular forty-foot buses. ZEBs for these special types either have not passed Altoona testing or have not been submitted for testing. This is also why in the comprehensive review, each bus type will be evaluated separately on the program readiness. At a minimum, the review will address these issues: costs, performance, and reliability of ZEBs and corresponding infrastructure, extend of workforce training, and the availability and barriers to deployment of zero-emission buses of different types. This is not limited to whether a bus has passed Altoona testing,

although that testing is an objective demonstration a bus is suitable for service in aspects such as structural durability and fuel efficiency, and therefore provides a reasonable basis upon which to condition the purchase requirements. Besides the information obtained in these reviews, CARB will also report annually on the implementation status of the Innovative Clean Transit regulation as committed in Resolution 18-60. This annual update will address development and deployment of zero-emission bus technologies, status of California incentive funding program, CARB's collaboration with transit agencies, manufacturers, infrastructure providers, and other state agencies to promote zero-emission bus technologies, and any potential changes to the regulatory requirements that may be warranted. Further, the ICT regulation has additional exemptions in section 2023.4 to address circumstances beyond transit agencies' control, including whether a bus type will meet the agency's requirements is available. These exemptions include:

1. Setback of construction schedule of needed ZEB infrastructure (section 2023.4(c)(1));
2. Available ZEBs cannot meet transit agency's daily mileage needs (section 2023.4(c)(2));
3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency's daily needs (section 2023.4(c)(3));
4. A required ZEB type that has passed Altoona testing and has met all safety requirements is unavailable for purchase (section 2023.4(c)(4));
5. A transit agency's governing body declares a fiscal emergency (section 2023.4(c)(5));
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5)); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5)).

Based on the state and pace of technology development, the available regulatory exemptions, and comprehensive reviews CARB will conduct, CARB has concluded that a later requirement would not be as effective at achieving the purposes of the regulation, or as effective and less burdensome.

H-4-3 No Later Phase-in for Special Types of Buses

Comment:

The standard should apply to shuttle, articulated, coach, and double-decker buses sooner. Under the proposed standard, these buses are not subject to the purchase standard for eight years despite comprising one-third of transit buses.

Waiting until 2026, as currently proposed, would miss an opportunity to reduce emissions from these buses. Several models of these buses are on the road

today and becoming increasingly available across manufacturers. We recommend these buses fall under the purchase standard two years after at least two models of a given type of bus have completed testing by the Federal Transit Administration. There are currently 14 companies that make over 30 different models of buses ranging from standard transit buses to shuttle buses, coach buses, double-decker buses, and long, articulated buses. Ten of these manufacturers are based or have operations in California. **(UCS-2)**

Comment:

The standard should apply to shuttle, articulated, coach, and double-decker buses sooner. Under the proposed standard, these buses are not subject to the purchase standard for eight years despite comprising one-third of transit buses.

Waiting until 2026, as currently proposed, would miss an opportunity to reduce emissions from these buses. Several models of these buses are on the road today and becoming increasingly available across manufacturers. We recommend these buses fall under the purchase standard two years after at least two models of a given type of bus have completed testing by the Federal Transit Administration.

If you haven't been following the electric bus industry, there are currently 14 companies that make over 30 different models of buses ranging from standard transit buses to shuttle buses, coach buses, double-decker buses, and long, articulated buses. **(UCS-3)**

Comment:

Cutaway, Over-The-Road, Double Decker, and Articulated Buses - The proposed rule states that cutaway, over-the-road (motor coaches), double decker and articulated buses are excluded from the ZEB purchase requirements until January 1, 2026. These four classes of buses make up almost one-third of all buses. There currently is at least one bus in each of these four bus types that is CARB HVIP eligible.

We agree that these bus types may be excluded from this rule initially but recommend that transit agencies be required to purchase buses according to the rule requirements for other transit buses two years after at least two commercial buses have been Altoona tested and become HVIP eligible in a bus class. **(ACT Coalition Partners-1)**

Comment:

Cutaways and other bus types not presently included should be added to the requirement two years after two commercial offerings have completed Altoona testing. **(Motiv)**

Comment:

And the one I want to touch on is the -- revising the date for when our articulated buses and shuttle buses come under the purview of this rule. Currently, it's 2026. We believe that's too late, given that these two types of buses make up a third of all buses in transit agencies' fleets across the state, and given that the technology of these buses exists today. There's articulated buses, there's shuttle buses that exist.

And what we would propose is that two years after being certified, these two types of buses, from the Federal Transit Administration by going through that certification process, we propose that they become under the purview of this rule at that time. **(B-O-UCS)**

Agency Response:

A later phase-in schedule for these bus types is essential to ensure a successful ZEB deployment for two reasons: (1) the development of these types of ZEBs is not as advanced as the standard 40-foot ZEBs; and (2) a lot of transit agencies using these special types of buses (especially the cutaway buses) are small transit agencies that already have a later phase-in schedule. A later deadline is consistent with the time needed to develop ZEBs of these types. An earlier purchase requirement would be more burdensome to transit agencies and could result in further deferral of ZEB technology deployment. Giving these bus types more time ensures there is adequate experience with these bus types before they are required to be purchased and allows for a smooth transition. Transit agencies will be able to count all ZEBs towards the purchase requirement even if the bus type is not required to be a ZEB.

H-5 ZEB Rollout Plan Requirements

H-5-1 Elements of the ZEB Rollout Plan

Comment:

MTC also supports CARB's proposal for operators to develop plans to achieve the 2040 all-zero-emission goal, including types of ZEBs, schedule for ZEB procurements, plans for infrastructure and staff training, and funding needs. In conjunction with the later start date, this element will assist operators in moving forward strategically with ZEB rollout. **(B-W-MTC)**

Comment:

We also support the Rollout Plan components, especially consideration of how the transit agencies plan to deploy ZEVs in disadvantaged communities. CalETC supports ensuring that the transition to zero-emissions will benefit disadvantaged

communities early-on as transit agencies replace conventional buses with ZEBs. (CalETC)

Comment:

I want to stress three key points going forward. The first is as is already mentioned in the staff principles, we really need to make sure that we're prioritizing the disadvantaged communities. (B-O-Enviro CA)

Comment:

We support the reg -- the new regulation -- proposed regulation, but we see a couple of opportunities that we don't want to miss on. And one has to do with the rollout plan. The rollout plan includes a requirement for training. (B-O-SunLine)

Comment:

We would like to partner with ARB in establishing a rollout -- or a rollout plan that establishes the minimum training requirements for funding and accepting zero-emission technologies. (B-O-SunLine)

Comment:

The individual agency rollout plan required under the Proposed ICT should include a section for a transit agency to outline anticipated challenges in meeting its 2040 goal.

While the rollout plan would require a transit agency to include a wealth of information related to how it plans to meet a fleet transition to zero-emission buses by 2040, including planned procurement dates, funding, and technology choice, it does not include a section that allows an agency to communicate where it foresees potential challenges or where flexibility may be needed. For instance, the rollout plan would currently require each agency to identify funding to meet the fleet transition, even when the agency does not know where that funding may come from. While new sources of grant funding may eventually become available, no agency can presuppose that taking place. The requirements related to the rollout plan should therefore be clarified to ensure that the plan is not meant to be financially constrained, and that agencies may deviate from their original plan. Furthermore, it would help inform the regulation's implementation going forward for agencies to communicate their specific technology requirements and where they foresee challenges. This could include fuel prices, electricity demand, range needs, and reliability. This would provide an opportunity for ARB to know where monitoring may be necessary as the regulation is implemented. (OCTA)

Agency Response:

CARB agrees that the function of the Rollout Plan should be informative and serve as a blueprint for the transit agencies to deploy ZEBs. With that, the ICT regulation requires the Rollout Plan to include certain elements essential for a successful ZEB deployment. The ICT regulation is also silent on other potential information to be incorporated into the Rollout Plan, such as for identifying challenges in meeting the regulation, to provide the greatest flexibility to transit agencies. In addition, the ICT regulation is silent on whether a transit should update the Rollout Plan based on real situations in future years. This is also to provide transit agencies flexibility based on their own needs. Individual transit agencies' Rollout Plans provide information on how transit agencies have determined the best strategy for their own unique situations. The Rollout Plans are not binding and are expected to change over time, but the initial plans will provide information needed to make a successful transition. This provision would require transit agencies to plan ahead of time, familiarize themselves with zero-emission technologies before the purchase requirements starts and to learn about potential challenges and solutions to achieve a smooth transition. The Rollout Plans would provide information on number of buses likely to be deployed by each agency for several years, including in disadvantaged communities, and the number of workforce expected to be trained for their maintenance and operation. Such information would help the State to learn about transit agencies challenges, take informed decisions on needs for funding and on how to support transit agencies through their transition. The Rollout Plans would also help utilities to learn about transit agency's infrastructure needs during different stages of transition to support them with providing adequate charging infrastructure. This information is necessary to address barriers to implementation.

H-5-2 2040 Goal

Comment:

Two, we should be looking to speed up the process. Many of you have seen that the City of Los Angeles working with the Chair of the ARB has already put forward a program to drastically reduce the amount of pollution that's coming from its transportation sources. We should be getting cities not just in Los Angeles, but all over the state of California to look at proposals similar to that, and to figure out - and this is the third point - ways to adopt that in. So we're not just looking at the buses, but we're looking to all of the mobile transportation forms here in the State. **(B-O-Enviro CA)**

Comment:

CalETC supports the Proposed Regulation's Zero-Emission Bus Rollout Plan concept and 2040 zero-emission deadline: It is imperative the Innovative Clean Transit regulation achieves a zero-emission transit system by 2040. We support the key element of the Proposed Regulation to require transit agencies to develop plans to transition to zero-emission bus (ZEB) fleets by 2040. The transition to ZEBs by 2040 is consistent with purchase schedules of transit

agencies and is necessary for the state to meet its clean air and climate targets. (CalETC)

Comment:

Achievement of 100% Zero Emissions Bus (Bus) 2040 Goal – In the Proposed Regulation Summary, the first listed “Key element of the proposal...” is that “Transit agencies develop individual plans to transition to a zero-emission bus fleet by 2040.” We fully support this goal and it means that by 2040, all transit agency buses will be zero emission. And yet the rule does not explicitly codify the 2040 requirement. Twenty- two years from now provides more than ample time for agencies to plan their fleet turnover to meet this goal.

We recommend that the rule contain specific language that requires that all buses must be zero emissions by 2040 and thereafter. (ACT Coalition Partners-1)

Comment:

The standard should clearly state that all buses must be zero-emission by 2040. Since CARB began workshops in May 2015, the goal of this standard has been achieving a full transition to zero-emission buses by 2040, yet the actual language of the standard doesn’t explicitly say this. In fact, it could be several years past 2040 when the full transition is achieved based on how the standard is currently written.

The standard’s proposed standard of 100 percent zero-emission buses purchases beginning in 2029 would guarantee a transition by the end of 2040 only for buses on the road for 12 years. But many buses in California are on the road for 14 years or longer, and there is up to a two-year lag between when a bus is purchased and when it hits the road. So, a 2029 purchase standard would likely not achieve the goal of all zero-emission buses by 2040. Anything past 2040 ignores the state of technology and how quickly other jurisdictions are making this transition, namely in China. (UCS-2, UCS-3)

Comment:

We're asking for three amendments. He talked about one of them. I will stress the second one, which is simply to have a binding requirement that by 2040 all the transit buses be converted over to zero emission. It's already clearly stated as a goal, and we're asking you just to put in the assurance that that will happen. (B-O-CCA)

Comment:

One of the -- point number two deals with the proposed regulation should include some form of sunset date for the large and small agencies to phase out old diesel vehicles quickly as possible.

So while we're incentivizing cleaner vehicles, we should be also working on getting the dirty vehicles out of circulation. (**B-O-California NGV Coalition**)

Comment:

Make it clear that CARB **does not** intend to force transit agencies to retire non - ZEB vehicles in 2040 and that CARB understands that transit agencies may continue to perform engine overhauls on CNG buses as 2040 approaches, which may result in CNG buses continuing to run in service beyond 2040. Depending on funding, transit agencies may not be able to retire CNG buses purchased, for example in 2028, and instead, due to resource limitations, they may spend far less money by performing an engine overhaul on the buses. CARB stated at the workshop that the intent of the language was to ensure that transit agencies do not purchase anything but ZEBs from 2040 on. However, this statement is inconsistent with the draft Regulation, which as currently drafted, ensures that all buses purchased from 2029 forward are to be 100% ZEB. Therefore, what does zero emissions by 2040 mean? (**Santa Cruz METRO**)

Comment:

This rule should contain specific language that requires that all buses must be zero emissions by 2040 and thereafter. (**Motiv**)

Agency Response:

The ICT regulation requires the ZEB Rollout Plan to identify a goal of full transition by 2040 to avoid early retirement of conventional internal combustion engine buses. This requirement will steer transit agencies towards better complying with the FTA requirements of using federal funding to purchase buses. However, the ICT regulation is silent on enforcing such provision and only identifies it as a goal. Further, the ICT regulation does not require a transit agency to convert to a 100% ZEB fleet by 2040 and will allow a transit agency to retire its last conventional internal combustion engine bus based on its own need. In light of the costs, requiring that all buses be ZEBs by 2040 would be more burdensome and would not be more effective in carrying out the purposes of the regulation.

H-5-3 Assessment of FCEB

Comment:

The first is to require an analysis and the assessment of both fuel cell electric because and battery electric bus alternatives, and the justification for the proportions of each of those in the rollout plans by the transit agencies.”

The second one, infrastructure plans and the rollout plan must be -- must include estimates of time and cost that will be incurred by the transit -- by the transit agency for all charging and/or fueling infrastructure required to ensure these factors have been taken into account. **(B-O-CHBC)**

Comment:

Specifically, CHBC recommends the following changes to the draft ICT Rule: 2023.I(d)(I)

- Modify part (B) to read: Analysis and assessment of both FCEB and BEB alternatives, and justification for the proportions of each in the Rollout Plan
- Add to part (C): Infrastructure plans in the Rollout Plan must include estimates of time and costs that will be incurred by the transit agency for all charging and/or fueling infrastructure required, to insure these factors have been taken into account. **(B-W-CHBC)**

Comment:

We therefore strongly support the recommendations of the California Hydrogen Business Council, particularly in these three areas:”

One, requiring rollout plans to include an analysis of both fuel cell electric and battery electric alternatives and justifying the proportions of each in the procurement plans; two, require the rollout plans to include time and cost estimates for all infrastructure elements that the transit agency will be responsible for, including cost estimates for utility upgrades outside of transit -- transit administrator facilities from their load-serving entities, **(B-O-Ballard)**

Agency Response:

Zero-emission bus technologies available for transit agencies include both battery and fuel cell electric bus technologies. The regulation does not limit transit agencies to study and deploy one type of zero-emission bus technology; however, it requires them to plan ahead of time, familiarize themselves with zero emission technologies before the purchase requirements starts and to learn about potential challenges and solutions to achieve a smooth transition. The plan is not limited to battery-electric technology. It is the transit agency’s discretion to choose which types of zero-emission technologies are

best suited for their operation. In addition, transit agencies may adjust their Rollout Plan after the submittal date as more information become available. It is not a binding plan. Its purpose is to ensure transit agencies are proactively planning, and to provide CARB information to determine what resources are needed to ensure successful implementation of the program.

Further, the Rollout Plan provision in the ICT regulation also requires a schedule to construct facilities and infrastructure modifications or upgrades, including charging, fueling, and maintenance facilities, to deploy and maintain zero-emission buses, and identifying funding sources to cover the costs.

H-5-4 ZEB Rollout Plan Submittal Date for Large Transit Agencies

Comment:

Additionally, moving the deadline for the Rollout Plan to 2021 will allow important deployments of BEB's and FCEB's to generate data which will be invaluable to transit agency assessments. Both AC Transit and Orange County Transit Agency are taking delivery of multiple BE B's and FCEB's from a single manufacturer this year and into next year. Operational service of these buses will be in earnest in the beginning of 2019, meaning that performance reporting will not be available until well into 2020. Moving the rollout plan deadline ahead to 2021 will allow data to be collected across a full year of operation, for consideration by all California transit agencies for their Rollout Plans.

This recommended change to 2023.I(d)(2) (A) is as follows:

- A large transit agency must submit its board approved Rollout Plan along with its approval to the Executive Officer by July 1, 2021.

In essence, the CHBC believes that transit agencies should not make decisions based on the limited information for small projects when committing to a pathway to a 100 ZEV-based transportation strategy. Instead, additional data from projects showcasing fuel cell bus fleets and battery bus fleets, their capabilities, fuel and electricity cost and time, infrastructure cost, footprint, viability at scale, range, customer satisfaction, reliability etc. should become more known prior to mandating a decision on large scale investment. **(B-W-CHBC)**

Comment:

The regulation start date and schedule is far too aggressive for technologies that are not yet proven. The proposed regulation requires a transit agency to develop a rollout plan in 2020. Transit agencies would have approximately one year from the adoption of the regulation to decide how they will meet the requirements of the regulation before technologies are proven to be economically and operationally feasible. This would force transit agencies to choose the technology they will be using for multiple decades based on limited prototype information.

While battery electric buses are further developed than hydrogen, hydrogen has several advantages over battery electric buses. Hydrogen buses do not have range limitations of battery electric buses. The range of a battery electric bus is limited by the size of the battery, while hydrogen tanks take up minimal space. Also, battery electric buses require significant time to charge the batteries. Hydrogen, on the other hand, can be fueled in a matter of minutes. Transitioning to a mobile, conventionally fueled technology such as hydrogen would present less operational concerns. Hydrogen could ultimately be a better zero emission technology for transit and other mobile applications. Transit agencies should be able to wait for the technologies to further develop before committing significant resources to a specific technology. **(SoCalGas)**

Comment:

Regulation start date and schedule: The regulation start date and schedule is far too aggressive for technologies that are not yet proven. While there have been purchases and deliveries of zero emission transit buses, there have yet to be any documented successes for large scale fleet conversions that would warrant such an aggressive schedule. Given your proposed timetable that requires a zero-emission bus (ZEB) rollout plan in 2020 for large transit agencies and 2023 for small transit agencies, large transit agencies would essentially have one year to decide on what type of ZEB pathway to take based on data that shows sub-par performance, uncertain capital costs (buses and infrastructure), and unstable electrical costs. It would not be prudent to force a technology on transit agencies without better results in the field and while competing ZEB technologies are being developed. In addition, the infrastructure issues attendant to Battery-Electric buses (e.g. charging equipment) have also proven to be less-than-ready. The ICT regulation should take this uncertainty into account and allow transit agencies more timeline flexibility. **(SoCalGas)**

Comment:

We also recommend that we -- that the proposal delay submittal of the rollout plans. If this proposal is adopted in January, that gives them less than a year to decide which technology to go with. Really, they're to be choosing between electric and hydrogen. And in that year's time, there's very -- there's not going to be that much data to base their opinion on. **(B-O-SoCalGas)**

Comment:

And thirdly, we recommend a change to require large transit agencies to submit its board-approved rollout plan along with its approval to the Executive Officer by July 1st, 2021, so one year later.

The reason for that is that this will allow important deployments of battery electric buses and fuel cell electric buses to generate data, which will be invaluable to transit agency assessments.

Both AC Transit and Orange County Transit agencies are taking delivery of multiple BEB and FCEB deliveries for a single manufacturer this year and the coming year. The operational service of these buses will begin in the beginning of 2019, meaning that performance data and reporting will not be available until well into 2020. So moving the rollout plan deadline to 2021 will allow data to be collected across a full year of operation for consideration by all California transit agencies in their rollout plan. **(B-O-CHBC)**

Comment:

and; three advance the due date for the rollout plan by one year to 2021 to allow important deployments of fuel cell, electric, and battery electric buses on a common manufacturers platform to gather at least a year of data, namely those at AC Transit and Orange County Transit Authority.

If these comparative assessments are not made and issues such as range or major utility upgrades prevent success of the ICT when alternatives could have been achieved, California will suffer back -- setbacks, and public support for zero-emission transport goals will be suffering. **(B-O-Ballard)**

Agency Response:

Each Rollout Plan has to be approved by the transit agency's governing body prior to submittal to CARB and is expected to include some assumptions about anticipated changes in technology, costs and funding sources. The requirements in section 2023.1(d)(2) balance the State's need for the information to address barriers with resource constraints at smaller transit agencies. Planning is the first step for an agency in transitioning to ZEBs. The Rollout Plans themselves are not binding and transit agencies may deviate from their plans over time as the market and technology changes per conditions directed by its Board, management, or resolution. They do not have to be updated for CARB. But the plans will provide information needed by the State, utilities and other stakeholders to make a successful transition. A later submittal date for the Rollout Plan for large transit agencies would not be reasonable because planning for a transit agency's Rollout Plan takes time and a later date for the Rollout plan could delay deployment of ZEBs and ultimately impair large transit agencies' ability to transition their fleets by 2040. Further, the proposed regulation has built in many exemptions in section 2023.4 to address potential unintentional consequences for situations beyond transit agencies' control. Given the non-binding characteristic of the plans, extending the due date later in time would not be as effective at achieving the purposes of the regulation and would not be less burdensome.

H-5-5 ZEB Rollout Plan Submittal Date for Small Transit Agencies

Comment:

Transit Agency Plan Creation For Small Agencies – The proposed rule calls for large agencies to complete their ZEB rollout plans by July 1, 2020 and July 1, 2023 for small agencies. For the small agencies, this is an unnecessary and deleterious three-year delay. Planning is the first step for an agency in transitioning to ZEBs and its delay will delay deployment for small agencies and ultimately impair their ability to transition their fleets by 2040. Further, they may miss the opportunity to take full advantage of the many currently available financial incentive and support programs. By giving the small agencies another six months, they can learn from the large agency plans and will have a total of two years for planning. Preparing a plan for a smaller agency should be far less complex than for a large agency, making this eminently doable.

We recommend that small agencies should complete their plans by January 1, 2021. **(ACT Coalition Partners-1)**

Comment:

I'll just focus on one of those, and that is the need to move up the date for the small transit agencies to submit plans. Right now, it's 2023. We're not suggesting that they change the compliance date for small agencies, just the planning date should come sooner, while we know there are incentives. We want to get them in line to start thinking about those incentives. **(B-O-Sierra Club-3)**

Comment:

Small transit agencies should submit transition plans by 2021 to take advantage of current incentive funding. Under the draft plan, transit agencies with less than 100 buses have until 2023 to submit plans for transitioning their fleets to zero-emission buses by 2040. If these transit agencies wait five years to come up with a plan, they could miss taking advantage of the significant amount of incentive funding currently available across the state for the bus itself as well as electric vehicle charging infrastructure. And due to the gaps between agencies' purchases, a delay in planning could result in a several years delay in deploying zero-emission buses. **(UCS-2, UCS-3)**

Comment:

The commenter states that: "Small transit agencies should complete their planning by 2021. **(Motiv)**

Comment:

In the Proposed Regulation, transit agencies are required to submit transit-board approved ZEB Rollout Plans. Large transit agencies are required to submit their ZEB Rollout Plans by July 1, 2020 and small transit agencies are required to submit their ZEB Rollout Plans by July 1, 2023. CalETC supports the submission date for large transit agencies and recommends that small transit agencies be required to submit their ZEB Rollout Plans sooner than 2023. An earlier submission date of January 1, 2021 will allow small transit agencies to plan for their ZEB transition sooner and will allow for small transit agencies to apply for and access ZEB funding in the near-term. Many California transit agencies have already established and are implementing ZEB plans, providing helpful guidance and lessons-learned to other transit agencies. (CalETC)

Comment:

ZEB Rollout Plan (Section 2023.1 (d)): The proposed regulation requires transit agencies to submit ZEB rollout plans, approved by their governing boards, detailing their commitment to fully transition to ZEB technology by 2040 or earlier as well as their schedule and needs for realizing that transition. The proposed regulation requires large and small agencies to submit these plans to ARB by July 1, 2020 and July 1, 2023, respectively.

We support and appreciate the inclusion of this new provision, which recognizes the strength of our past request for individualized ZEB deployment plans. This provision will encourage transit agencies to think through the steps necessary for full fleet conversion to ZEB technology, but will also provide the state with useful information on costs, funding needs and other barriers to electrification, which will help justify future state investment in ZEBs and support future legislative actions.

We recommend that ARB resist calls to accelerate the submission date for ZEB roll-out plans by small agencies and, instead, maintain the submission date in the proposed regulation. As we have communicated to you across many forums, even the transit agencies most bullish about ZEB technology are operating small ZEB fleets. These same agencies acknowledge that it will take time and resources for our industry to learn what it will take to successfully convert an entire fleet to ZEB technology, and to promulgate best practices. The lag in the submission date is useful, because it allows these early adopters and large agencies, many of which are better-capitalized, to uncover key insights into widespread ZEB deployment, which can be shared with small agencies and incorporated into their ZEB rollout plans. (CTA)

Comment:

CALACT strongly supports the delayed compliance for small operators with adopting the rollout plans and purchase mandates. CalACT's members are predominantly small operators and additional time will be needed to secure

funding for developing and adopting the rollout plans. In some cases operators will need to locate, purchase and build new storage facilities because of inadequate space, or the operators currently rents space from another public entity. The additional time needed to develop the rollout plans support the need for the later purchase mandate timeline. The later purchase mandate should also benefit small operators to take advantage of lower vehicle prices as demand increases and supply chains mature. **(CALACT)**

Comment:

ARBOC Specialty Vehicles, LLC strongly supports the delayed compliance for small operators with adopting the rollout plans and purchase mandates. CalACT's members are predominantly small operators and additional time will be needed to secure funding for developing and adopting the rollout plans. In some cases operators will need to locate, purchase and build new storage facilities because of inadequate space, or the operators currently rents space from another public entity. The additional time needed to develop the rollout plans support the need for the later purchase mandate timeline. The later purchase mandate should also benefit small operators to take advantage of lower vehicle prices as demand increases and supply chains mature. **(ARBOC)**

Comment:

We strongly support the delayed compliance for small operators adopting the rollout plans and purchase mandates. Our members are predominantly small operators, and additional time will be needed to secure funding for developing and rolling out the rollout plans. **(B-O-CALACT)**

Comment:

MST strongly supports the delayed compliance for small operators to adopt the rollout plans and purchase mandates. MST and other small operators in the state agree that additional time will be needed to secure funding for developing and adopting the plans. In some cases operators will need to locate, purchase, and build new storage facilities because of inadequate space or because they currently rent space from another public entity. The additional time needed to develop the roll-out plans support the need for the later purchase mandate timeline. **(MST-1)**

Comment:

As a small operator, additional time will be needed to secure funding for developing and adopting the rollout plans. Implementation of Innovative Clean Transit may require our agency to purchase and build new storage facilities to meet infrastructure requirements of electric charging stations. The additional time

needed to develop the rollout plans support the need for the later purchase mandate timeline. (**WESTCAT-2**)

Comment:

Delayed Compliance: Trinity County Transportation Commission strongly supports the delayed compliance for small operators with adopting the rollout plans and purchase mandates. As a small operator, additional time will be needed to secure funding for developing and adopting the rollout plans. Implementation of Innovative Clean Transit may require our agency to purchase and build new storage facilities to meet infrastructure requirements of electric charging stations. The additional time needed to develop the rollout plans support the need for the later purchase mandate timeline. The later purchase mandate should also benefit our agency to take advantage of lower vehicle prices as demand increases and supply chains mature. (**TCTC-2**)

Agency Response:

The Rollout Plans themselves are not binding and transit agencies may deviate from their plans over time as the market and technology changes per conditions directed by its Board, management, or resolution. They do not have to be updated for CARB. But the plans will provide information needed by the State, utilities and other stakeholders to make a successful transition. The requirements in section 2023.1(d)(2) balance the State's need for the information to address barriers with resource constraints at smaller transit agencies. Planning is the first step for an agency in transitioning to ZEBs. Small transit agencies have a smaller pool of resources with which to plan for, to purchase ZEBs, and to invest in ZEB infrastructure. The later submittal date for small transit agencies allows them additional which provides opportunities for them to learn from the experience of large transit agencies, more time to allocate resources, and may reduce their planning costs. Providing more time for small transit agencies does not prevent them from planning early. In addition, transit agencies will still may adjust their deployment strategy after the submittal date as more information become available with time. Similar to the due date for large transit agencies, given the non-binding characteristic of the plans, advancing the due date forward would not be as effective at achieving the purposes of the regulation and would not be less burdensome.

H-5-6 Complexity of Electricity Cost

Comment:

Electricity cost is very complex. It's not just about electricity of a kilowatt hour. You also have demand fees and taxes which are not advertised in your kilowatt hours. So that's not the same as miles or gallons of fuel. (**B-O-SDAP**)

Agency Response:

The ZEB Rollout Plan would necessitate transit agencies to familiarize themselves with zero emission technologies before the purchase requirements starts and to learn about potential challenges, how to manage electricity costs and to learn about available solutions to achieve a smooth transition. The Plan is intended to ensure transit agencies coordinate early with utilities to understand their potential electricity costs, available rate plans, and the process for building charging and fueling infrastructure to accommodate the deployment of ZEBs.

H-5-7 Consideration of CalEnviroScreen

Comment:

We also believe that the enviroscan[SIC] – we don't see the significance of that in this regulation. We understand it when it comes to funding opportunities, but don't clearly see the significance of the EnviroScreen with the rollout plan. (**B-O-SunLine**)

Agency Response:

CalEnviroScreen is a web-based mapping tool developed by the California Office of Environmental Health Hazard Assessment (OEHHA) to identify disadvantaged communities that are California's most pollution-burdened and vulnerable communities based on geographical, socioeconomic, and environmental hazard criteria.⁷⁶ The Rollout Plans would provide information on the number of buses likely to be deployed by each agency for several years, including in disadvantaged communities as identified by CalEnviroScreen. Such information would help transit agencies work with and respond to concerns from disadvantaged communities and other stakeholders advocating to advance pollution reductions in these burdened communities. The information will also help the State to make informed decisions on needs for funding and other policies on deploying zero-emission buses in these areas. Not considering this information would not be as effective in achieving the purposes of the regulation.

H-6 Joint ZEB Groups

Comment:

Comment: Compliance Option for Joint Zero-Emission Bus Groups (Section 2023.2): The proposed regulation outlines the requirements for establishment of Joint Zero-Emission Bus Groups. This provision allows two or more transit agencies to pool their resources to meet their ZEB purchase requirements, if the agencies share the same Metropolitan Planning Organization (MPO), Transportation Planning Agency (RTPA) or are located in the same air basin. Overall, we support the inclusion of this provision, which offers an alternative, more flexible pathway to compliance for small agencies across the state. That said, there are several small agencies in close proximity to one another that do

⁷⁶ See OEHHA, About CalEnviroScreen, <https://oehha.ca.gov/calenviroscreen/about-calenviroscreen>.

not share an MPO, RTPA or air basin, but which would benefit from this provision. For that reason, we recommend that ARB remove the requirement that transit agencies share an MPO, RTPA or air basin to form a joint zero-emission bus group. **(CTA)**

Agency Response:

This option should allow multiple transit agencies to work collaboratively in order to more effectively utilize and optimize fueling and maintenance infrastructure for early deployments while continuing to achieve emissions reductions locally. Some transit agencies within the group may take the lead in providing infrastructure, maintenance, and training operators, especially in early stages of the regulation's implementation.

Transit agencies forming a Joint Group must be within the same Metropolitan Planning Organization (MPO), Regional Transportation Planning Organization, air basin, air pollution control district, or at least share the same infrastructure because these entities are responsible for complying with air quality programs and requirements, and this provides a natural interconnection to ensure funding decisions will comply with legal constraints and for optimization of resources. Under federal and state law, MPOs must conduct long-range transportation planning. Those plans must support air quality goals and requirements as a condition of distributing federal transportation funding.⁷⁷ Those long-term plans, called Regional Transportation Plans, set transportation strategies and create a framework for project priorities within a metropolitan area's transportation system.⁷⁸ A Regional Transportation Planning Organization, similarly, is responsible for transportation planning in non-metropolitan areas. Additionally, multiple transit agencies within the same air district (Air Pollution Control District and Air Quality Management District) may secure funding through the local air district to deploy zero-emission buses. Being within the same air basin would provide at least the same emissions reduction benefits to the basin as if each transit agency would have complied with the regulation individually. Transit agencies in close proximity sharing infrastructure would provide better land use and optimization in infrastructure utilization and would reduce their operational costs and smooth out their transition to ZEBs. Removing the requirements that transit agencies in a Joint Group be connected as described would not be as effective at achieving the purposes of the regulation to reduce emissions, especially within the same air basin if the group members were not connected as specified in the regulation.

H-7 ZEB Bonus Credits

⁷⁷ See 42 U.S.C. § 7506(c) [federal transportation conformity requirements under the Clean Air Act]; 49 U.S.C. § 5303 [federal metropolitan transportation planning requirements]; FTA Metropolitan & Statewide Planning and NonMetropolitan Transportation Planning on formula funding. Available at <https://www.transit.dot.gov/funding/grants/metropolitan-statewide-planning-and-nonmetropolitan-transportation-planning-5303-5304>. See also Gov. Code § 65080 [California requirements for regional transportation plans].

⁷⁸ See, generally, 23 CFR Parts 450 and 771; 49 CFR Part 613; Gov. Code § 65080, et seq.

H-7-1 Purpose of Bonus Credits

Comment:

ZEB Bonus Credit (Section 2023.3): The proposed regulation outlines a schedule of ZEB bonus credits, which allows early adopters to collect additional credits for ZEBs already in service. These ZEB bonus credits can be used to satisfy future ZEB purchase requirements. We believe the proposed schedule is appropriate, because it recognizes that transit agencies that have already deployed ZEBs assumed additional costs and risks to support the commercialization of ZEB technology. We recommend that ARB maintain the proposed schedule, including the higher level of bonus credit for fuel-cell electric buses, which recognizes their higher upfront and operational costs; and, expand the schedule to include one bonus credit for conversions to battery-electric placed in service on or before December 31, 2017 and which remained in service as of January 1, 2018. **(CTA)**

Comment:

CARB's revised proposal includes a provision to grant bonus credits for battery-electric buses (BEBs) put in service before 2018 and for fuel-cell electric buses (FCEBs) placed in service before 2023, with double credit for FCEBs placed in service before 2018. MTC supports the bonus credits as an effective way to reward the early adopters who incurred high costs to help push the development of ZEB technology toward commercialization, and for operators of FCEBs that have substantially higher costs -and greater range and performance -than BEBs. Electric trolley coaches operated by SFMTA are treated as ZEBs under the current Transit Fleet Rule, but not under the ICT proposal. SFMTA's zero-emission electric trolley coach fleet is the largest such fleet in the United States, representing a significant investment in zero-emission bus technology. The use of electric trolley coaches clearly advances CARB's goal of reducing GHG and other emissions and improving air quality. On a well-to-wheel basis, SFMTA's trolley coaches are actually cleaner than other ZEB technologies, as the source of their electric power is hydroelectric. Additionally, because of the unique topographic challenges in San Francisco, electric trolley coaches are the only ZEBs currently available that can scale the 23% grades that exist on some of their routes. MTC, therefore, supports SFMTA's position that the proposed regulation be revised to:

- Give one bonus credit to operators for each electric trolley coach placed in service between January 1, 2018, and January 1, 2020. **(B-W-MTC)**

Comment:

Early action credits should be granted in a manner that takes into account all transit agency actions taken prior to any new requirement taking effect.

OCTA supports ARB efforts to recognize those agencies that have taken steps to implement advanced technologies prior to any new regulatory requirements. Currently, the ICT Proposal provides for different credit levels depending on whether the bus was put into service before or after January 1, 2018, for hydrogen buses. It is unclear why that differentiation is made. Instead, the two credits should be awarded for all hydrogen buses procured prior to the regulation taking effect, regardless of when that bus was put into service. **(OCTA)**

Comment:

The proposed bonus credit structure for zero-emission buses differs for battery-electric and hydrogen fuel-cell buses. CalETC recommends that all zero-emission buses receive the same amount of bonus credits for the same early-compliance period. **(CalETC)**

Comment:

Early Action Credits: The proposal includes “credit” provisions for agencies that purchase ZEBs prior to the requirement years. The credit should be based on emission reductions not on purchases. The credits should also be extended to transit agencies that purchase any type buses technology, such as near zero, natural gas buses powered by renewable natural gas, as long as early emission reductions are achieved. **(SoCalGas)**

Agency Response:

The ICT regulation uses bonus credits to recognize early adopters of ZEBs and maintain eligibility for incentive funding. Early adopters started operating ZEBs ahead of the regulatory requirements, taking more risks in deploying early technologies with higher costs. These transit agencies have been pioneers in addressing fuel cell maintenance, electric drivetrain maintenance, electricity rates, charging standards, education, training, developing new technologies, and resolving other issues. These pioneers and their experiences in addressing barriers have benefited other transit agencies and the broader market for zero-emission heavy-duty vehicles. Bonus credits for early adopters provides them some flexibility with complying with the ZEB purchase requirements throughout the regulation in recognition of this. This section allocates higher credits to early adopters of fuel cell electric buses (FCEBs) because these buses were more expensive and were some of the first to be deployed in regular transit service. Providing the same credits for battery and fuel cell buses would not be as effective at carrying out the purposes of the regulation. The regulation also provides credit for trolleybuses placed in service between January 1, 2018, and December 31, 2019, as recommended by SFMTA, which is the only transit agency operating electric trolleybuses.

H-7-2 Expand Bonus Credits for Small Transit Agencies

Comment:

NVTA would like to see the provision allowing bonus credits expanded to include battery electric buses ordered before the ICT regulation goes into effect for small transit systems in 2026. The change to include only battery electric buses purchased before December 31, 2017 poses significant financial challenges for agencies that are the size of NVTA. NVTA several years applying for zero emission bus grants, another year planning for their deployment of the new fuel technology, and will place an order in fall 2018. Under the current ICT regulation as it is written NVTA will not receive any bonus credit for early adoption of zero emission technology. (NVTA)

Agency Response:

The approved regulation counts ZEB purchases made before they are required to recognize the benefits of early actions by large and small transit agencies. CARB determined that providing more time for small transit agencies to transition to ZEBs with a delayed schedule was more appropriate for small transit agencies rather than providing bonus credits. As described in the ISOR, the bonus credits are being provided to early adopters that have been pioneers in addressing early barriers, including fuel cell maintenance, electric drivetrain maintenance, electricity rates, charging standards, education, and training. These pioneers and their experiences in addressing barriers have benefited other transit agencies and the broader market for zero-emission heavy-duty vehicles. Expanding the eligibility criteria for small transit agencies through 2026 would not be as effective at carrying out the purposes of the program.

H-7-3 Credit for Conversion to ZEB

Comment:

Additionally, we recommend that ARB, in crediting ZEB deployments that exceed ZEB purchase requirements, provide the same level of credit for conversions to battery-electric as purchases of standard battery-electric buses, and one-half credit for electric trolley buses placed into service between January 1, 2018, and December 31, 2020. (CTA)

Agency Response:

The regulation essentially includes this request. Transit agencies can meet the required minimum number of ZEB each year by any combination of purchase and lease of new or used ZEBs, as well as conversion of conventional internal combustion engine buses to ZEBs and use of any available ZEB bonus or zero emission mobility credits. The ICT regulation includes early and additional purchases of ZEBs and converted buses to ZEBs in the number of ZEBs in the fleet; therefore, it treats conversions the same as new purchases for credit eligibility. The regulation also provides credit for trolleybuses

placed in service between January 1, 2018, and December 31, 2019, as recommended by SFMTA, which is the only transit agency operating electric trolleybuses.

H-7-4 Bonus Credits for Electric Trolleybuses

Comment:

Zero Emission Bus Bonus Credit: SFMTA strongly believes that its use of electric trolley buses clearly and unequivocally advances CARB's goal of reducing GHG emissions and improving air quality. SFMTA is in the midst of the largest procurement of Zero Emission Buses (185 40' Zero Emission Trolley Buses) in North America. Trolley coaches should be counted as Zero Emission Buses and qualify for Bonus Credit for early adoption for the following reasons:

SFMTA's newest trolley coaches can be converted to full battery electric buses simply by removing the trolley poles and associated equipment and replacing these with a larger battery pack(s) and charging provision. We plan to conduct a pilot program to convert trolley coaches to battery electric buses to learn the feasibility of such conversion.

SFMTA's trolley coaches are truly zero-emission and are even more efficient and greener than electric buses. They use overhead wire infrastructure and much of the regenerated energy is fed back to the overhead line, making them more energy efficient. Our trolleys are greener than conventional battery electric buses as the electricity powering them is sourced from the hydroelectric Hetch Hetchy power plant.

SFMTA's next generation New Flyer trolleys contain state of the art propulsion/battery technology and support technological advances. In fact, the breakthrough in electric bus technology was made possible due to the New Flyer trolley coaches, which currently operate as short-range battery electric buses, using identical technology when running off of battery power. As battery technology improves, SFMTA plans to extend the range of operation on battery power. **(SFMTA-1)**

Comment:

We think trolley buses should be counted as zero-emission buses, and should qualify for bonus credit. We're in -- we're in the middle of purchasing the largest procurement of zero-emission buses in North America with 185 40-foot trolley electric buses.

Our trolley buses are zero emission in a true sense, as they're powered by greenhouse gas-free electricity, generated by a hydroelectric plant. The operation of trolley coaches does not produce any greenhouse gases compared

to a typical battery electric bus, which may not be powered by greenhouse gas-free electricity.

The trolley -- the trolleys can operate without the polls on battery power alone for a limited distance, much like the short-range battery electric buses. The trolley buses are electric buses with additional overhead infrastructure technology that allows us battery -- allows the batteries to be charged while the bus is operating, which offers us an additional advantage.

The intent behind our request to include trolley coaches in the ZEV definition is to get recognition for our zero-emission trolley coach buses. We do not plan to use bonus credit to delay our electrification efforts. We may not, in fact, use any of the bonus credit if all transit agencies statewide collectively purchase the required number of zero-emission buses as part -- part of the way for early compliance.

Like I said, SFMTA has already committed to procuring battery electric buses in starting 2025. And we need this time to ensure the battery electric buses infrastructure is in place before system-wide adoption of the battery electric buses. **(B-O-SFMTA)**

Comment:

The second issue is San Francisco Municipal Transit Agency operates a fleet of electric trolley buses. They're powered by overhead wires. These are zero emission buses. They're actually greener than any other ZEB technology at this point, because they operate on hydroelectric power.

The current transit fleet rule treats those as zero emission buses, but the ICT proposal does not. Those buses are very expensive to purchase. So we're painfully aware of that, since we help pay for them. They're -- the overhead wire is expense to maintain, so we think that Muni should get some credit for operating those buses, which are an important contribution to the zero-emission transition. **(B-O-MTC)**

Comment:

CARB's revised proposal includes a provision to grant bonus credits for battery-electric buses (BEBs) put in service before 2018 and for fuel-cell electric buses (FCEBs) placed in service before 2023, with double credit for FCEBs placed in service before 2018. MTC supports the bonus credits as an effective way to reward the early adopters who incurred high costs to help push the development of ZEB technology toward commercialization, and for operators of FCEBs that have substantially higher costs -and greater range and performance -than BEBs. Electric trolley coaches operated by SFMTA are treated as ZEBs under the current Transit Fleet Rule, but not under the ICT proposal. SFMTA's zero-

emission electric trolley coach fleet is the largest such fleet in the United States, representing a significant investment in zero-emission bus technology. The use of electric trolley coaches clearly advances CARB's goal of reducing GHG and other emissions and improving air quality. On a well-to-wheel basis, SFMTA's trolley coaches are actually cleaner than other ZEB technologies, as the source of their electric power is hydroelectric. Additionally, because of the unique topographic challenges in San Francisco, electric trolley coaches are the only ZEBs currently available that can scale the 23% grades that exist on some of their routes. MTC, therefore, supports SFMTA's position that the proposed regulation be revised to:

- Give one bonus credit to operators for each electric trolley coach placed in service between January 1, 2018, and January 1, 2020. **(B-W-MTC)**

Comment:

Additionally, we recommend that ARB, in crediting ZEB deployments that exceed ZEB purchase requirements, provide the same level of credit for conversions to battery-electric as purchases of standard battery-electric buses, and one-half credit for electric trolley buses placed into service between January 1, 2018, and December 31, 2020. **(CTA)**

Comment:

Already, the -- San Francisco is in a unique position. A lot of infrastructure has been invested in to make the trolley buses a success, and making sure that there's a synergy between the two. The technology is often interchangeable, as you've heard earlier, and has been provided in written comment. And there seems to be a good amount of flexibility in determining how much in bonus credits can be basically granted to SFMTA.

Whether it's partial credit or a timeline attached to that credit, we can all work together collaboratively between the advocates, as well as the City and County Of San Francisco to make sure that there's a successful implementation of this rule.” **(B-O-Brightline Defense)**

Agency Response:

The ICT regulation incorporates criteria for electric trolleybuses to earn zero emission bonus credits. The credits would be for electric trolleybuses placed in service between January 1, 2018, and December 31, 2019. Providing these bonus credits would recognize trolleybuses' contribution to expanding zero emission technology. The credits would expire by the end of 2024 and would provide additional flexibility for transit agencies deploying electric trolleybuses for early health and environmental benefits.

H-8 Exemptions Provisions

H-8-1 Exemptions Provisions-Purpose

Comment:

The proposed rule also includes several off-ramps for when technology constraints, manufacturing delays, or fiscal hardship warrant additional time for compliance. Without these off-ramps, and your favorable consideration of the changes proposed above, the ICT Rule would interfere with CalACT member's ability to maintain service levels and provide critical safety net transportation options. **(CALACT)**

Comment:

Similarly, we appreciate CARB providing flexibility for deferrals or exemptions if available ZEBs do not have sufficient range to meet daily mileage requirements. **(B-W-MTC)**

Comment:

Transit agencies and ridership could suffer unintended consequences: Transit agencies and ridership could suffer unintended consequences. Transit agencies, which are not for profit organizations and rely heavily on subsidies to provide services, will be asked to take on the financial burdens of zero emission technologies. If they are unable to get zero emission buses and their associated infrastructure fully subsidized, they will have no choice but to pass the burden on to their ridership in the form of increased fares or reduced service. If the technology struggles continue, not only transit agencies will be impacted, but those that rely on the essential services transit agencies provide will be impacted as well. This is significant because most riders who rely on public transit are low-income individuals. **(SoCalGas)**

Comment:

Create an off-ramp or deferral process for agencies that will have difficulty transitioning to zero-emission vehicles: Not all transit agencies have the same operational needs. Transit agencies operate varying routes and duty cycles and there is not a one size fits all approach. Zero emission buses may work well for some transit agencies, but not for others depending on the routes, operations, and economic considerations. Even within transit agencies where electric buses have been deployed, performance varies based on the types of routes being driven as well as many other factors. Further, if range and other performance issues affect the ability to keep buses on the road reliably, a transit agency will either have to curtail service OR purchase more buses resulting in significant financial implications (increased costs). Offramps should be provided for transit

agencies that will have difficulty using all ZEBs. Flexibility of integrating technologies should be afforded to transit agencies based on their specific needs. (**SoCalGas**)

Agency Response:

The exemptions are intended to ensure transit service is not adversely affected by the ICT regulation. The Executive Officer will grant an exemption upon request, if the specified criteria set forth in section 2023.4(c) are met to ensure transit agencies are not adversely impacted by the zero-emission bus purchase requirements. A transit agency would be able to purchase conventional buses, instead of zero-emission buses. These deferrals are necessary to allow transit agencies to continue their regular operation under extraordinary circumstances.

H-8-2 Exemptions Provisions- Daily Mileage Need

Comment:

We recognize that some transit agencies have a few very long duty cycles that current technology cannot service. In our experience, these bus routes remain an outlier to the vast majority of routes that can be serviced today by electric transit. We support the ability to defer zero-emission bus purchase requirements due to the inability to meet isolated mileage needs, but this should be limited strictly to vehicles serving those duty-cycles. We strongly recommend that exemptions or deferrals do not apply to an entire agency, if only a few duty cycles cannot be serviced by zero-emission technology. (**Proterra**)

Comment:

The proposed extensions and exemptions in the Proposed ICT need clarification, and should include automatic statewide regulatory exemptions in emergency situations.

OCTA appreciates efforts to include scenarios where the ARB Executive Director may approve extensions or exemptions for compliance with the requirements when certain conditions are present. While each of the scenarios presented are valid, clarification is needed in the following areas:

- For the scenarios related to bus delivery or range, these should be complete exemptions if the situation cannot be resolved within the one-year extension.
- Any extension or exemption for a bus being unable to meet a transit agency's requirement should be based on that agency's highest mileage routes. Currently, the Proposed ICT states that as long as a bus is able to meet the range requirements for at least one route within that agency's system, no extension will be given. However, when transit agencies purchase significant quantities of buses at one time, those buses will have to be used systemwide, including the higher range routes, which could be 300 plus miles. In order to

prevent any disruption in service, or the creation of several sub-fleets, a transit bus will therefore have to meet a transit agency's longest ranges. (OCTA)

Comment:

This regulation would require rural agencies to cut life line services (such as Plumas Transit's service to the nearest major medical center) as the distance traveled could not be provided by ANY known electric vehicle as of today. (Borchman)

Agency Response:

The exemption is intended to ensure transit service is not adversely affected. CARB survey data from transit fleets shows that for 40-foot buses, about 50 percent of buses operate less than 150 miles per day, and about 85 percent of buses operate less than 200 miles per day. Currently, there is no range issue for FCEBs. Depot charging BEBs are commonly available with a nominal range of 150 miles per day. Longer range BEBs are also available with larger battery capacity at higher prices. CARB also recognizes that some transit agencies have a few very long duty cycles that current technology cannot adequately service considering costs and infrastructure. Section 2023.4(c)(2) provides an exemption so that a transit agency does not have to purchase ZEBs that cannot meet its daily mileage need or multiple ZEBs to provide services currently supplied by one bus. An exemption for an entire transit agency rather than for a required purchase would be overly broad and thus not be as effective at carrying out the purpose of the regulation.

H-8-3 Methods to Determine Mileage Needs

Comment:

Additionally, we commit to working with ARB staff to clarify that the deferral for ZEBs that cannot meet a transit agency's daily mileage need requires the development of a new testing protocol to determine range based on real world operation, and should not use the Orange County bus test cycle. (CTA)

Comment:

The definition of "daily mileage" needs to be further developed. It is not a standard industry term.

The term "block" might be the best term to use. In the case of METRO, this term covers buses that pullout and run until they return to the yard at the end of the day or night. A bus pulls out of the yard and operates on a particular route and continues in service, without returning to the yard, and may "interline" to another bus route that uses the same size bus. Further, when a bus operator reaches the

end of his/her shift, a new bus operator will meet the bus on-route and continue with the bus in service. Metro operates bus blocks that range up to nearly 300 miles/day. Current ZEB bus range will limit operating ZEBs on about 1/3 of METRO's blocks. This is based on an overnight charge and without mid-day or opportunity recharging. METRO does not plan to have mid-day/opportunity recharging.

Avoid oversimplifying and generalizing the interpretation of bus range and please don't accept any Altoona testing numbers or the Orange County Bus Cycle. Bus ranges posted to-date by the manufacturers are far and away an overstatement of real life operational experiences. Variables such as the use of HV Ad the operating terrain and driver characteristics all impact the range of a bus, including stopping at bus stops.

A reasonable method of determining and monitoring improvements in bus range, inclusive of the variables noted above, needs to be established. Further, there needs to be a point somewhere in the timeframe of 2025 -2027 in which the CARB Board reviews the state of technology and any advancement in battery energy density and bus range. In the METRO example, once METRO purchases sufficient low range ZEBs to cover the 1/3 of our bus blocks that the buses can be used, METRO should only have to continue purchasing ZEBs if the technology has advanced sufficient to schedule the ZEBs on the next group of longer range bus blocks.

Since federal grants are used to purchase buses, buses purchased today, with their limited range, are buses the transit agencies are stuck with for at least fourteen years. It is in the best interest of the public trust that we properly invest the public's funds. (**Santa Cruz METRO**)

Agency Response:

The exemptions are intended to ensure transit service is not adversely affected. This exemption is based on miles travelled between charges of a depot-charging battery electric bus at the end of the battery warranty period. When submitting a request for an exemption, a transit agency must explain how ZEBs already purchased were suitable and why it is not reasonable to electrify the rest of the fleet. The transit agency must also submit a monthly mileage report for each type of bus in the fleet to show their average daily usage, and a copy of the ZEB request for proposal and resulting bids that shows battery capacity of each bus. A transit agency must also provide available empirical data of energy usage from ZEBs operated on daily assignments in transit agency's service territory that includes, but is not limited to, battery degradation, air conditioning, passenger loading, grades, and driving behavior.

The Executive Officer will review submitted information and compare the transit's required mileage with ranges of battery electric buses currently available. If empirical data are not available, the Executive Officer will use the Orange County Transit Cycle

as a default to determine the energy use per mile. If the transit agency's required range is higher than 80 percent of the range on battery electric buses (using the largest available battery pack) on this cycle, the transit agency will be granted an exemption until its next purchase. If the ZEB requirement can be met at the next purchase, the transit agency would have to purchase ZEBs. This requirement is necessary to excuse the transit agency from immediate compliance obligations if available ZEBs cannot satisfy the transit agency's daily mileage needs, and allows the transit agency to continue providing services with conventional buses, but ensures that ZEBs will be purchased when they are available according to the transit agency's regular purchasing cycle.

The Orange County Transit Cycle is a chassis dynamometer test for heavy-duty vehicles. The Orange County Transit Cycle is chosen for determination of mileage availability of ZEBs because the driving cycle of this test was developed by West Virginia University based on real bus operating data from the Orange County Transportation Authority. This test consists of urban and highway driving segments. It is an intermediate speed test cycle consisting of accelerations, decelerations and cruise operations reflective of transit bus use. This test was chosen because it represents an average driving cycle expected of California transit fleets, and results are available from the Altoona testing. Note that using the Orange County Bus Cycle test is an alternative under the exemption in section 2023.4(c)(2)(B) to demonstrate range requirements and limitations if in-use data are not available.

H-8-4 Exemptions Provisions- Gradeability Need

Comment:

Deferral from Zero-Emission Bus Purchase Requirements: SFMTA operates buses in one of the most challenging topographical urban environments and requires buses that can operate on up to 23 percent grade with Gross Vehicle Weight Rating, which current battery electric buses cannot do. SFMTA recommends modification of the following language to include a provision for gradeability under Section 9, titled "Deferral from Zero-Emission Bus Purchase Requirements:

When available ZEBs cannot meet a transit agency's daily mileage needs and/or gradeability requirement for the buses replaced per that purchase. (**SFMTA-1**)

Agency Response:

The exemption is intended to ensure transit service is not adversely affected. Section 2023.4(c)(3) of the ICT regulation addresses stakeholder concerns about gradeability performance for zero-emission buses that would be operated on steep grades, and the required documentation that a transit agency must provide to the Executive Officer to receive an exemption from the zero-emission bus purchase requirement.

H-8-5 Exemptions Provisions- ZEB Types Not Available

Comment:

Provisions for Extension or Exemption of a ZEB Purchase (Section 2023.4): The proposed regulation enumerates the conditions under which a transit agency may request an extension or exemption from the ZEB purchase requirement. These conditions, which must be verified by ARB's Executive Officer, generally relate to delays in bus delivery, delays in infrastructure buildout, and the unavailability of requisite ZEB technology that exist beyond the transit agency's control.

These conditions, which reflect many of the recommendations we offered in our July 19, 2018, comment letter are well-thought out and provide assurance that transit agencies will not be forced to comply with the ZEB purchase requirement, if external factors would make compliance impossible or otherwise harm transit service.

While we support this provision and the specific conditions outlined in the proposed regulation, we recommend that ARB replace Section 2023.4 (c)(4)(B)(3) in the proposed regulation with the following:

The cost or performance characteristics of the zero-emission bus would result in a transit agency violating any federal, state, or local laws, regulations or ordinances. **(CTA)**

Comment:

An especially problematic clause of the ICT regulation would implement a purchase mandate on smaller, cutaway buses beginning in 2026. Battery-electric cutaway buses are an emerging technology and, to the best of our knowledge, have not yet been approved for purchase with federal funding. Cutaway buses are critical to RTA for providing service in low-density rural areas and to persons who qualify for paratransit service under the Americans with Disabilities Act. Additionally, unlike fixed route operations, the Federal Transit Administration regulates the paratransit operating environment providing explicit requirements for pick up windows, denial of service as well as acceptable travel times. In the dynamic operating environment of paratransit services these unproven new buses could result in unintended violations of ADA law. **(RTA-1)**

Comment:

This regulation does not address caveats presented that could potentially cause agencies to fall out of compliance with both federal and state law and the Americans with Disabilities Act. **(Borchman)**

Agency Response:

The exemptions are intended to ensure transit service is not adversely affected. A transit agency may request an exemption from the ZEB purchase requirements of section 2023.1(a) when a required ZEB type for the applicable weight class based on GVWR is unavailable for purchase. A ZEB type is considered unavailable if it has not passed the complete Altoona bus testing and has not obtained a bus testing report, or it cannot be configured to meet the applicable requirements of the Americans with Disabilities Act (ADA). A ZEB is also considered unavailable if its purchase would result in a transit agency violating a federal, state, or local law, regulation, or ordinance. Transit agencies would be exempted from purchasing ZEB types if their physical characteristics, including the curb weight, are violating any federal, state, or local laws, regulations, or ordinances. It is redundant to include cost as an explicit element of the exemption in section 2023.4(c)(4)(B)(3) as requested because this factor is implicitly included in whether a bus type is available, and financial hardship is an express ground for an exemption.

H-8-6 Exemptions Provisions- Financial Hardship

Comment:

Please let's continue to ensure that there is sufficient incentive funding available for these vehicles, and off-ramps and flexibility in the cases that transit agencies truly cannot meet the requirements. **(B-O-CALSTART)**

Comment:

NCTD, like most transit systems, have significantly under-funded capital programs. For example, NCTD has 98 revenue vehicles that support its rubber wheel operations that have reached the end of their useful life and require replacement. The estimated cost to replace these 98 buses with compressed natural gas and gasoline technology is over \$51 million. Additionally, NCTD has critical unfunded safety project needs of \$171 million for rail bridge replacements and \$82 million for bluff stabilization in Del Mar. The cost to procure electric buses and convert NCTD facilities will significantly add to the capital improvement program deficit that already exists. **(Vista-1)**

Comment:

The inclusion of smaller, cutaway buses by 2026. This will increase costs for these already expensive transit services and further erode our ability to provide existing levels of transit service to San Diego. **(San Diego MTS)**

Agency Response:

The exemption is intended to ensure transit service is not adversely affected. Section 2023.4(c)(5) of the ICT regulation provides a financial hardship exemption. This includes situations where a transit agency cannot offset the incremental costs of purchasing any zero emission buses when in good faith has applied for all available funding and financing options, or it cannot offset the electricity costs for operating a depot charging battery electric bus when compared to the same type of internal combustion engine bus. A transit agency can also apply for an exemption when its governing body publicly declares a fiscal emergency.

H-8-7 Utility Rates

Comment:

Transit-specific utility rates are needed to address the concerns of demand charges associated with fleet electrification. CARB should coordinate efforts with the CPUC and the Energy Commission in order to incent transit districts to electrify their fleets with targeted rate design, as opposed to chilling their investment due to problematic rate design which imposes burdensome electricity (fuel) costs. (Olivine)

Agency Response:

CARB is coordinating with the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) to implement Senate Bill 350 (SB 350), which encompasses utility rate design.⁷⁹

SB 350 provided several directives to state agencies to support its goals of GHG reduction and transportation system electrification. Among them, the CPUC will oversee Investor-Owned Utilities' (IOUs) investment in transportation electrification through their core competencies, primarily charging equipment and upstream electrical infrastructure. In 2016, the Assigned Commissioner over the PUC's rulemaking to promote transportation electrification issued a ruling regarding the utilities' filings required by SB 350 that provided guidance on proposing rate designs. Rate design may "facilitate the use of complementary technologies that assist customers in their efficient integration of vehicles with the grid."⁸⁰

To further support transportation electrification, on May 31, 2018, the CPUC approved \$738 million in transportation electrification projects for the state's electric utilities. Decision 18-05-040⁸¹ approves significant investments to support the electrification of the medium- and heavy-duty sectors in PG&E and SCE service territory and a residential charging station rebate program for SDG&E's customers.⁸² On September 27, 2018, the CPUC unanimously adopted Decision 18-09-034⁸³ authorizing the three small electric utilities in California (PacifiCorp, Bear Valley Electric Service, and Liberty

⁷⁹ Ch. 547, stats. 2015.

⁸⁰ California Public Utilities Commission, Order Instituting Rulemaking to Consider Alternative-Fueled Vehicle Programs, Tariffs, and Policies, Rulemaking 13-11-007, Assigned Commissioner's Ruling Regarding the Filing of the Transportation Electrification Applications Pursuant To Senate Bill 350, filed Nov. 14, 2013, p. 21.

⁸¹ California Public Utilities Commission (CPUC). Decision 18-05-040, May 31, 2018. Available at: <http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442457637>.

⁸² California Public Utilities Commission (CPUC). Transportation Electrification Activities Pursuant to Senate Bill 350. Available at: <http://www.cpuc.ca.gov/sb350te/>. Accessed April 18, 2019.

⁸³ California Public Utilities Commission (CPUC). Decision 18-09-034, September 27, 2018. Available at: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M231/K030/231030113.PDF>.

Utilities) to spend up to \$7.33 million on eight transportation electrification programs, including a battery electric bus infrastructure program at the Tahoe Transportation District, and a test of a new electric vehicle rate.⁸⁴

The electricity rate a transit agency pays varies with factors such as the electric utility served by the agency, the number of buses deployed in a depot, and charging strategy. There are options for transit agencies to reduce or manage electricity costs, such as a fleet management system that uses software to do strategic charging. Other options include on-site electricity generation or off-grid charging and stationary energy storage that charges buses when electricity is in low demand. Unused electricity generated on-site can also mitigate peak demand and commodity charges.

CARB does not have authority over electricity rate design. However, transit agencies may declare a financial hardship to receive an exemption if certain additional costs, such as incrementally higher net electricity costs when compared to conventional fuels, cannot be adequately addressed.

H-8-8 Requesting Technical Workshop on Transit Electrification

Comment:

Olivine recommends a technical workshop be held on these issues; the opportunity to explore and debate them would be valuable to all stakeholders. Olivine believes that such a workshop will help shed light on many uncertainties around deploying infrastructure and concerns around fuel costs. **(Olivine)**

Agency Response:

CARB agrees and has held many technical workshops throughout the proceedings to develop this regulation. Workshops were held as part of this proceeding on the LCFS program, investor owned utilities' proposals under SB 350 to accelerate widespread transportation electrification, and zero-emission technologies. These workshops enabled all stakeholders to discuss transportation electrification barriers and solutions for transit agencies. The LCFS workshops during this proceeding provided an opportunity to acquire information on how transit agencies, public fleets, and school districts that use alternative fuels (including electricity) in trucks and buses, and fixed guideway systems can opt-in to the LCFS program and generate LCFS credits as a revenue source. The utility workshops provided an update on electric utility proposals to remove barriers to transportation electrification, and a continued discussion on costs. Experts from California's electric utilities, the Public Utilities Commission, transit agencies, and other interested stakeholders participated in these workshops to discuss transportation electrification issues, identify synergies, and streamline transit-utility interaction for transit agencies that electrify their fleets. The latest advances on transit bus technologies, associated infrastructure, and funding opportunities for transit buses

⁸⁴ California Public Utilities Commission (CPUC). Transportation Electrification Activities Pursuant to Senate Bill 350. Available at: <http://www.cpuc.ca.gov/sb350te/>. Accessed April 18, 2019.

in California were discussed in two technology workshops. All technical workshops materials can be accessed at CARB website at <https://arb.ca.gov/msprog/ict/meeting.htm>.

H-9 Low-NOx Purchase Requirements

H-9-1 Low-NOx Requirement for Hybrid Buses

Comment:

The proposed regulation makes a number of definitional changes to 13 CCR §2023, specifically with reference to bus types. Previously, CARB regulations utilized the terms “transit fleet”, “transit fleet vehicle” and “urban bus”. These definitions were inherently broad. An “urban bus” was defined as a “passenger carrying vehicle powered by a heavy duty diesel engine or of a type normally powered by a heavy duty engine.” CARB has interpreted this definition to include hybrid vehicles, specifically those powered by Allison H 40 EP and H 50 EP hybrid transmissions.

In addition, the proposed regulatory text concerning Low-NOx engines (proposed §2023.6) imposes a requirement for transit agencies to purchase buses with “Lox-NOx engines” if certain criteria are met. Among the criteria is a requirement that the engine “be certified to the lowest level of NOx emissions at the time of purchase that is suitable for the bus and fuel type for the engine being purchased.” Id. at §2023.6(a)(l).

It would be helpful for CARB to further clarify the effect of these changes with respect to current hybrid vehicles and affirm that either standing alone, or in combination with each other, the definitions continue to encompass hybrid vehicles utilizing Allison H 40 EP and H 50 EP hybrid transmissions. Such an interpretation is fully consistent with the regulatory language that has been proposed, but further elucidation by CARB could help avoid any uncertainty.

Specifically, the Proposed Regulation Order includes a new term “conventional internal combustion engine bus” to mean “a bus with an internal combustion engine (ICE) propulsion system or a combination of an internal combustion engine with an electric propulsion system commonly referred to as a hybrid powertrain”. A plain reading of this definition is that it is more encompassing of the types of vehicles that can currently be considered to be an “urban bus”. This is largely due to the fact that the criteria of a “heavy duty diesel engine” or a “heavy duty engine” in the current definition is absent in the new definition. Therefore, utilization of this inherently broader definition would not preclude H 40 EP and H 50 EP transmissions that have been allowable under the previous definition. Moreover, under the new definition, systems “commonly referred to as a hybrid powertrain” are included (and thus would encompass Allison H 40/50 series transmissions). (**Allison**)

Comment:

With regard to requirements to utilize Low-NOx engines, hybrid vehicles may require that certain types of engines be used (due to the integrated nature of the engines used in these vehicles and the hybrid powertrain). Engines that are compatible with different hybrid technologies may not be fully compatible or available on a “drop in” basis with other vehicles even in a similar weight category or use.

It appears that CARB has recognized this issue and developed a regulation that will allow continuation of existing practices in this area. Specifically, CARB's use of the word “suitable” in proposed 2023.6(a)(3) recognizes that use of engines certified to the “lowest level of NOx emissions” is contingent on whether such engines can reasonably be used in a specific vehicle application, like hybrids. In the final rule or accompanying explanation, it would be helpful for CARB to recognize that engine selection for hybrid vehicles is not the same as in the conventional vehicle sector and thus such needs are encompassed by the “suitable” criterion. Since certain engine types were “suitable” with Allison H 40 HP and H 50 HP transmissions, they would continue to remain so under the revised definitions. **(Allison)**

Agency Response:

The ICT regulation addresses the concern about hybrid buses. Sections 2023.6(a)(1) and (2) of the regulation include “hybrid propulsion system paired with the engine” for the Low-NOx Engine Purchase Requirements. This language clarifies that a hybrid bus would only be required to have a low NOx engine if the hybrid propulsion system in combination with the engine is certified to the Low-NOx engine standard.

H-9-2 Low-NOx Requirements for Diesel Technology

Comment:

We wanted to point out the diesel bus provision. Under the proposed regulation, if a transit agency is replacing a diesel bus, they can replace it with the cleanest available diesel technology, which would be a 2010 engine. We think that this is an incredibly low floor for the program. We recommend that any bus, regardless of the technology, be replaced with at least a near-zero technology with -- using renewable fuel. **(B-O-SoCalGas)**

Comment:

If ZEB strategies fall short diesel pathway properties are allowed to purchase 2010 diesel buses. They only will be required to -- they will not be able -- be

required to purchase near-zero emission buses unless they are commercially available for diesel. **(B-O-Clean Energy-1)**

Comment:

Although near zero natural gas buses and renewable natural gas are commercially available, cost-effective and deliver ZEB-like performance for both nitrogen oxide (NOx) a carbon emission, the proposed ICT regulation does little to leverage this more affordable alternative as a compliance option. Instead, the proposed ICT only requires the technology when ZEB technologies are not being purchased by a transit property that already runs a natural gas property. For those transit properties that operate on diesel, there is no requirement at all unless a low NOx diesel product becomes available on the market. Of course, based on the State Implementation Plan, we may not see diesel low NOx engines until 2023. **(Clean Energy)**

Comment:

So that's not -- that's -- that's a very low backstop to be able to purchase a 2010 diesel engine. Meanwhile, we have nine of the most polluted non-attainment zones under the federal ozone standard in the country. And Southern California just experienced the longest smog streak in 20 years. I strongly recommend that the backstop, at a minimum, for all non-ZEB purchases be near-zero buses that meet the most stringent low-NOx standard. **(B-O-Clean Energy-1)**

Agency Response:

As described in section 2023.1(a)(1), the purchase requirement of ZEBs is phased in to smooth out the early transitional phase to zero-emission technologies for transit agencies. To achieve the emission reduction goals in the early stages of this transition, the regulation requires low-NOx engines on new conventional internal combustion engine bus purchases if available. This approach adds the incremental cost only of purchasing an engine certified to the optional low-NOx engine standard if the engine is certified to the optional standard and is available for the engine fuel type. This requirement should meet the emissions reductions targets by 2023 and 2031 in the statewide SIP strategies.

The approved regulation does not require diesel fleets to convert from diesel fueled engines to engines of different fuel types for two reasons: (1) requiring a switch of fuel is costly (e.g. from the diesel fuel path to CNG fuel path) and could be a detour for transit agencies to deploy ZEB technologies with little benefit; and (2) CARB is already planning on a low-NOx engine regulation soon that would apply to all heavy-duty engines. CARB Board action on a lower NOx standard for on-road heavy-duty engines is expected in 2020. CARB expects this action will maximize NOx reductions and could apply to the 2024 engine year for all heavy-duty engines. Therefore, requiring all fuel pathways to convert to low-NOx will be costly, may not provide additional benefits and

may deter emission reduction benefits. This would be less effective at carrying out the purposes of the proposed regulation and would be more burdensome.

H-9-3 Require Advanced Technology in Case of ZEB Exemptions

Comment:

And our position is that we do support electrification, but also there should be more than one strategy. And if the problems do persist, we do propose allowing near-zero buses, as long as they meet a 0.02 NOx performance standard with renewable fuel. **(B-O-Clean Energy-2)**

Comment:

The second point that I want to highlight is, you know, off-ramps. And we heard a little bit today about some modifications and we appreciate those. But we believe that waiver for those folks that are having a number of issues that may crop up that prevent them from meeting the regulation, there should be a technology standard there that they should meet. They should require the adoption of natural -- near-zero technology that meets the 0.02 standard. And those transit agencies should have that as a way to get the waiver. **(B-O-California NGV Coalition)**

Agency Response:

The commenters are promoting two goals: (1) use of Low-NOx CNG engines; and (2) use of renewable natural gas; particularly, when transit agencies are granted exemptions from the ZEB purchase requirements. CARB believes the first is a good short-term, interim complementary solution before the full deployment of ZEBs. However, the second has no real emission reduction benefit under the ICT regulation.

For transit buses, Low-NOx engines are only certified for CNG buses and not for diesel buses. LowNOx engines can achieve emission reductions in early years before ZEBs are fully deployed, and are incorporated into the ICT regulation when combustion engine bus purchases are made. However, requiring diesel bus fleets to convert to CNG buses is unnecessary for two reasons: (1) converting diesel buses to CNG buses is costly in infrastructure and the learning curve, and so could deter bus purchases or ZEB deployment; and (2) a conversion requirement is unnecessary since CARB is planning to propose a Low-NOx engine requirement regulation in 2020 likely to begin with the 2024 model year.

H-9-4 Support Low-NOx Purchase Requirements

Comment:

We also support the provision that provides for low-NOx purchase requirements beginning in 2020, because we have some -- some short-range goals in addition

to long-range goals. And so requiring low NOx early on is a good way to split the middle on this. **(B-O-CAPCOA)**

Agency Response:

CARB appreciates the support.

H-10 Use of Renewable Fuels

Comment:

We appreciate the inclusion of "off ramps" in the proposed rule that allow extensions or exemptions if specified conditions occur. This includes an exemption from ZEB purchases based on financial hardships. A financial hardship exemption should also extend to the purchase of alternative diesel fuel. While CARB is working toward the commercialization of alternative diesel fuel, it is unknown if there will be a stable supply and reasonable price for alternative diesel fuel. It is also uncertain if engine warranties allow the use of alternative fuels. **(AC Transit)**

Agency Response:

It is the intent of the exemption options to ensure transit service is not adversely affected. Section 2023.4(c)(5) of the ICT regulation provides some flexibility for a transit agency with financial hardship to comply. This includes situations where a transit agency cannot offset the incremental costs of purchasing any zero emission buses when in good faith has applied for all funding and financing options, or it cannot offset the electricity costs for operating a depot charging battery electric bus when compared to the same type of internal combustion engine bus. A transit agency can also apply for exemption, when its governing body publicly declares a fiscal emergency.

Renewable diesel is suitable for use without engine modification and is also widely available at a comparable cost to diesel for large purchases. Small transit agencies are not subject to the renewable fuel purchase requirement. There is no foreseeable need to provide an exemption for renewable fuel purchases for large transit agencies; however, the annual updates to the Board and comprehensive review would provide an opportunity to revisit the requirement if needed. Providing this exemption would not be as effective in carrying out the purpose of the regulation.

H-11 Adoption of the Regulation

Comment:

To reiterate, we believe a regulation should be completed this year to facilitate the conversion to ZEB technology by 2040. **(CTA)**

Comment:

First and foremost, we support approving this standard or as soon as possible, and recommend a final approval take place no later than December 2018. We cannot afford to wait any longer to begin our committed transition to 100 percent zero-emission buses. **(UCS-2)**

Agency Response:

The Board adopted the ICT regulation in December 2018 and we look forward to working with stakeholders to achieve a complete transition to ZEBs.

H-12 Regulation Flexibility and Joint Group Option

Comment:

Further, MTC fully endorses the proposal's flexibility to comply with the regulation through the use of individual and group implementation plans, which will allow operators to meet local needs such as bus replacement schedules and emergency response requirements. **(B-W-MTC)**

Agency Response:

CARB appreciates the support.

I. OTHERS

This section addresses comments that are not included in above sections (categories). Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

I-1 Electrical Infrastructure

Comment:

And lastly, I'd like to comment on some of the comments that were made earlier about the electrical infrastructure might be a little difficult and large. And for a State certified electrician, such as myself, and for companies I've worked for, it is seamless work for us. This is what we do, so please give us a chance to do it. **(B-O-IBEW-1)**

Agency Response:

CARB appreciates IBEW's continued effort in supporting transportation electrification. CARB also agrees that fueling and charging infrastructure for ZEBs is essential for successful and timely ZEB deployment. Therefore, the ICT regulation requires each transit agency to prepare a ZEB Rollout Plan with a schedule for infrastructure upgrade, modification, and construction.

I-2 Liquid and Gaseous Fuels

Comment:

The ICT rule must acknowledge that California now has two economic -- economical alternatives for zero emission's energy transmission distribution, namely the power grid, and hydrogen as a fuel. This -- the most appropriate method will be determined by use in each case. Liquid and gaseous fuels have proven their effectiveness in serving dense loads in and in transporting that energy over long distances without adding permanent infrastructure. **(B-O-Ballard)**

Agency Response:

CARB agrees and allows different ZEB technologies to meet the purchase requirements.

I-3 Renewable Hydrogen

Comment:

And going back to those 2030 goals, keep that in mind, 2030 will show different infrastructure costs as there are now. And I heard some references to that earlier. As you may be aware, last week -- or the week before, the Hydrogen Council met in a conjunction with the Climate Summit in San Francisco. And one of the goals they shared was for 2030 to have completely decarbonized hydrogen. In other words, the hydrogen most likely 100 percent renewable. And I've not heard any reference to that yet about the fuel -- on the fuel side of things, so that will contribute to the emission reductions. **(B-O-CaFCP)**

Agency Response:

Senate Bill (SB) 1505 requires CARB to develop regulations to require one-third of hydrogen to be produced from renewable sources for transportation. In the LCFS regulation, the carbon intensity benchmarks will be decreased from 93.23 gCO_{2e}/MJ in

2019 to 79.55 gCO₂e/MJ in 2030 and subsequent years.⁸⁵ SB 100 (de Leon, 2018) increases the Renewable Portfolio Standard to 60 percent by 2030, and requires all state's electricity to come from carbon-free resources by 2045. These mandates will help to keep all the transportation fuels cleaner with lower carbon intensity in the future.

I-4 Emergency

Comment:

I want to emphasize in short Foothills and other transit agency's concern over resiliency under state-of-emergency situations. If we are subjected to an earthquake, in addition to maybe a cyber attack and someone impacts our electrical systems and we're only dependent upon electrical modes of transportation, what do we do? **(B-O-Clean Energy-1)**

Agency Response:

Existing transit operators rely on a mix of fuels that are subject to various challenges with operation during natural disasters and have back-up systems and procedures to ensure reliability. Electricity supply can be backed up by battery storage systems or generators, and fuel cell electric buses are likely to have hydrogen stored on site with similar back-up systems as used for CNG compression and fueling. It would be speculative to conclude that implementation of the program could not be managed with appropriate planning. While cyber-attacks constitute a real threat, it could have an effect on the supply of conventional fuels as well as electricity. The commenter does not present evidence that links increased reliance on the electrical grid for vehicle charging to decreased ability to respond to a cyber-attack on the electrical grid for battery electric buses nor fuel cell electric buses.

I-5 Battery Storage

Comment:

If we also provide a rule for renewable battery storage, that can also unlock some other advantages. **(B-O-SDAP)**

Agency Response:

The ICT regulation provides flexibility for each transit agency to identify the most suitable ways to deploy zero-emission buses. Although some transit agencies may include some battery storage systems as part of their plan, it is up to the transit agency to work with the utility to determine the best approach for their operation. A requirement

⁸⁵ California Air Resources Board (CARB) (2019). Low Carbon Fuel Standard, Final Regulation Order, posted January 4, 2019. Available at: https://www.arb.ca.gov/regact/2018/lcfs18/frolcfs.pdf?_ga=2.100014045.293243011.1551893649-1852339309.1549338215.

for battery storage would not be as effective and would be more burdensome in carrying out the purposes of the regulation.

I-6 Renewable Natural Gas

Comment:

A transition to zero-emission technologies is clearly not the most effective way to meet our climate change goals. Your own website notes that RNG is the lowest carbon intensity fuel that exists today. A transit vehicle powered by dairy RNG can achieve a carbon intensity as low as negative 272 grams per megajoule.

This is better than an electric transit vehicle powered by 100 percent wind or solar. Furthermore, eliminating the single largest commercial market for RNG in California will significantly impact our ability to meet the state's short-lived climate pollutant goals set forth in Senator Lara's SB 1383. This would be making a huge step backward in meeting our climate change goals.

A transition to zero emission technologies is also not an efficient way to meet our air quality or public health goals. California's own University of California found that ultra low NOx engines powered by RNG perform at 99.8 percent clean, finding that there is no statistically significant difference with respect to air quality and public health outcomes between a zero-emission vehicle and ultra low NOx vehicle at a fraction of the cost.

This eventual ban on RNG-fueled vehicles will also cause us to forego the significant local air, soil, and water quality benefits that RNG production facilities provide upstream in the quality -- in the communities where they operate. Instead, this regulation would favor electric generation that has potential to shift emissions away from the communities near transit corridors, but around the power plants that are fueling the vehicle. **(B-O-RNG Coalition)**

Comment:

However, this rule cannot be formed in isolation. Achieving SB 100's 2045 goals of carbon neutrality and a renewable grid will require more than tripling of our renewable generation in California, and doubling or more of our electrical loads on our electrical grid.

Economically transmitting and distributing this energy will be a monumental challenge, particularly in areas of remote generation, such as mountains and deserts, and in areas of dense usage, such as ports, urban industrial areas, and in many transit agencies. **(B-O-Ballard)**

Comment:

Emission reductions should be the focus of the regulation: The average carbon intensity of renewable natural gas (RNG) is 60-80 percent lower than diesel and can have a carbon intensity (CI) up to 400 percent lower than diesel - carbon negative values far below any other fuel/technology. This is possible because RNG mitigates emissions that would have escaped to atmosphere if not captured. ARB awarded AMP Americas, a renewable energy company, a CI score of -254.94 grams of carbon dioxide per megajoule (g CO₂e/MJ), which is the lowest ever issued by ARB. In comparison, the California electric grid has an energy efficiency ratio corrected CI value of approximately 20 g CO₂e/MJ.

Last year, Cummins Westport Inc. certified a 12-liter engine to the Optional Low Nitrogen Oxide (NO_x) standard. A study commissioned by ARB and completed by Southwest Research Institute (SWRI) was recently released that showed that in some transit duty cycles, the natural gas 12 liter near zero engine showed 0.000 grams of NO_x per brake horsepower/hour (g/bhp-hr). 1 The SWRI report concluded that 2010-compliant natural gas engines could be developed, using existing technology, that reduced NO_x tailpipe emissions to undetectable levels. These technologies are available today and can cost effectively achieve more emission reductions while also maintaining an expected level of service for the transit agencies purchasing the technology. Continued deployment of existing, proven, clean bus engines would achieve immediate emission reductions that would benefit the public and help to achieve the state's climate goals.

Additionally, LA Metro's recent study found that "...the use of RNG and transition to low NO_x buses, will be more effective at reducing in-basin PM, total CO₂, total GHGs, and total NO_x from the LAMTA fleet over the next 40 years than transition to either electric or fuel cell buses... This approach will also be less expensive than transition to either electric or fuel cell buses." Existing natural gas technologies combined with the use of renewable natural gas achieve more emission reductions at a faster rate and at a lower cost than ZEBs. A long-term technology mandate for ZEBs leaves significant emission reductions on the table, while the technology is still being developed. ARB should focus on emission reductions rather than a technology mandate of ZEBs. This can be done by providing alternative compliance based on emission reductions. (**SoCalGas**)

Comment:

Emission reductions should be the focus of the regulation: Any fuel and technology capable of meeting the emission performance goals established by ARB should be an option for transit operators to retain and maximize operational flexibility, control and reduce costs, and ensure no service curtailments or interruptions. As an example, the average carbon intensity of RNG is 60-80 percent lower than diesel. Based on the source, RNG can have a carbon intensity (CI) up to 400 percent lower than diesel, and can be carbon negative, as RNG mitigates emissions that would have otherwise occurred. ARB recently awarded the company, AMP Americas, a renewable energy company, a CI score

of -254.94 grams of carbon dioxide per megajoule (g CO₂e/MJ) for RNG, which is the lowest CI score ever issued by ARB for any fuel or technology. In comparison, the California electric grid has an energy efficiency ratio corrected CI value of approximately 20 g CO₂e/MJ. Clearly, RNG can meet and exceed the greenhouse gas emission reductions resulting from the use of electricity and should be an option for transit fleet operators in any new regulation.

The Cummins Westport Inc. has had a 9-liter engine certified to the Optional Low Nitrogen Oxide (NO_x) standard at the lowest level of 0.02 grams/bhp-hr. Last week Cummins Westport Inc. also certified a 12-liter engine to the Optional Low NO_x standard. While it meets the standard, the engine was actually certified to 0.01 grams NO_x, which is 95% lower than existing diesel (certifications attached). A study commissioned by ARB and completed by Southwest Research Institute (SWRI) was recently released that showed that in some transit duty cycles, the natural gas 12 liter near zero engine showed 0.000 grams of NO_x per brake horsepower/hour (g/bhp-hr).⁴ The SWRI report concluded that 2010-compliant natural gas engines could be modified, using existing technology, that reduced NO_x tailpipe emissions to zero.

Additionally, LA Metro's recent study found that "...the use of RNG and transition to low NO_x buses, will be more effective at reducing in-basin PM, total CO₂, total GHGs, and total NO_x from the LAMTA fleet over the next 40 years than transition to either electric or fuel cell buses...This approach will also be less expensive than transition to either electric or fuel cell buses."⁵ In other words, existing natural gas technologies combined with the use of renewable natural gas achieve more emission reductions at a lower cost than ZEBs. A long-term technology mandate for ZEBs leaves significant emission reductions on the table, while the technology is still being developed. ARB should focus on emission reductions rather than picking aspiration goals to be achieved by a specific technology. ARB's plan should allow for alternative compliance, which would likely result in greater emission reductions at a faster rate. **(SoCalGas)**

Agency Response:

CARB did not consider the effects of the ICT regulation in isolation. Overall, and in its analysis of the economic and environmental effects, CARB included other programs and measures to reduce emissions and concluded that ZEBs have greater environmental benefits than conventional internal combustion engine buses (including if burning renewable natural gas) in both fuel efficiency and ultimate emissions on both criteria pollutants and GHGs. As part of this analysis, CARB recognized that GHG reductions from RNG were previously accounted for in adopting the LCFS and related programs that require and incentivize use of RNG. The fact that renewable natural gas (RNG) and renewable diesel (RD) are commercially available at a comparable price with their fossil counterparts in California is attributed primarily to the LCFS program. The GHG emission reduction benefits and costs from the production and use of RNG and RD is therefore also attributed to the LCFS program. Renewable natural gas

producers generate credits that can be sold for those who need the credits to comply with the LCFS regulation for use as a transportation fuel in a wide range of vehicles.

When conducting the emission reductions accounting, the LCFS program recognizes the need to isolate the effects of the LCFS from outcomes that would have occurred without the regulation, the baseline includes existing regulations and trends that influence the types and carbon intensities of transportation fuels consumed in California. The major regulations and trends include programs like the Advanced Clean Car program that fosters the market of electric cars. The LCFS accounting policy is described in the ISOR from the 2015 Rule re-adoption ISOR (<https://www.arb.ca.gov/regact/2015/lcfs2015/lcfs15isor.pdf>).

The ICT regulation, together with other obligations to reduce greenhouse gas emissions, like those in Senate Bill (SB) 1383, statutes of 2016, chapter 395, to reduce short-lived climate pollutants, will provide significant environmental benefits.

The analysis of alternatives to the ICT Regulation in the ISOR shows the emissions benefits of different strategies, including the benefits of using low NOx engines with RNG. The regulation requires low-NOx engines, if available for the engine fuel type, and use of renewable diesel during the transition to a ZEB fleet.

I-7 ZEB Deployment Status

Comment:

As the Initial Statement of Reasons ("ISOR") for the proposed regulation notes, a 15 percent ZEB purchase requirement for larger transit agencies has existed in California since 2006, but this requirement has not, to date, been met. The ISOR indicates that there were 132 ZEBs in operation by transit agencies in May 2018. While the ISOR does not provide an explicit percentage of the number of ZEBs in the current fleet, such can be calculated by reference to other data and text provided in the ISOR. Using this information, it would appear that ZEBs (as a percentage of all transit buses in California) currently represent a little over 1% of the fleet.

Thus, despite long-standing ZEB purchase requirements there have been a number of substantial barriers to the deployment of this technology within transit fleets. As a result, Allison believes that CARB must consider the full range of factors that have resulted in the inability of past "zero emission" mandates to meet regulatory targets. Central to this analysis is a "year-over-year" estimation of ZEB mandate costs and the availability of resources to meet the mandate. While Allison recognizes that the ZEB program is integral to important policy goals being pursued by California and CARB, the opportunity for successful implementation of the program would be enhanced by more robust regulatory analysis. One outcome of such an effort could be the identification of other alternatives to obtaining the desired policy goals.

In any final rule that results from the pending process, CARB should maintain proposed flexibility options and explore whether other compliance flexibility is feasible. CARB should also clarify the scope of its regulations, which include multiple new regulatory definitions that could cause confusion in the existing hybrid market. (**Allison**)

Agency Response:

The commenter asserts there are ZEB deployment barriers that have not been overcome, the key among them is ZEB cost, resulting in ZEB deployment far below existing requirements. The ICT regulation contains exemptions to ensure transit service is not adversely affected. CARB will report annually to the Board on the status of the ICT regulation implementation. This report will address development and deployment of zero-emission bus technologies, the status of incentive funding programs, CARB's collaboration with transit agencies, manufacturers, infrastructure providers, and other state agencies to promote zero-emission bus technologies. In addition, the comprehensive review committed to in Resolution 18-60 will, at a minimum, address these issues: costs, California incentive funding programs, performance, reliability of zero-emission buses, associated infrastructure to operate and maintain zero-emission buses, creation of jobs and training programs for employment in manufacturing, maintaining, and operating zero-emission bus technologies, the deployment status of zero-emission buses and related technologies, and the availability and barriers to deployment of zero-emission buses of different types. Based on the information, CARB can change the regulatory requirements that may be warranted.

In developing the ICT Regulation, CARB solicited input on potential alternatives, as described in Chapter IX, Evaluation of Regulatory Alternatives, in the Initial Statement of Reasons. CARB discussed the reasons for rejecting them, and concluded that none of the alternatives would be less burdensome and as effective in carrying out the goals of the regulation to reduce emissions from transit buses.

I-8 Operational Feasibility

Comment:

While there are several demonstration projects, and a lot of people have invested into zero-emission buses, they have not yet proven to be operationally or economically feasible. It's been reported by several news outlets like the LA Times and the Albuquerque Business Journal that they have a record of poor performance. (**B-O-SoCalGas**)

Agency Response:

CARB recognizes the challenges in deploying zero-emission buses, but also the successes. As of 2018, more than 130 zero-emission buses were operating in

California.⁸⁶ Among those successful deployments are zero-emission buses deployed by Alameda Contra Costa Transit District (AC Transit) and Antelope Valley Transit Authority (AVTA). Traditionally, a public transit bus life expectancy is measured in the number of miles on its diesel engine. A diesel engine could undergo midlife overhaul at 6 years or 250,000 miles. The life expectancy of a fuel cell power plant is measured in hours. The Department of Energy/Federal Transit Administration target for a fuel-cell electric bus power plant is 25,000 hours. As of February 2019, seven fuel cell power plants (FCPPs) at AC Transit exceeded the 25,000-hour milestone, which demonstrated the potential for fuel cells to meet the equivalent life cycle expectancy similar to a diesel engine.⁸⁷ In 2017, AVTA became the first transit agency in California to operate a 60-foot articulated battery electric bus. AVTA will become the first California transit agency to have 100% zero-emission buses this year with their 85-bus fleet. These success stories demonstrate zero-emission buses can be reliable and meet transit agency service requirements.

Besides these successes, CARB has been closely monitoring ZEB deployment status and performance studies, including fuel cell electric and battery electric buses evaluations by the National Renewable Energy Laboratory (NREL).⁸⁸ The NREL reports provide real-world operation and maintenance data for both zero-emission buses and conventional buses from transit agencies. Evaluation report of these buses are available at the NREL website.

CARB will also conduct a comprehensive review of program readiness, considering issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to initiating any purchase requirement. This provides the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts to transit service. The annual update to the Board will similarly assess the status of ZEB technologies for consideration of any potential changes to the regulatory requirements. Both the comprehensive review and the annual update to the Board will provide the Board with the best information on cost and performance of zero-emission buses.

I-9 ZEB Deployment Violating FTA Regulations

Comment:

For Pasadena's transit services, ZEB deployment will reduce operational flexibility and violate longstanding FTA regulations.

- Currently, if a bus needs maintenance it is able to be exchanged with any other bus in the fleet. However, a ZEB vehicle will only be able to be deployed to a ZEB enabled route.

⁸⁶ See CARB, Battery and Fuel Cell Electric Buses in California, ISOR ref. 34, p. XIII-4.

⁸⁷ See CARB, ISOR Appendix J; AC Transit, ZEBA Summary Report, February 2019, page 1.

⁸⁸ Evaluation reports for fuel cell electric and battery electric buses are available at the National Renewable Energy Laboratory (NREL) website at: <https://www.nrel.gov/hydrogen/fuel-cell-bus-evaluation.html>.

- Restrictions to ZEB deployment may violate FTA regulations by requiring increased spare ratio of vehicles and create service inequity due to the resulting inability to deploy vehicles among all routes. (**City of Pasadena**)

Agency Response:

CARB recognizes the challenges transit agencies are facing to transition to ZEB fleets. Therefore, The ICT regulation contains exemptions that can provide safeguards to transit agencies to help address potential unintentional individual consequences and ensure transit service are not adversely affected. Exemptions would apply when any weight class based on ZEB gross vehicle weight rating (GVWR) exemption resulted in a transit agency violating any federal, state, or local law, regulation, or ordinance.

In addition, the ICT regulation starts with lower ZEB purchase requirements at the beginning and gradually increases. This allows sufficient time and opportunities for transit agencies to deploy ZEBs in a manner that is consistent with a transit agency's normal bus purchase schedule.

I-10 Availability of Zero-Emission Bus Suppliers

Comment:

Current mandates by the federal government specifically bar purchases of Chinese-manufactured buses (i.e. - electric buses.) (**Borchman**)

Agency Response:

The ICT regulation ensures transit agencies can follow all federal, state, and local laws, regulations, and ordinances. The Buy American Act and the Fixing America's Surface Transportation Act require that fixed-route buses, as manufactured goods, and the steel and iron for them, be produced in the United States if they are funded by the federal Department of Transportation. This requirement may be waived if, for fiscal year 2020 and beyond, the costs of components and subcomponents produced in the United States is more than 70% of the cost of all components and subcomponents and that final manufacture occurs in the United States.⁸⁹

All conventional bus manufacturers provide ZEBs to the market. Many are in California. Five manufacturers, including BYD, El Dorado National-California, GILLIG, GreenPower, and Proterra, have ZEB manufacturing plants producing either BEBs or FCEBs or both in California.⁹⁰ GreenPower's BEB manufacturing plant in Porterville is under construction. Out of all ZEB manufacturers, BYD is the only Chinese-owned bus

⁸⁹ See 49 U.S.C. §§ 5307, 5323, 5339; see also Dept. of Transportation, Federal Transit Administration, Notice of funding opportunity, Fiscal Year 2018 Competitive Funding Opportunity; Grants for Buses and Bus Facilities Infrastructure Investment Program, 83 Fed.Reg. 29,609, 29,614 (June 25, 2018).

⁹⁰ See ISOR, Table I-2: Zero-Emission Standard Bus Manufacturers in California, p. I-17. Available at https://www.arb.ca.gov/regact/2018/ict2018/isor.pdf?_ga=2.231805020.217144606.1555215395-2124256164.1542392963#page=43&zoom=100,0,292.

manufacturer not previously in the US bus market. With conventional bus manufacturers (e.g. New Flyer and Gillig) providing ZEBs to customers and new entrants to the market (e.g. GreenPower and Proterra), California transit agencies likely have sufficient options and supply in the ZEB market for buses that meet federal Buy American requirements. More directly, there are sufficient US ZEB manufacturers to supply the California market.

I-11 Comments on the Discussion Document

Comment:

The Performance Based Option conclusion is flawed: The Discussion document addresses a performance based regulation option but claims a “fleet-wide performance standard” is problematic and dismisses that approach for several reasons, none of which are defensible:

1. Inability to access funding programs: ARB staff states “funding programs would not allow funding to be used to purchase ZEB or low NOx engines until the transit agency could show compliance with the next compliance requirement.” ARB has had a performance based “Fleet Rule for Transit Agencies” regulation in effect for many years that set fleet-wide average NOx and diesel PM emission performance standards and has enabled transit fleets to access funding where they showed the emission reductions went above and beyond the prevailing standard. ARB staff does not explain why this would not be the case under a technology mandate mechanism. Transit agencies will still be able to access funding programs under a performance based regulation, so this objection is misplaced.
2. Inability to establish an “equitable” performance based mechanism: ARB staff states “For example, a uniform NOx reduction goal may be easy to meet for a CNG bus fleet because low NOx engines are already available but may be impractical for a diesel bus fleet that could be forced to retire buses and aggressively ramp up ZEB purchases to achieve the same reductions.” It is not clear why ARB staff believes it is inequitable to force diesel bus fleets to aggressively ramp up ZEB purchases but believe it is equitable to force all bus fleets to aggressively ramp up ZEB purchases. A properly designed performance based mechanism would provide diesel bus fleets various options to meet the performance based requirements which may or may not include ZEB purchases. Transit fleet operators should be given fuel and technology choices that allow them to cost-effectively meet performance based emission standards while retaining operational flexibility.
3. Inability to separate a performance based regulation from other parallel ARB regulations: ARB staff states “there are challenges with properly separating new actions from those that are already occurring due to ARB regulations for engine emissions standards, vehicle efficiency

requirements, and policies to reduce transportation fuel carbon intensity". ARB has had a performance based "Fleet Rule for Transit Agencies" regulation in effect for many years that set fleet-wide average NOX and diesel PM emission performance standards and has performed well independent of other ARB actions such as the development of the optional low NOX engine standards, the Low Carbon Fuel Standard program, and other regulations. To suggest that updating the "Fleet Rule for Transit Agencies" for NOX and diesel PM emission standards and including new GHG and petroleum reduction standards would be problematic is not explained by CARB staff and is incorrect.

4. Inability to utilize the National Transit Database (NTD) due to fluctuations in fuel use, mileage, and passenger counts: ARB staff lists this as a potential barrier but does not explain why the fluctuation in NTD information would prevent the use of a performance based regulation.

ARB staff identifies several other potential compliance methods, including a "zero emission miles-based fleet-wide approach". This method is extremely impractical and would not result in gaining the most emission reductions in the most efficient manner. Transit agencies operate varying routes and duty cycles and there is not a one size fits all approach. Zero emission buses may work well for some transit agencies, but not for others depending on the routes, operations, and economic considerations. A transit agency that chooses to not fully utilize zero emission buses (ZEBs) because of these considerations would be forced to modify its operations to use ZEBs for a set number of miles despite these considerations. A zero-emission miles based approach is of particular concern because ZEBs are better suited for very short routes, which would not log as many miles as longer routes. Also, there is no mileage requirement for transit agencies who meet the purchase requirements.

The purpose of the performance based option is to "provide for the greatest opportunity to let market forces drive the form of the emission benefits." This method clearly does not meet this goal as a strict technology mandate will not accomplish that goal. The performance based option should solely be based on emission reductions. (**SoCalGas**)

Agency Response:

The Innovative Clean Transit Discussion Document was provided in December 2017 at the statewide workshop to facilitate discussions and solicit comments. The comments on these topics of the Discussion Documents were not part of the regulation as proposed to be adopted. These comments are not directed at the proposed regulations or the process by which they were adopted under the Administrative Procedure Act.

V. COMMENTS RECEIVED DURING THE 15-DAY COMMENT PERIOD AND AT THE BOARD HEARING ON DECEMBER 14, 2018, AND AGENCY RESPONSES

This chapter contains comments or comment letters submitted during the 15-day comment period and written or oral comments provided at the Board Hearing on December 14, 2018. This chapter also contains responses for these comments. As indicated in Chapter I, three tables are listed below identifying the commenters and where their comments are responded, organized in the same manner as the comments on the initially-proposed 45-day regulatory text that are in Chapter IV. Table V.1 lists comment letters submitted during the 15-day comment period and their response categories. Table V.2 lists oral comments given at the December 14, 2018, Board Hearing and their response categories. Table V.3 lists written comments given at the December 14, 2018, Board Hearing and their response categories.

Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

Table V.1: Comment Letters submitted during the 15-day comment period

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
1	15-1-1	Michael, D'Adamo	Individual		11/9/2018	A
2	15-1-LADOT	Ralph, Corinne	LADOT		11/14/2018	A
3	15-1-Sierra Club	Ray, Pingle	Sierra Club		11/20/2018	G-6-1
4	15-1-Motiv	Urvi, Nagrani	Motiv Power Systems		11/20/2018	A
5	15-1-CTA-1	Pimentel, Michael	California Transit Association		11/21/2018	B-1 E-5
6	15-1-American Lung Association	William, Barrett	American Lung Association		11/21/2018	A
7	15-1-Earthjustice-1	Adrian, Martinez	Earthjustice		11/21/2018	A
8	15-1-SamTrans	Jessica, Epstein	San Mateo County Transit District		11/25/2018	B-2
9	15-1-Ballard	Tim, Sasseen	Ballard Power Systems Inc.		11/26/2018	G-4-2
10	15-1-BYD	Vincent, Wiraatmadja	BYD		11/26/2018	A
11	15-1-County Connection	Rick, Ramacier	Central Contra Costa Transit Authority (County Connection)		11/26/2018	B-1 E-6
12	15-1-CALACT	Jacklyn, Montgomery	California Association for Coordinated Transportation (CALACT)	This letter is identical to Board Hearing commenter letter #399, CALACT though submitted on different dates. Please refer to #399, CALACT for responses	11/26/2018	E-8, E-10, E-13 H-1-2, H-1-5, H-5-5, H-8-1
13	15-1-MST	Carl, Sedoryk	Monterey Salinas Transit District (MST)		11/26/2018	E-1, E-6, E-7 G-1-1, G-4-1, G-4-2
14	15-1-Earthjustice-2	Kyle, Da Silva	Earthjustice		11/26/2018	A
15	15-1-Allison	Greg, Mann	Allison Transmission		11/26/2018	E-1, E-2 G-1-3, G-3-1

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
16	15-1-UCS-1	James, O'Dea	Union of Concerned Scientists		11/26/2018	NC**
17	15-1-SFMTA	Edward, Reiskin	San Francisco Municipal Transportation Agency (SFMTA)		11/26/2018	G-6-2
18	15-1-CHBC	Emanuel, Wagner	California Hydrogen Business Council (CHBC)		11/26/2018	A
19	15-1-CalETC	Hannah Goldsmith	California Electric Transportation Coalition (CalETC)		11/26/2018	G-5-1, G-6-1
20	15-1-OCTA	Dustin, Sifford	Orange County Transportation Authority (OCTA)		11/26/2018	B-1
21	15-1-AC Transit	Steve, Wallauch	AC-Transit		11/26/2018	B-1
						E-7
						G-6-1, G-6-2, G-6-4
22	15-1-Earthjustice-3	Adrian, Martinez	Earthjustice	This letter is identical to #7, Earthjustice-1 though submitted on different dates. Please refer to #7, Earthjustice-1 for responses.	11/26/2018	A
23	15-1-UCS-2	Emily, Heffling	Union of Concerned Scientists		11/26/2018	G-3-2
24	15-1-Santa Cruz METRO	Alex, Clifford	Santa Cruz Metropolitan Transit District (Santa Cruz METRO)		11/26/2018	C-3
						E-5
25	15-1-BlueGreen Alliance	Sam, Appel	BlueGreen Alliance		11/26/2018	D-1
26	15-1-UCS-3	James, O'Dea	Union of Concerned Scientists		11/25/2018	G-5-2
27	15-1-CTA-2	Joshua, Shaw	California Transit Association		11/26/2018	B-1
						E-5

Docket number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
28	15-1-CalZEV	Michelle, Spita	Californians for Zero-Emission Vehicles (CalZEV) Coalition		11/26/2018	B-1
						E-6
						G-4-1, G-6-3

* The docket number is assigned based on the date received

**This comment letter is not considered as a comment

Table V. 2: Oral comments given at the December 14, 2018, Board Hearing

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
1	B-O-2-AVTA	Norm Hickling	Antelope Valley Transit Authority		12/14/2018	A
2	B-O-2-SCE	Vazken Kassakhian	Southern California Edison (SCE)		12/14/2018	A
3	B-O-2-LADOT	Corinne Ralph	Los Angeles Department of Transportation (LADOT)		12/14/2018	A
4	B-O-2-Clean Energy	Todd Campbell	Clean Energy		12/14/2018	C-6
						E-9
						H-1, H-2
5	B-O-2-CTE	Jamie Levin	Center for Transportation and the Environment (CTE)		12/14/2018	C-1
						E-6, E-8
6	B-O-2-Sierra Club-1	Kathryn Phillips	Sierra Club		12/14/2018	A
7	B-O-2-Sierra Club-2	Ray Pingle	Sierra Club		12/14/2018	H-3
8	B-O-2-Proterra	Kent Leacock	Proterra		12/14/2018	A
9	B-O-2-CaFCP	Nico Bouwkamp	California Fuel Cell Partnership (CaFCP)		12/14/2018	C-2
						E-6, E-7
						H-4
10	B-O-2-Brightline Defense	Eddie Ahn	Brightline Defense		12/14/2018	A
11	B-O-2-SFMTA	Bhavin Khatri	San Francisco Municipal Transportation Agency (SFMTA)		12/14/2018	A
12	B-O-2-Ballard	Tim Sasseen	Ballard Power Systems		12/14/2018	A
13	B-O-2-SMUD	Bill Boyce	SMUD		12/14/2018	A
14	B-O-2-AC Transit	Sal Llamas	AC Transit		12/14/2018	B-3
						E-6

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
						G-6-4
15	B-O-2-BYD	Alejandra Duran	Weideman Group on behalf BYD		12/14/2018	A
16	B-O-2-IBEW 569	Nick Segura	IBEW Local 569 San Diego		12/14/2018	A
17	B-O-2-SDMTS	Paul Jablonski	San Diego Metropolitan Transit System (SDMTS)		12/14/2018	B-3
						E-3, E-4
18	B-O-2-CTA	Joshua Shaw	California Transit Association (CTA)		12/14/2018	C-1, C-4
						E-1, E-4, E-6
						G-7
19	B-O-2-MTC	Kenneth Folan	Metropolitan Transportation Commission (MTC)		12/14/2018	B-3
						E-6
20	B-O-2-Enviro CA	Emma Shumway	Environment California (Enviro CA)		12/14/2018	A
21	B-O-2-Jacobson	Dan Jacobson	Individual		12/14/2018	A
22	B-O-2-Earthjustice	Sasan Saadat	Earthjustice		12/14/2018	A
23	B-O-2-UCS	Emily Heffling	Union of Concerned Scientists (UCS)		12/14/2018	A
24	B-O-2-TTD	Jake Donahue	Tahoe Transportation District (TTD)		12/14/2018	E-6
25	B-O-2-Cal ETC	Hannah Goldsmith	California Electric Transportation Coalition (Cal ETC)		12/14/2018	A
26	B-O-2-Trillium	Jon Costantino	Trillium.		12/14/2018	B-3
27	B-O-2-American Lung Association	Will Barrett	American Lung Association		12/14/2018	A
28	B-O-2-CEJA	Stephanie Tsai	California Environmental Justice Alliance (CEJA)		12/14/2018	H-5
29	B-O-2-LMCC	Bernie Kotlier	Labor Management Cooperation Committee (LMCC), IBEW and NECA		12/14/2018	A
30	B-O-2-BlueGreen Alliance	Sam Appel	BlueGreen Alliance		12/14/2018	D-1
31	B-O-2-Lion Electric	Nate Baguio	Lion Electric Company		12/14/2018	A

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letter	Date Received	Section #
32	B-O-2-CCA	Bill Magavern	Coalition for Clean Air (CCA)		12/14/2018	E-6
33	B-O-2-CCAEJ-1	Ericka Flores	Center for Community Action and Environmental Justice (CCAEJ)		12/14/2018	A
34	B-O-2-CCAEJ-2	Andrea Vidaurre	Center for Community Action and Environmental Justice (CCAEJ)		12/14/2018	A
35	B-O-2-UEPI	Iris Verduzco	Urban and Environmental Policy Institute (UEPI), Occidental College		12/14/2018	A
36	B-O-2-Enviro CA	Emily Fieberling	Environment California (Enviro CA)		12/14/2018	A
37	B-O-2-Santa Cruz METRO	Michael Pimentel	Santa Cruz Metropolitan Transit District (Santa Cruz METRO)		12/14/2018	C-1, C-4
						E-1, E-4, E-6
						G-7
38	B-O-2-LAMTA	Wendy Mitchell	L.A. County Metropolitan Transit Authority (LAMTA)		12/14/2018	A
39	B-O-2-CALSTART	Ryan Schuchard	CALSTART		12/14/2018	E-5, E-6
40	B-O-2-JMA	Abhilasha Bhola	Jobs to Move America (JMA)		12/14/2018	D-1
41	B-O-2-Greenlots	Tom Ashley	Greenlots		12/14/2018	C-5
						E-6
						G-2-1

* The docket number is assigned based on the date received.

Table V. 3: Written comments given at the December 14, 2018, Board Hearing

Docket Number*	Reference Code	Submitted by	Affiliation	Duplicated Identical Letters	Date Received	Section #
1	B-W-2 -BYD	Alejandra Duran	BYD		12/17/2018	E-5, E-6
2	B-W-2 -Frontier Group***	Emma Shumway	Frontier Group		12/17/2018	NC**
3	B-W-2 -LA METRO	Jesus Montes	LA METRO		12/17/2018	A
4	B-W-2 -MTC	Kenneth Folan	Metropolitan Transportation Commission		12/17/2018	E-5, E-6
						H-6

* The docket number is assigned based on the date received.

** This commenter letter is not considered as a comment.

*** This is a report, not a comment letter.

A. COMMENTS IN SUPPORT

Comment:

The following entities are fully committed to support the objectives and goals of forthcoming Innovative Clean Transit Regulation to achieve air quality and climate mitigation target. Adoption of the ICT Regulation as a key component of California's policy portfolio of solutions enabling a transition to zero emission vehicles. In addition to the public health and global warming benefits, zero-emission buses can also help boost transit ridership, as they provide a better experience by operating more quietly, smoothly, and cleanly than conventional-fueled buses. Increasing transit ridership is critical to cities and counties implementing sustainable community development strategies. (15-1-1, 15-1-LADOT, 15-1-Motiv, 15-1-American Lung Association, 15-1-Earthjustice-1, 15-1-BYD, 15-1-Earthjustice-2,⁹¹, 15-1-CHBC, 15-1-Earthjustice-3, 15-1 UCS-2, UCS-3, B-O-2-AVTA, B-O-2-SCE, B-O-2-LADOT, B-O-2-Sierra Club-1, B-O-2-Proterra, B-O-2-Brightline Defense, B-O-2-SFMTA, B-O-2-Ballard, B-O-2-SMUD, B-O-2-BYD, B-O-2-IBEW 569, B-O-2-Enviro CA, B-O-2-Jacobson, B-O-2-Earthjustice, B-O-2-UCS, B-O-2-Cal ETC, B-O-2-American Lung Association, B-O-2-LMCC, B-O-2-Lion Electric, B-O-2-CCAEJ-1, B-O-2-CCAEJ-2, B-O-2-UEPI, B-O-2-Enviro CA, B-O-2-LAMTA, and B-W-2-LA METRO)

Agency Response:

The ICT regulation will generate environmental benefits related to greenhouse gas (GHG), criteria pollutants, and toxic air contaminants reductions by broadly implementing zero-emission technologies as a necessary component to effectively address these multiple and complicated air quality and climate protection issues. CARB understand that transit agencies will continue to play important roles in helping California meet air quality standards and GHG emissions reduction goals by deploying the cleanest technologies.

B. BENCHMARK AND REGULATORY ASSESSMENT

This section addresses comments related to benchmark and regulatory assessment. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

⁹¹ The comment letter, 15-Earthjustice-2, has a total of 305 pages. The page numbers in this footnote refer to the page numbers in this comment letter. 15-Earthjustice-2 contains two support letters (on p. 2 and p. 164) and personal comments. For the first support letter on p. 2, 236 personal comments in support of the Innovative Clean Transit Regulation are provided on pp. 3-98 of the letter. The names who signed the support letter on p. 2 are listed on pp. 99-163. For the second support letter on p. 164, 161 personal comments in support of the ICT regulations are provided on pp. 165-250. The names who signed the support letter on p. 164 are listed on pp. 251-305.

B-1 Benchmarks Using Data Points In Staff Analysis

Multiple Comments:

The following two commenters share the same view on benchmarking and regulatory assessment.

Benchmarking and Regulatory Assessment: In our September 24 letter, and in public testimony before the Board on September 28, the Association made the following recommendations related to “Benchmarking and Regulatory Assessment:

1. Move the existing language on the “Performance Review of Zero-Emission Bus Technologies” scheduled to occur “at least one year prior to the initiation of any purchase requirements” from the ISOR (pp. I-13 to I-14) to the proposed regulation. The relevant language reads:

The performance review would identify the status of ZEB technology and would help the State design policies to further advance zero-emission technologies, and inform funding strategies related to zero-emission vehicles and infrastructure. The review would occur at least one year prior to the initiation of any purchase requirements. This review would look at bus categories, such as cutaway buses and standard buses individually, to ensure categorical needs and characteristics are considered. Staff envisions the performance review will comprise the following components:

- Costs. Costs include infrastructure and vehicle capital, operating and maintenance costs. Infrastructure capital costs include charging/refueling equipment, installation, and utility upgrade costs.
- Battery performance. Batteries used in the ZEBs will degrade over time. The assessment will help identify how battery degradation may affect daily operating range as vehicles age, and whether transit buses would require mid-life battery replacement. The assessment can help to estimate the remaining battery capacity after the end of their useful life in buses.
- Operating range. The maximum operating range of a vehicle after it is fully charged or refueled. Range assessment will take into consideration various factors, such as energy storage capacity, battery degradation, HVAC, passenger loading, and grades. Understanding real world operating range is essential for a transit agency to plan for its routes and schedule using ZEB technologies.
- Performance and reliability. Different from small pilot or demonstration projects, a successful system-wide transition to the ZEB technologies must demonstrate the reliability and viability of the technologies. Measurements could include bus availability, road call frequency, and other performance metrics, such as fuel

efficiency and factors affecting fuel efficiency, refueling or charging time and frequency, and parts availability.

2. Add language to the proposed regulation that establishes benchmarks for ZEB cost and performance and funding availability – these should be sourced from the inputs and assumptions used by ARB staff in the Original SRIA, Draft Environmental Analysis and Cost Update.
3. Add language to the proposed regulation that requires the Board to temporarily halt the initiation of an upcoming year's purchase requirement, if real-world ZEB cost and performance and funding availability are misaligned with the benchmarks established in the proposed regulation. **(15-1-CTA-1, 15-1-CTA-2)**

Comment:

Electric drivetrain technology is commercially proven and tested, making regulatory benchmarking unnecessary to the success of this rule: U.S. transit agencies have logged millions of miles of revenue service with hundreds of zero-emission buses, and these fleets are growing in number every month. Zero-emission buses outperform combustion buses across every major performance category including efficiency, acceleration, and gradeability. Furthermore, zero-emission buses have demonstrated that they can meet unique service needs in diverse settings from Juneau, Alaska to Tallahassee, Florida.

CalZEV is concerned that a one-size-fits-all benchmarking system would redirect staff resources thereby increasing project timelines and hampering commercial progress, which would ultimately hinder California's ability to scale zero-emission fleets. This is an unnecessary distraction since the technology has been commercially proven, making many of the cost and performance trade-offs based upon specific manufacturer approaches rather than technical limitations. Transit agencies already evaluate such differences regularly when making procurements, and having CARB play a greater role in that process would shift staff resources that would be better used in planning to meet route- and location-specific needs. **(15-1-CalZEV)**

Comment:

The first one and perhaps most important is that the imposition of the zero-emission bus (ZEB) purchase requirement is still not tied to benchmarks for ZEB cost and performance, infrastructure buildout costs, and funding availability. There are significant risks in assuming, that data gathered from limited, short-term ZEB deployments will accurately reflect the realities of ZEB deployments at-scale. County Connection strongly believes that, despite the claims of some interest groups, ZEB cost and performance, infrastructure buildout, and the cost of electricity as fuel, are still issues. We remain concerned that without

benchmarks being placed in the updated regulation, future CARB boards and or staff (current board members and staff notwithstanding) will not feel beholden to the current language that is in the current CARB staff report.

As I wrote in my letter to you on this subject dated September 24, 2018, County Connection strongly believes you should be guided by this question posed by the California Transit Association (CTA) months ago: "What will happen to transit service, if the assertions made by ARB staff and interest groups are wrong, and the cost and difficulty of the transition to fully electrified bus fleets more closely align with the warnings of California's public transit agencies?" To help ensure that this question is addressed in manner that minimizes the risk to transit service and the transit using public, County Connection reiterates that performance and cost benchmarking is placed within the regulation itself. Below I re-submit a short paragraph originally draft by CTA on this that was a part of my letter of September 24, 2018.

Benchmarking and Regulatory Assessment

This provision would require the California Air Resources Board to conduct a regulatory assessment - before a ZEB purchase requirement goes into effect - that evaluates real-world ZEB cost and performance with benchmarks for ZEB cost and performance established at the time of rule adoption. This regulatory assessment should allow the Board to issue an across-the-board suspension of the ZEB purchase requirement, much like the original Transit Fleet Rule did, if real-world ZEB cost and performance is not yet at parity with the cost and performance of conventionally-fueled transit buses. This provision would have no impact on the ZEB purchase requirement, if benchmarks for ZEB cost and performance are being met, as anticipated by ARB staff and interest groups. **(15-1-County Connection)**

Comment:

To further enhance the partnership with transit operators, a periodic review of zero emission bus (ZEB) technology advancements should be included in the final ICT Rule. An independent technology review can be scheduled at three-year intervals to establish benchmarks that would allow Original Equipment Manufacturers (OEMs) and energy providers time to realize and deliver advancements promised during the ICT ruling process. The review will consider advancements in ZEB range, scalability of fueling/charging facility technology, and reduction in cost of ZEBs, infrastructure, hydrogen fuel and electricity rates. If advancements with ZEB technology have not materialized during the review year, implementation of the ICT Rule can be delayed until the OEM's and energy providers achieve the benchmark targets. **(15-1-AC Transit)**

Comment:

While progress has been made, OCTA continues to have concerns about the proposal's lack of clear benchmarks in the regulation to ensure that the technology and costs match the regulation's assumptions, and the absence of a viable funding source that would help agencies meet the purchase requirement. (15-1-OCTA)

Agency Response:

The ICT regulation addresses cost and performance issues through case-by-case exemptions. CTA's benchmark-based approach would utilize the variables assessed in the ISOR and SRIA and does not include metrics like bus performance, gradeability, and bus type availability. Such a benchmark-based alternative, as compared to a case-by-case exemption evaluation, may not solve the issue for transit agencies truly in need. It could exempt transit agencies that need no exemption and therefore does not have nearly the same level of certainty as the ICT regulation to reduce air quality and GHG emissions. Transit fleets are diverse and their circumstances vary; these circumstances are better considered individually, while maintaining environmentally protective regulations to the extent appropriate across the State. A benchmark may be more likely to result in the suspension of the ZEB purchase requirement and the associated air quality benefits from all transit agencies when that benchmark measure is only a challenge for a few transit fleets. Exemptions lend themselves to application based on the circumstances of a transit agency in purchasing new buses and flexibly tailored to yield the results needed.

A benchmark provision is not as effective, less burdensome to affected private persons, or more cost-effective to affected private persons and equally effective, than the adopted regulations due to these reasons:

1. The ICT regulation contains exemptions that can provide maximum safeguards to transit agencies to help address potential unintentional individual consequences and ensure transit service are not adversely affected during implementation of the rule;
2. In addition, the benchmark approach does not maintain the benefits of the rule while allowing relief for particular challenges encountered by individual transit agencies. The ICT regulation allows transit agencies to utilize exemption options to address particular issues such as a delay in infrastructure, range, gradeability, gross vehicle weight rating (GVWR), and financial hardship. The ICT regulation protects an individual fleet's operation integrity and better protects environmental benefits without giving a blanket deferral when a specific issue does not apply to all agencies;
3. The comprehensive review committed to in Resolution 18-60 will provide the information requested by the comments without the negative aspects of a regulatory provision that would suspend the benefits of the regulation. The review will, at a minimum, address these issues: (1) costs, California incentive funding

programs, performance, reliability of zero-emission buses; (2) associated infrastructure to operate and maintain zero-emission buses; (3) the extent of the creation of jobs and training programs for employment in manufacturing, maintaining, and operating zero-emission bus technologies; (4) the deployment status of zero-emission buses and related technologies; and (5) the availability and barriers to deployment of zero-emission buses of different types.

This review should help the State improve policies to advance heavy-duty zero-emission technologies, and inform funding strategies related to zero-emission vehicles, buses, and infrastructure, while ensuring transit service or fares are not adversely impacted by the transition.

4. CARB will report to the Board annually on the implementation status of the Innovative Clean Transit regulation. This report will address development and deployment of zero-emission bus technologies, status of California incentive funding program, CARB's collaboration with transit agencies, manufacturers, infrastructure providers, and other state agencies to promote zero-emission bus technologies, and any potential changes to the regulatory requirements that may be warranted.
5. The ICT regulation, as approved, also better ensures the ZEB deployment meets the project objectives identified in the Environmental Analysis⁹² including reducing criteria pollutant emissions and GHGs to the maximum extent possible to meet federal and State standards; incentivizing and spurring ZEV technology to help meet the statewide SIP strategies and protecting and preserving the public health via reducing harmful air pollution. This is because a benchmarking alternative could inappropriately and inflexibly delay environmentally protective regulations.

For all the reasons discussed above, the ICT regulation does not contain the benchmark provision.

B-2 Other Benchmark Related Comments

Comment:

Given this planned transition, we support policies must take into account various real-world constraints, including the state of ZEB technology, the cost and difficulty of infrastructure buildout, as well as funding availability. The Proposed Amendments under consideration in this 15-day comment period, while a step in the direction of a workable regulation, unfortunately, fall short of the transit

⁹² California Air Resources Board (2018). Final Environmental Analysis for the Proposed Innovative Clean Transit Regulation, December 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/ictfinallea.pdf?_ga=2.169212134.693820738.1550089616-373350717.1537814934.

industry's recommendations for accounting for these constraints. **(15-1-Samtrans)**

Agency Response:

The commenters suggested using “real-world” ZEB data points as benchmarks for performance and withholding implementation of regulatory requirements when such benchmarks are not met. This approach would be less effective at carrying out the purposes of the regulation because the comprehensive program review and annual updates will provide “real-world” information for CARB to consider program adjustments, without suspending the requirements and foregoing the emission benefits.

The comprehensive review committed to in Resolution 18-60 will, at a minimum, address these issues: costs, California incentive funding programs, performance, reliability of zero-emission buses, associated infrastructure to operate and maintain zero-emission buses, creation of jobs and training programs for employment in manufacturing, maintaining, and operating zero-emission bus technologies, the deployment status of zero-emission buses and related technologies, and the availability and barriers to deployment of zero-emission buses of different types. This review should help the State improve policies to advance heavy-duty zero-emission technologies, and inform funding strategies related to zero-emission vehicles, buses, and infrastructure, while ensuring transit service or fares are not adversely impacted by the transition.

CARB will report annually to the Board on ICT regulation implementation. This report will address development and deployment of zero-emission bus technologies, the status of incentive funding programs, CARB's collaboration with transit agencies, manufacturers, infrastructure providers, and other state agencies to promote zero-emission bus technologies, and any potential changes to the regulatory requirements that may be warranted.

The ICT regulation also contains exemptions to ensure transit service is not adversely affected.

B-3 Comprehensive Review

Comment:

AC Transit also appreciates including a performance review one year before the start of the purchase requirements, and we urge the Board to continue to periodically conduct performance reviews of zero-emission bus technology, the status and the advancements of the technology. **(B-O-2-AC Transit)**

Comment:

I'm very happy that the resolution calls for a review by this Board of the technology. It's vitally important that we not jeopardize transit service to our

community as an unintended consequence of this regulation. And I know most of my colleagues are planning to implement this technology, but no one has yet figured out how to charge a fleet of 800 buses in an urban environment operating scenario. **(B-O-2-SDMTS)**

Comment:

One thing I'd mention on the new information that we received this morning is that operators usually start planning for their purchase two years in advance, so I would encourage your staff to start the review as soon as you can, so that that can inform that process. The sooner you get started with the review I think the better. **(B-O-2-MTC)**

Comment:

We're happy to see the resolution have the annual number -- the annual review, as well as the performance review. One thing I will note is that the annual to the Board requirements do not discuss cost. And we can't wait four, five, six years to talk about that. So love to see some of those cost numbers brought back to the Board every year. **(B-O-2-Trillium)**

Agency Response:

CARB recognizes the significant concerns about the cost and performance of ZEBs, the uncertainty surrounding funding availability, and the challenges of infrastructure buildout.

Therefore, the ICT regulation has built in the following safeguards to ensure service is not adversely affected:

1. Includes the following flexibilities to allow transit fleets to implement zero emission technologies in a way that is consistent with their operation, provides opportunities for transit fleets to utilize incentives, and encourages innovative mobility options:
 - a. Joint Zero-Emission Option
 - b. Zero-Emission Mobility
 - c. Bonus Credits to recognize early adopters
2. The ICT regulation contains exemptions for transit agencies to help address potential unintentional individual consequences and ensure transit service is not adversely affected.

In addition, Resolution 18-60 requires CARB staff to:

1. Provide an annual update to the Board on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted
2. Conduct a comprehensive review of program readiness, considering issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to the initiation of any purchase requirement. This is

intended to provide the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts on transit service.

C. TECHNOLOGY

This section addresses comments related to technology. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

C-1 Technology Readiness

Comment:

And what we see, as we develop these transition plans, there's a significant issue related to financing -- the ability to finance these new technologies, and also there's the challenge of ensuring that the technology will actually be able to provide the kind of service that these agencies presently provide. **(B-O-2-CTE)**

Comment:

They're professional staff -- many of the professional staff at some of those agencies still share concerns with us about implementation. These challenges include, but are not limited to, the availability of funding to purchase ZEBs and install related infrastructure, the high cost of electricity as a fuel, the scalability of charging infrastructure, and the cost and performances of zero-emission bus technology relative to conventional fuels that we use today. **(B-O-2-CTA, B-O-2-Santa Cruz METRO)**

Agency Response:

The ICT Staff Report acknowledges some operational and performance challenges have been encountered during the early years of ZEB deployment. This is expected with new technology. Therefore, the ICT regulation includes exemptions addressing a wide range of uncertainties and provides flexibility to allow transit fleets to implement zero-emission technologies so it is consistent with their operation, provides opportunities for transit fleets to utilize incentives, encourages innovative mobility options, and provides relief where demonstrated to be necessary. But the regulation provides time for the technology to improve. ZEB purchases are not required until 2023 which provides ample time for transit fleets to learn from experiences with early ZEBs and provides sufficient time for manufacturers to ramp up production to meet increasing demand. The approved regulation no longer sets a limit on when a bus must be delivered; therefore, longer times for bus delivery are expected to avoid non-compliance.

Resolution 18-60 further expresses the Board's intent to support the flexibility in the ICT regulation to avoid adverse impacts on transit service. As specified in Resolution 18-60, CARB will update the Board annually on ZEB status and conduct a comprehensive review at least one year before the first purchase requirement starts. The comprehensive review of program readiness will consider issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to initiating any purchase requirement. This provides the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts on transit service.

The ICT regulation includes exemptions addressing a wide range of uncertainties and provides flexibility to allow transit fleets to implement zero-emission technologies so it is consistent with their operation, provides opportunities for transit fleets to utilize incentives, and encourages innovative mobility options.

The regulation provides various flexibilities for transit agencies to meet their ZEB compliance obligations and has built in many safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. The Executive Officer will grant an exemption upon request, if the specified criteria are met. For example, a transit agency may receive an exemption from purchase of ZEBs under these circumstances:

1. Setback of construction schedule of needed ZEB infrastructure (section 2023.4(c)(1);
2. Available ZEBs cannot meet transit agency's daily mileage needs (section 2023.4(c)(2);
3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency's daily needs (section 2023.4(c)(3);
4. A required ZEB type that has passed Altoona testing and has met all safety requirements is unavailable for purchase (section 2023.4(c)(4);
5. A transit agency's governing body declares a fiscal emergency (section 2023.4(c)(5);
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5).

Resolution 18-60 further expresses CARB's intent to support the flexibility in the ICT regulation to not cause adverse impacts on transit service. As specified in Resolution 18-60, CARB will hear an update annually on ZEB status and conduct a comprehensive review at least one year before the first purchase requirement starts. The comprehensive review of program readiness will consider issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure. The annual

update to the Board on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted will consider whether to develop proposed amendments to the requirements to ensure there are no adverse impacts on transit service.

C-2 Fuel Cell Electric Buses

Comment:

But I wanted to urge to -- urge you to consider both of the options, as was mentioned earlier by Mr. Levin from CTE to consider both battery and fuel cell options equally. Especially, we're looking at a longer timeline. We're not looking at the coming two years, but we're looking at 2030. (**B-O-2-CaFCP**)

Agency Response:

CARB supports the development and commercialization of FCEBs. Both fuel cell electric bus (FCEB) and battery electric bus (BEB) are considered as ZEBs and they can be used to meet ZEB purchase requirement under the ICT regulation. Therefore, CARB included a bonus credit option for early deployments of FCEBs and BEBs to reward pioneers and as a recognition of their contribution to supporting zero-emission. Bonus credits serve to recognize and incentivize early adoption of ZEBs and facilitate funding availability and facilitate funding availability. The ICT regulation allocated higher bonus credits to early adopters of FCEB because these buses are more expensive and require more complex infrastructure. Additional credits are allocated to early deployment of FCEBs in recognition of their higher costs, to ensure early adopters of FCEB are able to remain eligible for incentives in the future.

C-3 Range

Comment:

Therefore, buses purchased must have a range of at least 300 miles end of life (inclusive of battery degradation). The current zero emissions Buses (ZEBs) available on the market today fall significantly short of this reasonable operating range. (**15-1-Santa Cruz METRO**)

Agency Response:

CARB understands that not all zero-emission buses can meet all fleets' daily range requirements. Therefore, the ICT regulation includes exemptions in the event zero-emission buses are not available to meet the range and other needs of transit agencies to ensure service is not reduced as a result of the ICT regulation. In addition, depot charging battery-electric buses are not the only available technology suitable to

meet fleets' daily operating ranges. Fuel cell electric buses may be integrated into transit fleets because they can provide similar daily mileage ranges and refueling time as diesel or CNG buses.

C-4 Flexibility and Scalability

Comment:

They're professional staff -- many of the professional staff at some of those agencies still share concerns with us about implementation. These challenges include, but are not limited to, the availability of funding to purchase ZEBs and install related infrastructure, the high cost of electricity as a fuel, the scalability of charging infrastructure, and the cost and performances of zero-emission bus technology relative to conventional fuels that we use today. **(B-O-2-CTA, B-O-2-Santa Cruz METRO)**

Agency Response:

CARB recognizes the challenges transit agencies are facing to transition to ZEB fleets. The ICT regulation provides flexibility to transit agencies by requiring purchases consistent with ordinary cycles, and phased requirements. The ICT regulation also provided exemptions to ensure transit service is not adversely affected. Relevant here, an exemption is provided if a ZEB in a given weight class would have a gross vehicle weight rating (GVWR) that exceeds any federal, state, or local law, regulation, or ordinance if operated as required by the transit agency.

CARB continues to share the latest technology information with the transit community. For example, CARB, the Antelope Valley Transit Authority (AVTA), and the California Transit Association (CTA) jointly held a Zero-Emission Bus Technology Showcase and Symposium on February 6-7, 2019, to provide information on the State's current and future support for zero-emission transit buses, updated technical information on zero-emission technologies, associated infrastructure and scale up options, operating costs and fuels, deployment planning, and funding sources. Presentations and recordings of this event are available at <https://arb.ca.gov/msprog/ict/meeting.htm>.

In addition, CARB is committed to:

1. Provide an annual update on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted;
2. Conduct a comprehensive review of program readiness, considering issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to the initiation of any purchase requirement. This is intended to provide the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts on transit service.

C-5 Infrastructure

Comment:

We also want to encourage sort of a continued eye on the state of the infrastructure to support these buses, both encouraging potentially further investments by the utilities, as well as considering important steps such as managed charging to ensure that costs of energy are as low as possible. (**B-O-2-Greenlots**)

Agency Response:

CARB agrees infrastructure integration for ZEBs is complex and must be closely monitored. As mentioned in the ICT ISOR on page I-9, considering the complexities of charging and fueling infrastructure for BEBs and FCEBs is important to address this complexity. The comprehensive review on program readiness will examine issues such as costs, performance, and reliability of ZEBs and corresponding infrastructure, at least one year prior to the initiation of any purchase requirement. This is intended to provide the Board with information to determine whether any additional actions are necessary to ensure that the regulation will not result in adverse impacts on transit service. The annual update to the Board will similarly assess the status of ZEB technologies for consideration of any potential changes to the regulatory requirements that may be warranted.

C-6 Backstop Technology

Comment:

But we also hope that you will direct staff to backstop this rule with the cleanest available technologies near-zero buses at 0.02 grams NOx, if zero emission bus technology falls short. (**B-O-2-Clean Energy**)

Agency Response:

As described in section 2023.1(a)(1), the purchase requirement of ZEBs is phased in to smooth out the early transitional phase to zero-emission technologies for transit agencies. To achieve the emission reduction goals in the early stages of this transition, the ICT regulation requires best available low-NOx engines on new conventional internal combustion engine bus purchases that are planned to be dispatched from a facility outside of NOx-exempt areas to provide ozone and oxides of nitrogen reductions where needed most when conventional bus purchases are made. A backstop in the ICT regulation is not needed as suggested by the commenter because CARB Board action on a lower NOx standard for on-road heavy-duty engines is expected in 2020. The effort will maximize NOx reductions and could apply to the 2024 engine year for all heavy-duty combustion engines.

D. WORKFORCE TRAINING

This section addresses workforce training related comments. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

D-1 Job Creation in Disadvantaged Communities

Comment:

On behalf of the organizations listed below, we urge the California Air Resources Board ("CARB") to highlight the value of high quality job creation associated with the Innovative Clean Transit Rule ("ICT").

CARB can and should encourage transit agencies to use policy tools that have a proven track record of delivering on high quality job creation, access to these jobs for disadvantaged communities and apprenticeship and pre apprenticeship programs. We recommend that CARB encourage transit agencies to use workforce policies, such as the US Employment Plan, as part of California's transition to zero emission buses through CARB's Statement of Reasons. We propose sample language in the statement of reason as seen in the attached document.

However, we believe that the Initial Statement of Reasons does not recognize the link between intentional workforce policies and the job quality / job access outcomes identified in the BYD example. We are concerned that without intentional policies, the co-benefits of "high quality job opportunities" and "employment in disadvantaged communities" described by the Statement of Reason are less likely to materialize. **(15-1-BlueGreen Alliance)**

Comment:

CARB should recommend transit agencies (and CARB itself) link incentives to those projects that demonstrate "economic benefits for low income residents" and by connecting these residents to good quality clean transportation jobs and the associated training and workforce development opportunities. **(15-1-BlueGreen Alliance)**

Comment:

We know that you do understand this, and we look forward to making sure that you take the next steps to make sure that those jobs are actually delivered to the disadvantaged communities that we're talking about today, and to make sure that

those are, indeed, high-quality jobs with sustainable high pay, training, fair labor practices, and retention. **(B-O-2-BlueGreen Alliance)**

Comment:

We encourage ARB to also adopt proactive jobs policies, such as the U.S. Employment Plan that incentivize manufacturers to provide good jobs to disadvantaged communities. **(B-O-2-JMA)**

Agency Response:

As discussed on page V-4 of the ISOR, deployment of the ZEBs under the ICT regulation is expected to generate high-quality employment opportunities to California in manufacturing and maintenance positions. As discussed on page VII-3, the ICT regulation is expected to introduce these employment opportunities to disadvantaged communities. In California there are eight ZEB manufacturers that provide high quality jobs. BYD has signed a community benefits agreement (CBA) with Jobs to Move America (JMA), which will support the creation of a robust U.S. jobs program, with a goal of recruiting and hiring 40 percent of its workers from populations facing significant barriers to employments including veterans, women, and historically disadvantaged minority groups.

CARB will conduct a comprehensive review on program readiness at least one year prior to any purchase requirement. One of the major criteria to be examined is deep investments in pre-apprenticeship and the workforce training programs. CARB could consider this information in deciding whether to propose amendments to the requirements.

E. ECONOMIC IMPACT ASSESSMENT

This section addresses comments related to economic impact assessment. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

E-1 Total Cost of Ownership

Comment:

MST remains concerned with the specifics of what is now in print as well as the impact the associated price tag will have on local agencies like MST. You should be aware that according to ARB staff's own estimates, which include some significant assumptions we would strongly dispute, the regulation will cost transit agencies \$1.1 billion between 2020 and 2040. If you remove the Low Carbon Fuel Standards (LCFS) funding, which does not even have statutory

authorization through 2040, that price tag climbs to \$2.1 billion over the same time frame. **(15-1-MST)**

Comment:

Allison does not believe that CARB has fully addressed the economic impacts of its proposed regulations and the “affordability” of ZEBs. This could, in turn, mean that projected benefits from the regulation will be less than contemplated. **(15-1-Allison)**

Comment:

They're professional staff -- many of the professional staff at some of those agencies still share concerns with us about implementation. These challenges include, but are not limited to, the availability of funding to purchase ZEBs and install related infrastructure, the high cost of electricity as a fuel, the scalability of charging infrastructure, and the cost and performances of zero-emission bus technology relative to conventional fuels that we use today. **(B-O-2-CTA. B-O-2-Santa Cruz METRO)**

Agency Response:

CARB recognizes the greater initial capital cost for zero emission buses (ZEBs) and associated infrastructure but also recognizes operational savings offset these costs over the life of a bus. The data and assumptions used in the staff analysis were developed in coordination with affected stakeholders and are detailed in the Standardized Regulatory Impact Assessment (SRIA) and ISOR.

The cost analysis provided in the SRIA and ISOR includes the “worst case scenario” for funding where it assumes grant funding is not available and all capital costs are paid up front. The ISOR also demonstrated that financing or battery leasing as viable options. These options can address higher upfront costs and spread them out over several years, and the annual installments would be paid for with operational savings. CARB used an example to illustrate the financing option in Attachment B of the Supplemental 15-Day Notices.⁹³ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and would not result in adverse changes in transit service or fares. Resolution 18-60 expresses CARB’s intent that the regulation will not adversely affect service.

⁹³ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

CARB's analysis considered the effects of the LCFS program, and arguably underestimated it. The SRIA applied a credit value of \$100 to illustrate how the credits could supplement the transition cost. Recently, the LCFS credit price was close to \$200,⁹⁴ which would reduce the regulation's costs further. The LCFS regulation will continue to set carbon reduction targets beyond 2030.⁹⁵

In addition, staff prepared "Attachment B: Supplemental To Economic Impacts Assessment" as part of the 15-day package released on November 9, 2018.⁹⁶ This analysis is an addendum to the Initial Statement of Reasons (ISOR) for the Proposed Innovative Clean Transit (ICT) Regulation that includes further analysis of costs and adds detailed financing examples that demonstrates the regulation is feasible and will not cause reductions in service nor adverse impacts on fares. The analysis shows that in the case that incentives are not available to reduce upfront costs, financing is a viable option for transit agencies for the incremental upfront cost of purchasing BEBs by distributing the incremental cost over several years. Compared with purchasing conventional buses, even without incentives, the impact of leasing BEBs on annual cash flow is not expected to be noticeable or cause adverse changes in transit service, fares, or ridership.

Further, the ICT regulation provides a phase-in schedule for technology to improve continuously and for transit agencies to learn from a small-scaled deployment. The ICT regulation also provides various safeguards in section 2023.4(c) to ensure transit service is not adversely affected. The Executive Officer will grant an exemption from the zero-emission bus purchase requirements upon request, if the specified criteria are met, under these circumstances:

1. Setback of construction schedule of needed ZEB infrastructure (section 2023.4(c)(1));
2. Available ZEBs cannot meet transit agency's daily mileage needs (section 2023.4(c)(2) ;
3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency's daily needs (section 2023.4(c)(3));
4. A required ZEB type that has passed Altoona testing and has met all safety requirements is unavailable for purchase (section 2023.4(c)(4));

⁹⁴ California Air Resources Board (CARB) (2019). Weekly LCFS Credit Transfer Activity Reports. Page last reviewed March 19, 2019. Available: <https://www.arb.ca.gov/fuels/lcfs/credit/lrtweeklycreditreports.htm>

⁹⁵ See section 95484 of the Low Carbon Fuel Standard regulation at https://www.arb.ca.gov/regact/2018/lcfs18/frolcfs.pdf?_ga=2.147285424.664056872.1553549032-1959568993.1456785342. Both Tables 1 and 2 set carbon intensity targets for 2030 and subsequent years.

⁹⁶ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Attachment B: Supplemental to Economic Impact Assessment of the Initial Statement of Reasons for the Innovative Clean Transit Regulation (posted November 9, 2018), available at: <https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf>.

5. A transit agency's governing body declares a fiscal emergency (section 2023.4(c)(5));
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5)); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5)).

The safeguards ensure that no ZEB purchases are required unless available depot charging BEBs are available to meet range and operational needs with a single charge. The exemptions would apply even if other options like charging on route or fuel cell electric buses are available. These safeguards allow for exemptions from the ZEB purchase requirement if technology does not improve sufficiently to meet a transit agency's need and ensures that more buses are not needed to provide the same level of service. If exemptions are used the estimated capital costs would be lower than estimated by staff.

E-2 Cost Analysis

Comment:

Allison's September 24, 2018, comments took issue with the representation that the ZEB purchase requirements in the ICT Regulation would save money over time. Specifically, CARB projected \$1.5 billion in net cost savings from 2020 to 2050. Allison pointed out that CARB's regulatory analysis showed that the program would cost more than the benefits generated each year through 2038 and that sources of funding identified for the program appeared to be inadequate to address estimated costs of the mandate incurred as phased in through 2029 and perhaps later.

CARB has issued a supplement to its economic impacts assessment. This document indicates that "the annual costs of the regulation reflect higher initial costs for zero-emission buses and associated infrastructure without grant funding or finance." The supplemental analysis also notes that "[f]unding cannot be guaranteed to be available indefinitely. These are helpful clarifications to the original analysis.

In the supplemental analysis, however, CARB indicates that the financial needs of the program could be met through the financing of bus purchases to spread out costs, rather than through upfront purchase of vehicles. CARB uses an example where \$300,000 of a bus purchase price is financed over 14 years, rather than paid upfront in year one. This financing arrangement (at 3.5% interest) then leads to \$27,471 in annual payments, or \$384,594 over the full 14 year period. In other words, out-of-pocket capital costs are about 28% higher.

In its final analysis, CARB should not only consider the costs to transit agencies as offset by other state policies such as the LCFS – but the overall cost of the ZEB purchase mandate versus reliance on conventional buses and hybrid technologies to the state as a whole. Under such an analysis, the costs of financing the ZEB technology option (versus a “baseline option of conventional vehicles and hybrid vehicles) and the cost of state incentives in the form of the LCFS can be more directly be assessed. Such an analysis would better inform CARB’s overall assessment of the achievability of the ZEB purchase mandates and resulting benefits to the public that can be realistically expected. (15-1-Allison)

Agency Response:

The analysis in “Attachment B: Supplemental To Economic Impacts Assessment”⁹⁷ in the Initial Statement of Reasons provides additional analysis beyond that in the SRIA of expected program costs. It adds detailed financing examples showing the regulation is not expected to cause reductions in service or adverse impacts on fares. If incentives are not available to reduce upfront costs, financing is a viable option for transit agencies to pay the incremental costs of purchasing BEBs and distribute the incremental costs over several years. Although financing costs will increase the annual payment due to the interest payment, the impact of leasing BEBs on annual cash flow is not expected to be noticeable or cause adverse changes in transit service, fares, or ridership compared with purchasing conventional buses. The Supplemental analysis concluded that even considering financing costs, the total annual costs for battery electric buses were comparable to conventional buses, due to savings in maintenance and fuel and LCFS credits.

In the cost analysis in the SRIA and in the ISOR, CARB staff compared the costs to transit agencies under the ICT regulation scenario with the costs under the “current conditions.” Under the “current conditions,” transit agencies continue to purchase diesel, diesel hybrid, and CNG buses. The LCFS program was included in the cost analysis because transit agencies will receive LCFS credits in both scenarios if they use low-carbon fuels, including electricity and hydrogen, when they participate in the LCFS program. Today, renewable diesel and renewable natural gas are available to transit agencies, and the cost of these renewable fuels are essentially the same as conventional fuels due to the LCFS credits. The higher costs of producing these renewable fuels are offset by the value of credits from the federal Renewable Fuel Standard (RFS) program and LCFS program. Therefore, the LCFS revenue should not be excluded from the cost analysis.

E-3 Bus Price Trend

⁹⁷ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Attachment B: Supplemental to Economic Impact Assessment of the Initial Statement of Reasons for the Innovative Clean Transit Regulation (posted November 9, 2018), available at: <https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf>.

Comment:

I have to take exception with the statement in the staff presentation that this technology will produce substantial savings to transit industry. As someone who operates over 800 vehicles and his [sic] operated a number of fleets over my career, this will not produce substantial savings to us.

This has not gone down in price for me over the last five years. In fact, it continues to go up every time I change it out. **(B-O-2-SDMTS)**

Agency Response:

CARB's bus price projections are in Appendix F-2, Bus Price Projections, of the ISOR.⁹⁸ Appendix F-2 explained the methodology CARB staff used to project bus prices. In summary, to project bus prices in the near future, CARB staff assumed that conventional bus prices will continue to increase at similar rates as the historical data. The price projection for BEBs is similar to projections for CNG and diesel hybrid buses, except that additional reductions for bus batteries are taken into account. CARB estimates that battery costs for buses will decrease over time, from \$725/kWh in 2015 to an estimated \$405/kWh in 2020 and \$218/kWh in 2030 for batteries used in depot-charging buses. ISOR Appendix E: Battery Cost for Heavy-Duty Electric Vehicles provided a literature review on a number of studies regarding battery cost estimates, the data sources, and the factors contributing to battery cost and expected decreases over time.⁹⁹

After the battery cost has been accounted for, CARB agrees with the commenter that the bus price will go up, which may due to more advanced features or components added to the buses—which is independent of the propulsion technology.

However, CARB's analysis also showed that ZEBs are expected to cost less overall. The Supplemental analysis in attachment B to the ISOR¹⁰⁰ concluded that even considering financing costs, the total annual costs for battery electric buses were comparable to conventional buses, due to savings in maintenance and fuel and LCFS credits.

To evaluate whether there would be costs savings in the future, CARB will conduct a comprehensive review of ZEB costs and technologies at least one year prior to the

⁹⁸ ICT ISOR Appendix F.2 Bus Price Projections. California Air Resources Board (2018). Available https://www.arb.ca.gov/regact/2018/ict2018/appf-2.pdf?_ga=2.135558386.217144606.1555215395-2124256164.1542392963

⁹⁹ ICT ISOR Appendix E: Battery Cost for Heavy-Duty Electric Vehicles, pp. 5-15. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appe.pdf?_ga=2.8616373.1273971576.1555537400-1410185627.1555537400.

¹⁰⁰ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Attachment B: Supplemental to Economic Impact Assessment of the Initial Statement of Reasons for the Innovative Clean Transit Regulation (posted November 9, 2018), available at: <https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf>.

initiation of any purchase requirement. This will provide the Board with information to consider whether any additional actions are necessary to ensure that the ICT regulation will not result in adverse impacts on transit service.

E-4 Electricity and Hydrogen Cost

Comment:

I really worry about how much it's going to cost us in terms of our electricity rates, which seem to go up every year. (B-O-2-SDMTS)

Comment:

They're professional staff -- many of the professional staff at some of those agencies still share concerns with us about implementation. These challenges include, but are not limited to, the availability of funding to purchase ZEBs and install related infrastructure, the high cost of electricity as a fuel, the scalability of charging infrastructure, and the cost and performances of zero-emission bus technology relative to conventional fuels that we use today. (B-O-2-CTA, B-O-2-Santa Cruz METRO)

Agency Response:

As explained in Appendix D of the ISOR, fuel costs are determined by unit fuel price and total fuel consumption. Standard electricity rates vary by utility, schedule of demand, total customer demand, and season. Commercial customer electricity rates commonly have a demand charge on top of the electricity usage rate and both costs are included in the analysis. Hydrogen price is affected by various factors, including station throughput, production and delivery methods, energy sources, and production rates. Unlike crude oil, there is no international price standard for hydrogen. Hydrogen price is highly dependent on station throughput. The cost of electricity or hydrogen after accounting for the Low Carbon Fuel Standard (LCFS) credit value is significantly less than that for fuel for comparable combustion buses. A financial hardship exemption would be granted if the transit agency can demonstrate that it cannot offset the managed, net electricity cost for depot charging BEBs when compared to the fuel cost of the same type of conventional internal combustion engine buses.

E-5 Funding for Regulation Compliance

Comment:

CARB must change their interpretation of the availability of HVIP to transit agencies. Currently, CARB staff insist that HVIP will only be available to transit agencies that purchase ZEBs ahead of the Purchase. Schedule/mandate and HVIP is not to be utilized for regulatory compliance. Transit agencies are not --for profit" agencies and since CARB is implementing this Regulation, CARB must

become a partner by seeking to assist wherever possible in offsetting the \$300K higher cost of a ZEB versus a conventional CNG bus. METRO respectfully requests that CARB change their interpretation of the HVIP program to allow HVIP dollars to be available to any transit agency that purchases ZEBs and at any time. **(15-1-Santa Cruz METRO)**

Comment:

Add language to the proposed regulation that authorizes a transit agency that has submitted a ZEB rollout plan to ARB to access incentive funding, like HVIP, to pay for regulatory compliance.

In recognition that several of ARB's incentive funding programs have statutory prohibitions on paying for regulatory compliance, this authorization would apply only to incentive funding programs for which no such statutory prohibition applies. **(15-1-CTA-1)**

Comment:

Role of Incentives: In our September 24 letter, and in public testimony before the Board on September 28, the Association recommended that ARB fund the transition to ZEBs in a manner that does not force transit agencies to compromise transit service or the maintenance or expansion of their capital assets. This approach acknowledges that the vast majority of ZEBs purchased to-date – because they are more expensive than conventionally-fueled buses – were purchased with state and/or federal incentive funding, and could be accomplished by:

1. Adding language to the proposed regulation that authorizes a transit agency that has submitted a ZEB rollout plan to ARB to access incentive funding, like HVIP, to offset the incremental cost of ZEBs for the life of the regulation. **(15-1-CTA-2)**

Comment:

If the total cost of ownership matters are not addressed as the regulation begins, it will be important that funding continue to be eligible for the transit fleets in the regulation. **(B-O-2-CALSTART)**

Comment:

Importantly, the funding should be accessible to transit agencies for funding regulatory compliance. Although CARB policy has historically adhered to a "polluter pays" principle to put guardrails between funding programs and regulatory compliance, the ICT rule's narrow application to solely transit agencies calls for a more nuanced analysis. Previous regulations prevented access to

subsidies for compliance because doing so would require the use of public state funds to bring private fleets into compliance.

As the ICT rule only applies to public transit agencies, which rely solely on fares and funding from federal, state and local sources, the concern about public funds going to private fleets is not applicable in this case. Additionally, transit agencies provide an essential public service to the state's most disadvantaged communities, which argues strongly for the ability to continue to access state incentives to ensure that these services operate smoothly. A dedicated and reliable funding stream will ensure that funds meant to ensure service reliability and state of good repair and not diverted. For these reasons, BYD strongly urges the Board to allow transit agencies to continue to access vouchers even after the rule goes into effect. **(B-W-2-BYD)**

Comment:

The ICT rule will make a vast amount of state funding ineligible to be used for ZEBs. In particular, funds from the Hybrid Voucher Incentive Program (HVIP) and the Volkswagen Environmental Mitigation Trust – the two most suitable current funding sources for the incremental costs of ZEB procurements – are prohibited from being used to fund ZEBs procured to meet a regulation; only ZEBs purchased earlier or in greater numbers than required would be eligible. The need to expend limited local and federal funds to procure ZEBs, which are still substantially more costly than conventional buses, could diminish our ability to provide the transit service levels needed to meet other goals, including the GHG reduction goals of SB375.

CARB staff responses to funding and service level-themed comments on the regulation's Draft Environmental Analysis default to CARB's own analysis that the regulation will lead to future operating cost savings, and point to financing or the various exemptions an agency could claim to avoid reducing service in the face of significantly higher capital costs. However, the best course of action would be to ensure that funding from current and new sources is available to meet ZEB goals. **(B-W-2-MTC)**

Agency Response:

These comments suggest changes to funding programs and are not directed at the ICT regulation because this regulation does not govern funding requirements or policies, and those provisions were not proposed to be considered. The regulatory structure that enabled and encouraged transit agencies to procure zero-emission buses ahead of the regulatory purchase requirements would preserve that funding. For large transit agencies, the purchase requirement starts in 2023, so all transit agencies are eligible for funding prior to 2023. If transit agencies go above and beyond the regulatory requirements by making early ZEB purchases, the early purchase could also provide them additional access to funding in later years.

The ICT regulation also has built in many safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. The Executive Officer will grant an exemption upon request, if the specified criteria in section 2023.4(c) are met. For example, a transit agency may receive an exemption from the requirements to purchase ZEBs if a transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5)).

The cost analysis in the Standardized Regulatory Impact Assessment (SRIA)¹⁰¹ and the ISOR¹⁰² reflects the “worst case scenario” for funding by not presuming any is available. The funding uncertainty was analyzed in the ISOR referring to financing or battery leasing as viable options. These options can address higher upfront costs and spread them out over several years, and the annual installments would be paid for with operational savings. CARB used an example to illustrate the financing option in Attachment B of the Supplemental 15-Day Notices.¹⁰³ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and would not result in adverse changes in transit service or fares.

Funding is allocated by the Legislature through an annual budget appropriation process which might include a specific sub-allocation to the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP). The annual funding need for HVIP is determined based on historical demand. Consideration is also given to technology and market status, and other important factors as described in the Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from the Low Carbon Transportation Investments and the Air Quality Improvement Program (AQIP),¹⁰⁴ and recommendations are developed that help to shape the Funding Plan. The annual funding need for a particular vehicle type and technology is part of the Low Carbon Transportation Investments and Air Quality Improvement Program (Clean

¹⁰¹ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Standardized Regulatory Impact Assessment (SRIA), Table C12, Released April 19, 2018. Available at: http://www.dof.ca.gov/Forecasting/Economics/Major_Regulations/Major_Regulations_Table/documents/ICT_SRIA_ARB_4-23-18.pdf.

¹⁰² California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix K: Statewide Cost Analysis Spreadsheet. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appk-statewidecostanalysis.xlsx?_ga=2.93126173.1056658111.1554742789-1649277338.1553838884.

¹⁰³ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

¹⁰⁴ California Air Resources Board (CARB). Fiscal Year 2017-18 Funding Plan for Clean Transportation Incentives, Part II - Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and AQIP. Released on November 9, 2017. https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1718_funding_plan_final.pdf.

Transportation Incentives) Funding Plan evaluated and approved by the Board, and will be assessed based on technology and market status, and other important factors.¹⁰⁵

HVIP, however, is just one of the funding programs in CARB's portfolio of clean transportation incentives that can purchase transit vehicles.¹⁰⁶ Other potential funding programs include the Volkswagen Mitigation Trust¹⁰⁷ and the Carl Moyer Program.¹⁰⁸ The California Department of Transportation (Caltrans) offers operating and capital assistance for transit agencies through its Low Carbon Transit Operations Program (LCTOP)¹⁰⁹, and the California State Transportation Agency funds projects through its Transit and Intercity Rail Capital Program (TIRCP)¹¹⁰. Funding is also available from federal agencies, such as the U.S. Department of Energy¹¹¹ and the Federal Transit Administration.¹¹²

E-6 Funding Concern, On-going Funding Need and Availability of Funding

Comment:

The second outstanding concern relates to incentive funding. Since very little progress has been made on this concern in the proposed amendments, I restate what I said on this concern in my letter from September 24, 2018, below.

The staff report supporting the proposed regulation emphasizes the importance of incentive funding to minimizing adverse impacts to transit service (see Initial Statement of Reasons, pages ES-8, III-S;VIII-26). However, this proposed regulation is aimed at public transit operators who by definition are local or regional government services supported by California state tax payers. As such, most of them use federal transportation funds to purchase buses and paratransit vehicles. Thus, they are beholden to strict federal rule and regulations regarding how buses are procured and how long they must remain in service before they can be retired

¹⁰⁵ California Air Resources Board (CARB). Low Carbon Transportation Investments and AQIP Funding Plans <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>.

¹⁰⁶ California Air Resources Board (CARB). California HVIP. <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>.

¹⁰⁷ California Air Resources Board (CARB). Volkswagen Environmental Mitigation Trust for California <https://ww2.arb.ca.gov/our-work/programs/volkswagen-environmental-mitigation-trust-california>.

¹⁰⁸ California Air Resources Board (CARB). Carl Moyer Memorial Air Quality Attainment Standards Program <https://www.arb.ca.gov/msprog/moyer/moyer.htm>.

¹⁰⁹ California Department of Transportation. Low Carbon Transit Operations Program <http://www.dot.ca.gov/drm/splctop.html>.

¹¹⁰ California Department of Transportation. Transit and Intercity Rail Capital Program <http://www.dot.ca.gov/drm/sptircp.html>.

¹¹¹ U.S. Department of Energy, Energy Efficiency and Renewable Energy. <https://www.energy.gov/eere/office-energy-efficiency-renewable-energy>.

¹¹² U.S. Federal Transit Administration, Capital Investment Grants Program. <https://www.transit.dot.gov/CIG>.

The various individual transit operators are all on different bus replacement cycles based on when they receive the necessary federal funding to pay for replacement buses. Some of these federally defined bus replacement scheduled will not allow an operator(s) to purchase "early" in terms of meeting the proposed regulation when they are replacing existing non-zero emission buses. In those cases, present policies on the use of incentive funding won't allow those transit operators to use the incentive funds. Thus, some operators are going to be financially penalized for simply adhering to federal transit vehicle procurement rules.

Given the stated importance of this funding and our shared goal of protecting vital transit service, and at the same time move forward together towards full ZEB implementation within public transit by 2040, CARB should revise its current policy disallowing the use of incentive funding to meet regulatory compliance to explicitly allow transit agencies to use incentive funding whenever they _we prepared to purchase a ZEB - and any of the related charging infrastructure or related bus yard improvements - at least through 2029. **(15-1-County Connection)**

Comment:

We fully understand that ARB cannot make commitments for future funding because you do not the control the State's purse strings; the Legislature does. That said, our industry has long argued that accessing the incentive funding that ARB does have should be made much simpler and more useful to transit agencies.

Under the proposed regulation, transit agencies would only be able to access ARB's incentive funding – primarily Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project dollars – if they take early action to procure ZEBs before the purchase mandates kick in or if they procure more ZEBs than is required. Unfortunately, this will mean that transit agencies that cannot procure ZEBs early because their fleets have not reached their useful life when the purchase mandate goes into effect, or because their financial positions won't allow it, would be barred from accessing incentive funding for future ZEB procurements. **(15-1-MST)**

Comment:

We believe that transit agencies need more funding for planning to serve disadvantaged communities that disproportionately rely on public transportation. We recognize the need to provide agencies with reliable and adequate support, and we encourage CARB and the California Legislature to continue providing vital incentives, like HVIP, and state funding through the entire transition period to 100% zero-emission buses.

There have also been concerns about operating costs. However, two of the large investor-owned utilities in the state, Southern California Edison (SCE) and Pacific Gas and Electric Company (PG&E) have approved filings that will help support the ICT measure, and the third, San Diego Gas & Electric Company (SDG&E), is awaiting approval of its filing. Southern California Edison is implementing its recently-approved rates for commercial customers with electric vehicles. The new rates eliminate demand charges for the first five years, and instead recover electricity costs through a volumetric energy charge. PG&E also recently filed for a new rate that will reduce costs for commercial electric vehicle applications upon approval. SDG&E held a rates workshop in November to showcase both the SCE and PG&E rates and solicited comments for how to proceed on their own rate structure for commercial applications.

On behalf of the CalZEV coalition, we believe that new rate structures for electricity will make electricity competitive with fossil fuels.

In addition, software management of charging technology within and outside these rate filings will also be effective in cost minimization of electricity as a fuel. **(15-1-CalZEV)**

Comment:

And what we see, as we develop these transition plans, there's a significant issue related to financing -- the ability to finance these new technologies, and also there's the challenge of ensuring that the technology will actually be able to provide the kind of service that these agencies presently provide. **(B-O-2-CTE)**

Comment:

I did notice in the staff presentation that there were -- were comments related to the incentives available. Yes, that is true, but that is today, and we're looking at 12 years ahead and possibly beyond that. That may not be a good indicator. And the needs for heavy-duty infrastructure and buses may be larger than we anticipate at this point, because we're only looking at buses, and we can only wait and see what happens when the truck industry also gets motivated by this Board, and by this organization to move towards zero emission. **(B-O-2-CaFCP)**

Comment:

However, we believe that this partnership needs to include a funding commitment for infrastructure investments in fueling, charging, and maintenance facilities, and storage capacity. **(B-O-2-AC Transit)**

Comment:

They're professional staff -- many of the professional staff at some of those agencies still share concerns with us about implementation. These challenges include, but are not limited to, the availability of funding to purchase ZEBs and install related infrastructure, the high cost of electricity as a fuel, the scalability of charging infrastructure, and the cost and performances of zero-emission bus technology relative to conventional fuels that we use today. **(B-O-2-CTA, B-O-2-Santa Cruz METRO)**

Comment:

We also share concerns on the funding side. We're in the middle of a capital replacements for BART cars for CalTrain electrification, Muni light rail vehicles. So there's a lot on our plate down in the Bay Area. **(B-O-2-MTC)**

Comment:

We do though want to stress the importance of funding being dedicated to support this new rule, and the importance that that funding be administered in a way that is truly technology neutral. **(B-O-2-TTD)**

Comment:

And finally when it comes to funding, there -- fortunately, we've had ample incentive funding available in recent years. I think it's incumbent on all of us who are involved in the annual budget process to make sure that that continues. **(B-O-2-CCA)**

Comment:

I do just want to say that as the rule is implemented, we do need to make sure that we do give the resources to the transit agency they need to succeed. And just three points on that. We do wish to continue that there is sufficient incentive funding, as many others have pointed to, many of whom we will be working with in concert to help make happen. **(B-O-2-CALSTART)**

Comment:

We do want to ensure continued support from the Board and indeed the stakeholder community to ensure that there is adequate funding for transit districts to make these transitions. **(B-O-2-Greenlots)**

Comment:

Although financing options are available and provide some flexibility, support from the state remains critical to achieving the emission reduction goals that undergird the need for this rule. To ensure that the rule succeeds. BYD would

like to reiterate the need for CARB and other state agencies to identify dedicated and reliable funding streams to help offset the incremental cost between ZEBs and conventional buses, especially in the form of voucher programs such as HVIP. The strength of voucher programs is their convenience and agency staff should make it a priority to keep the redemption process as streamlined as possible. **(B-W-2-BYD)**

Comment:

Under the goals of SB375, MTC as the Metropolitan Planning Organization has a mandate to aggressively pursue projects and planning that advance efforts to reduce GHGs. Therefore, MTC strongly encourages the CARB Board and staff to follow the spirit of the recent joint California Transportation Commission (CTC)/CARB meeting and our prior letters to strategically partner with MPOs, RTPAs, and transit operators on the funding of transit electrification. **(B-W-2-MTC)**

Agency Response:

CARB recognizes the challenges transit agencies are facing to transition to ZEB fleets, and the commitments that transit agencies, local government agencies, and the State must make. The staff cost analysis did not include grants or funding, but recognizes that zero-emission vehicles are more expensive upfront but provide operational savings in lower fuel and maintenance costs. CARB understands there is no dedicated funding except for the credit value from the LCFS program. Even though ZEB technologies have advanced rapidly in recent years, continued improvements in ZEB costs and performance are still to facilitate the transition to full zero-emission technologies. Staff will provide the Board with a comprehensive review of costs and performance of ZEBs at least one year prior to the start of the purchase requirements. Per Resolution 18-60, CARB staff is also committed to provide an annual update to the Board on the status of ZEB technologies and any potential changes to the regulatory requirements that may be warranted.

The Legislature appropriates funding. To distribute appropriated funding each fiscal year, CARB staff submits a proposed Low Carbon Transportation Investments and Air Quality Improvement Program (Clean Transportation Incentives) Funding Plan to the Board for approval.¹¹³ The Funding Plan serves as the blueprint for expending the Clean Transportation Incentives funds appropriated to CARB in the State budget by the Legislature. The plan establishes CARB's priorities for the funding cycle, describes the projects CARB intends to fund, and sets funding targets for each project. The major funding source for ZEBs is the Hybrid and Zero-Emission Truck and Bus Voucher

¹¹³ California Air Resources Board (CARB). Low Carbon Transportation Investments and Air Quality Improvement Program (AQIP) Funding Plans website. Available at: <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program/low-1>. Accessed April 17, 2019.

Incentive Project and Low NOx Engine Incentives, which are the cornerstone of advanced technology heavy-duty incentives in the funding plan.

Both the annual update of the ICT program and the comprehensive review on program readiness will identify the status of ZEB technologies and will inform funding strategies related to zero-emission vehicles and infrastructure. The Board reviews and approves the funding plan based on the best information available.

The cost analysis in the Standardized Regulatory Impact Assessment¹¹⁴ and the ISOR¹¹⁵ reflects the “worst case scenario” for funding by not presuming any is available. The funding uncertainty was mentioned in the ISOR referring to financing or battery leasing as viable options. These options can address higher upfront costs and spread them out over several years, and the annual installments would be paid for with operational savings. CARB used an example to illustrate the financing option in Attachment B of the Supplemental 15-Day Notices.¹¹⁶ Compared with purchasing conventional buses, even without funding, the impact of leasing battery electric buses on annual cash flow is not expected to be noticeable, and would not result in adverse changes in transit service or fares. Resolution 18-60 expresses the Board’s intent that the regulation will not cause adverse impacts on transit service.

The ICT regulation also provides various flexibilities for transit agencies to meet their ZEB compliance obligations and has built in many safeguards in section 2023.4(c) to address potential unintended consequences to ensure transit service is not adversely affected at any transit agency. In section 2023.4(a), “It is the intent of this section to ensure transit service is not adversely affected.” With this intent and regulatory design, transit agencies may request an exemption from the zero-emission bus purchase requirements. The Executive Officer will grant an exemption upon request, if the specified criteria in section 2023.4(c) are met. For example, a transit agency may receive an exemption from the requirements to purchase ZEBs under these circumstances:

1. Setback of construction schedule of needed ZEB infrastructure (section 2023.4(c)(1));
2. Available ZEBs cannot meet transit agency’s daily mileage needs (section 2023.4(c)(2);

¹¹⁴ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Standardized Regulatory Impact Assessment (SRIA), Table C12, Released April 19, 2018. Available at: http://www.dof.ca.gov/Forecasting/Economics/Major_Regulations/Major_Regulations_Table/documents/ICT_SRIA_ARB_4-23-18.pdf.

¹¹⁵ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason, Appendix K: Statewide Cost Analysis Spreadsheet. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appk-statewidecostanalysis.xlsx?_ga=2.93126173.1056658111.1554742789-1649277338.1553838884.

¹¹⁶ California Air Resources Board (CARB) (2018). Proposed Innovative Clean Transit Regulation, Supplemental 15-Day Notices, Attachment B: Supplemental to Economic Impact Assessment. Posted November 9, 2018. Available: https://www.arb.ca.gov/regact/2018/ict2018/15dayattb.pdf?_ga=2.187437675.2133674279.1550084476-1852339309.1549338215.

3. Available ZEBs do not have adequate gradeability performance when compared to internal combustion engine buses to meet the transit agency's daily needs (section 2023.4(c)(3));
4. A required ZEB type that has passed Altoona testing and has met all safety requirements is unavailable for purchase (section 2023.4(c)(4));
5. A transit agency's governing body declares a fiscal emergency (section 2023.4(c)(5));
6. A transit agency can demonstrate that it cannot offset the incremental cost of purchasing available ZEBs with available funding or financing (section 2023.4(c)(5)); or
7. A transit agency cannot offset the managed, net electricity cost for depot charging battery electric buses (section 2023.4(c)(5)).

E-7 Funding for Infrastructure

Comment:

At September's Board meeting, Board members made numerous comments that the ICT Rule should reflect a partnership with transit operators and not a mandate. We appreciate this sentiment, and AC Transit is committed to working with CARB on transitioning to a zero emission fleet. However, this partnership needs to include a funding commitment for infrastructure investments in fueling/charging facilities, maintenance facilities, and storage capacity. **(15-1-AC Transit)**

Comment:

We also ask you to consider that if incentive funding isn't available to transit agencies when they need it, an agency might have no alternative but to keep an older, higher pollution/emissions vehicle in service because they lack the resources to move forward with a zero-emission bus purchase and its attendant electric charging or hydrogen storage/fueling infrastructure costs. In that regard, we feel that ARB must express its support for creating an infrastructure funding program. **(15-1-MST)**

Comment:

With regards to funding support on the infrastructure side of things, the challenge is that there are a lot of unknowns, the cost of infrastructure, especially for the fleets you're talking about is significant. And I urge ARB to consider dedicated funding for heavy-duty fueling infrastructure, both for hydrogen as well as for fast charging for buses, because there lots of unknowns at this point, because there are not really any large fleets in the state that operate like transit agencies do today. **(B-O-2-CaFCP)**

Agency Response:

As shown in the economic analyses of the regulation, CARB recognizes the incremental capital cost for purchasing ZEBs and associated infrastructure is greater than for conventional buses, but also recognizes there are operational savings over the life of a bus.

CARB recognizes the challenges the infrastructure may present. The regulation has an exemption to address infrastructure delays and another one to address situations where the cost of deploying ZEBs and associated infrastructure cannot be offset or cannot be financed by the transit agency. CARB also acknowledges that funding is an important tool to reduce or eliminate the upfront costs of ZEB and related infrastructure. The ICT regulation is structured to encourage transit agencies to voluntarily purchase ZEBs before the requirements begin and to take advantage of funding.

As CARB committed, it will conduct a comprehensive review at least one year prior to initiating any purchase requirement, on program readiness, and other factors such as costs, performance, reliability of ZEBs, and infrastructure. CARB would consider adjusting the requirements based on the outcome of this review.

The ISOR also discussed the incentive programs that are available to offset the incremental cost of zero-emission technologies.¹¹⁷ First among these was the HVIP. Transit agencies have been using HVIP for ZEB purchases. The amount of a voucher for a ZEB depends on the bus length, the zero emission technology, and the location of the vehicle deployed. Additional amounts could be available to assist with needed infrastructure including up to \$30,000 for chargers, and up to \$100,000 per bus for the purchase of five or more FCEBs. For FY 2017-2018, the budget allocated up to \$180 million for the HVIP program with minimum of \$35 million set aside to fund ZEBs exclusively. An additional \$125 million has been allocated to the HVIP program per SB 856 for FY 2018-2019. Since HVIP's inception in FY 2009-2010 through April 2018, the program has paid for 47 ZEBs from eight transit agencies. As of April 2018, there are additional requests for HVIP for 139 ZEBs from nine transit agencies.

The Moyer Program for incentive funding also covers infrastructure projects. Public transit buses are eligible to receive infrastructure funding up to 50 percent of a hydrogen station or a battery charging station if a station has no public access. There will be up to an additional 10 percent (total of 60 percent) for publicly accessible hydrogen and battery charging stations and up to an additional 15 percent (total of 65 percent) for projects with solar or wind power generation systems. Eligible costs include design and engineering fees, cost of equipment, and installation costs. Unlike vehicle projects, infrastructure projects do not have to meet a cost-effectiveness limit.

As stated in the ISOR, on May 31, 2018, the California Public Utility Commission (CPUC) unanimously approved transportation electrification projects proposed by three major Investor Owner Utilities (IOUs), with \$738 million including \$236 million from Pacific Gas and Electric and \$343 million from Southern California Edison on medium and heavy-duty infrastructure, required under Senate Bill 350, chapter 547, statutes of

¹¹⁷ See ISOR, p. III-8

2015.¹¹⁸ This approval would reduce the infrastructure costs to transit agencies in those utility service areas. In addition, on May 25, 2018, CARB approved allocations for Volkswagen Environmental Trust Funds that included up to \$65 million for zero-emission transit buses.

E-8 Funding for Fuel Cell Electric Buses

Comment:

There are challenges with the hydrogen fueling infrastructure. But the capability of hydrogen fueling to scale up to large fleet numbers is very significant. And we want to emphasize that it is so important for this Board and your staff to fund that additional cost associated with fuel cell technology, so that we will reach parity with these two technologies to ultimately achieve our objectives here. **(B-O-2-CTE)**

Agency Response:

CARB agrees that all zero-emission technologies are valuable means of reducing emissions and that incentive funding is important for the success of these regulations. CARB also recognizes the cost for a FCEB is higher than that of a BEB. For FY 2018-19, the HVIP voucher amount for a 40' FCEB is \$300,000, which is double the voucher amount for a 40' BEB.¹¹⁹ The voucher amount will be higher if a vehicle is operated in a disadvantaged community.

On October 25, 2018, the Board approved the FY2018-19 Funding Plan for Clean Transportation Incentives, which identified six key areas of interest that align with the proposed areas of focus over the next three years.¹²⁰ One of the key areas is for fuel cell electric transit bus pilot projects. CARB will continue to work with stakeholders to explore the potential projects, if funding is provided by the Legislature in the forthcoming fiscal years. CARB will also continue to evaluate the need to provide higher funding amounts for FCEBs when the funding priorities are reviewed. CARB's Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and Air Quality Improvement Program (AQIP)

¹¹⁸ *Application of San Diego Gas & Electric Company* (U 902E) for Approval of SB 350 Transportation Electrification Proposals (Cal.P.U.C. Decision 18-05-040 May 31, 2018) No. A 17-01-020 and Related Matters A 17-01-021, 17-01-022.

¹¹⁹ California HVIP (2018). FY18-19 Voucher Tables – October 2018. Available at: <https://www.californiahvip.org/wp-content/uploads/2018/11/HVIP-FY18-19-Funding-Tables-11-19-2018.pdf>.

¹²⁰ California Air Resources Board (CARB) (2018). Proposed Fiscal Year 2018-19 Funding Plan for Clean Transportation Incentives for Low Carbon Transportation Investments and the Air Quality Improvement Program. Released September 21, 2018. Available at: https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1819_funding_plan.pdf?_ga=2.189725227.1056658111.1554742789-1649277338.1553838884.

provides a detailed set of recommendations on the need for heavy-duty funding over the next three years.¹²¹

E-9 Cost Effectiveness

Comment:

As you -- as you would expect or could appreciate, the rule before you is troubling to us, just because we earnestly believe that near-zero buses powered by renewables is a cost effective and comparable solution that is available and ready today, but also because the substantial public investments that have been made to ready transit systems on renewable gas operations. **(B-O-2-Clean Energy)**

Agency Response:

The staff analysis of a low-NOx engine and renewable fuel strategy is included in the ISOR as an alternative. As a starting principle, the greenhouse gas reductions from renewable natural gas, even in transit buses, is not attributable to the ICT Regulation because those reductions were accounted for in the Low Carbon Fuel Standard and Renewable Fuel Standards regulations.¹²² The competitive costs of renewable natural gas are also due to these regulations. Renewable natural gas is commercially available at a price comparable to fossil natural gas in California due to the credits under these regulations.

The staff analysis showed this alternative results in an overall cost increase due to the incremental cost of low-NOx engines compared to the life-cycle operational savings from zero-emission buses. The costs and benefits of this alternative (Alternative 2) were evaluated in the Standardized Regulatory Impact Assessment and were shown in Appendix B of the ISOR. From 2020 through 2043, the low-NOx engine (Alternative 2) was estimated to cost \$241 million more relative to the “current conditions.”¹²³ In the updated analysis in Form 399,¹²⁴ between 2020 and 2050, transit agencies are

¹²¹ California Air Resources Board (CARB) (2017). Fiscal Year 2017-18 Funding Plan for Clean Transportation Incentives, Part II - Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and AQIP. Released November 9, 2017. https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1718_funding_plan_final.pdf.

¹²² California Air Resources Board (CARB) (2018). Public Hearing to Consider Proposed Amendments to the Low Carbon Fuel Standard Regulation and to the Regulation on Commercialization of Alternative Diesel Fuels. Staff Report: Initial Statement of Reasons. Date of Release: March 6, 2018. Available: <https://www.arb.ca.gov/regact/2018/lcfs18/isor.pdf>.

¹²³ California Air Resources Board (CARB) (2018). The Proposed Innovative Clean Transit Regulation, Staff Report: Initial Statement of Reason. Appendix B-1: Original SRIA Submitted to DOF. Posted August 7, 2018. Available at: https://www.arb.ca.gov/regact/2018/ict2018/appb-1.pdf?_ga=2.64420399.1056658111.1554742789-1649277338.1553838884.

¹²⁴ California Air Resources Board (CARB) (2019). Proposed Innovative Clean Transit Regulation, An Amendment to the Fleet Rule for Transit Agencies, Economic and Fiscal Impact Statement, Form STD 399, June 18, 2019.

estimated to incur \$1.3 billion in cost increases, and \$2.8 billion in cost-savings, resulting in an estimated net cost-savings to transit agencies of \$1.5 billion under the ICT regulation. For the low-NOx engine (Alternative 2), transit agencies are estimated to incur \$0.38 billion in cost increases, but no cost-savings, resulting in an estimated net cost of \$0.38 billion for the same time period.¹²⁵

In the analysis, CARB attributed no costs or benefits to using renewable natural gas (RNG) because they are correctly attributed to the LCFS regulation.

CARB agrees that using RNG to replace fossil natural gas (NG) can help reduce emissions and associated emissions from fossil NG extraction and storage. However, natural gas-fueled buses, including natural gas vehicles (NGVs) fueled by RNG, still produce tailpipe emissions that affect local air quality, so this technology has limited comparability to zero-emission technology.

Zero--emission technologies are crucial in addressing the state's long term air quality issues and meeting climate protection goals, as reflected in the 2016 Mobile Source Strategy. Transit buses and how they operate are well suited to zero-emission technology. They are usually operated in urban centers often at low speeds with a lot of stop-and-go driving cycles, which are optimal for electric drivetrains and conducive to regenerative braking. This sector is a favorable setting for the technology to develop and improve so it can meet the needs of other heavy-duty vehicle sectors and advance the transition to clean transportation and freight systems.

F. ENVIRONMENTAL ANALYSIS

The responses to these comments are in the "*Responses to Comments on the Draft Environmental Analysis for Innovative Clean Transit Regulation*" that was approved by the Board on December 14, 2018, and is incorporated in the FSOR as Appendix 7.

G. COMMENTS ON SPECIFIC REGULATORY PROVISIONS

This section addresses comments on specific regulatory provisions. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

G-1 Definitions

G-1-1 Definition of Large and Small Transit Agencies

Comment:

¹²⁵ California Air Resources Board (CARB) (2019). Proposed Innovative Clean Transit Regulation, An Amendment to the Fleet Rule for Transit Agencies, Economic and Fiscal Impact Statement, Form STD 399, Table 4 in the Form 399 Attachment June 18, 2019.

MST urges the Board to reconsider the definition of a “small operator” and instead use a definition that transit operators are familiar with and which is currently used in federal and state programs. The proposed regulations define a small operator as any operator with fewer than 100 buses. MST urges the Board to rely on the current federal definition that specifies a small operator as having less than 100 buses during peak operations. **(15-1-MST)**

Comment:

CalACT urges the Board to adopt the definition of a “small operator” as defined in the November 9th, 2018, release of the Updated Proposed Innovative Clean Transit Rule. This update will provide a clear definition already known by transit agencies and used at the Federal & State level. **(15-1-CALACT)**

Agency Response:

In response to stakeholder comments and to remain consistent with Federal requirements for funding buses, CARB revised the definitions for “Large Transit Agency” and “Small Transit Agency” to a definition that is more commonly used.

G-1-2 Definition of Cutaway

Comment:

CalACT also supports the proposed definition of a cutaway bus. These vehicles are the workhorse of small transit systems due to their lower capital and operating costs. These vehicles are produced in a wide variety of sizes, and the proposed definition specifying vehicles weight of 14,000 pounds to 26,000 pounds is appropriate. In addition, the rule recognizes that a commercially available zero emission cutaway bus is currently not available. **(15-1-CALACT)**

Agency Response:

CARB agrees with the comments. The ICT regulation includes a later phase-in date for cutaway, over-the-road, double decker, and articulated buses as described in section 2023.1(c). The ICT regulation also provides sufficient lead-time for transit agencies, especially for small transit agencies to plan ahead of time, take advantage of available funds, and purchase ZEBs. In addition, the ICT regulation provides flexibility for transit agencies to comply with the ZEB purchase requirements, as well as providing exemptions to defer from ZEB purchase requirements under circumstances that are beyond transit agencies’ control.

G-1-3 Definition of Hybrid Systems

Comment:

The amended regulatory language proposed by CARB retains the definition of “conventional internal combustion engine bus” without change. CARB’s modifications to the proposed regulation order, however, would amend provisions allowing for the purchase of hybrid vehicles (i.e., through obtaining one of the exemptions allowed by 13 CCR §2023.4) by further defining the situations in which an exemption will be granted. But such changes do not affect the initial classification (i.e., definition) of the vehicle as a hybrid, pursuant to §2023(b)(13)

Allison would urge CARB to maintain this position in its final regulations. Allison has proven -- through the operation of thousands of buses for many years in the transit fleets of some of the nation’s major cities -- that up to 25% in fuel savings can be achieved by hybrid technology vehicles. Such substantial reduction in emissions and fuel use is consistent with, and contributes to the goals of CARB’s program. **(15-1-Allison)**

Comment:

CARB is proposing amended language to address engine/hybrid system pairing and NOx performance. Specifically, CARB proposes to impose the Low-NOx engine purchase requirement for situations where a new conventional internal combustion engine bus or hybrid bus purchase is made. In this situation, two criteria must be met: (1) the engine or “hybrid propulsion system paired with the engine” must have been available for purchase or lease for two years; and (2) the engine or “hybrid propulsion system paired with the engine” must be certified to the lowest level of NOx emissions that is “suitable.” See §2023.6(a)(1)-(2).

As noted above, Allison’s H 40 EP and H 50 EP systems have been in commercial production for well over a decade. Thus, such systems meet the first criteria, i.e., they have been available for purchase for at least two years. With regard to the second criteria, CARB has helpfully amended previous language to recognize that engines and hybrid systems work in concert with each other. Thus, emission levels may vary depending on which engine/hybrid systems are used or can be used for a particular vehicle. The specification of the lowest level of NOx emissions that is “suitable” addresses this impact as evidenced by CARB’s explanatory document noting that “pairing” is to “clarify that a hybrid bus would only be required to have a low NOx engine if the hybrid propulsion system in combination with the engine was certified to the Low-NOx engine standard. **(15-1-Allison)**

Agency Response:

The ICT regulation applies to all vehicles that meet the definition of a bus described in Section 2023(b)(6) and fall within the scope of the regulation in Section 2023(a), including hybrid buses. To address concerns raised by Allison, the ICT regulation has the Low-NOx engine purchase requirements in sections 2023.6(a)(1) and (2) that

include “hybrid propulsion system paired with the engine”. This language clarifies that a hybrid bus would only be required to have a low NOx engine if the hybrid propulsion system in combination with the engine was certified to the Low-NOx engine standard.

G-2 ZEB Purchase Requirements

G-2-1 Accelerated ZEB Purchase Schedule

Comment:

Finally, I would offer sort of a common refrain from Greenlots that while we're very supportive of this regulation, we also don't believe it goes far enough, or acts as quickly as we ultimately need to act. So we will encourage the Board and all of the stakeholders to continue to think about how we can accelerate this transition and ensure that, in this case, the cities and transit districts have the adequate support to continue to move forward. **(B-O-2-Greenlots)**

Agency Response:

While a more aggressive schedule to phase in ZEBs could theoretically provide more emission reductions and health benefits starting in early years, it does not provide time for experience to be gained from early ZEB models and prevents transit agencies from utilizing incentive funds that could lower capital costs. In addition, it usually takes a few years for transit agencies to plan for infrastructure and bus purchases. A more aggressive schedule provides significantly less time for transit agencies to adjust to new technology and the learning curve on how to troubleshoot and address challenges. Transit agencies would also need time to train the workforce, such as operators and maintenance staff, to support their ZEB fleets. A more aggressive schedule would not be as successful and thus would not be as effective at carrying out the purpose of the regulation and would be more burdensome.

G-3 Discharge of the Initial ZEB Purchase Requirements

G-3-1 Support the Discharge Requirements

Comment:

In our September 24, 2018, comments, Allison encouraged CARB to retain waivers for 2023 and 2024 ZEB purchase requirements where transit agencies committed to an “early purchase” of ZEBs by 2020 and 2021. Allison also supported options to implement zero-mobility programs in lieu of purchasing ZEBs.

In its modifications to the proposed regulation order, CARB is proposing to retain the early ZEB purchase incentives by lowering the requirement for 2020 (to 850 ZEBs down from 1,000) and to increase the requirement to 1,250 ZEBs from

1,150 for 2021. This change is described as “improv[ing] the likelihood the initial target would be met” while increasing emission benefits overall. CARB also proposes to retain the zero-emission mobility programs as option in lieu of ZEB purchases. Allison continues to support program flexibilities that allow for beneficial actions to be undertaken by transit agencies apart from ZEB purchases.

Based on our analysis in Section III of these comments and other considerations, we believe that such flexibilities are important to the successful implementation of the program, especially in the earlier years of the ZEB purchase requirements that are specified in §2023.1(a)(1). **(15-1-Allison)**

Agency Response:

CARB agrees with the comment and appreciates the support. The purposes of the discharge provision in Section 2023.1(b) are to encourage earlier investments, provide flexibility complying with the ZEB purchase requirements, and preserve access to incentive funds. The discharge thresholds provide some large transit agencies that currently have less ZEB infrastructure additional time to comply with regulatory requirements. It also provides earlier and greater emissions reductions benefits, because the thresholds are higher than the minimum number of ZEBs that would be otherwise achieved under the regulation. A different schedule would not be as effective in carrying out the purpose of the regulation and would not be less burdensome.

G-3-2 More Ambitious Short-Term Targets

Comment:

We have the technology to put zero-emission buses on the road today – and the science tells us we can’t wait to take strong action. Therefore, the rule should also set ambitious short-term targets as well, to get at least 1,250 zero-emission buses on California streets by the end of 2021. **(15-1-UCS-2)**

Agency Response:

The purposes of the discharge provision in Section 2023.1(b) are to encourage earlier investments, provide flexibility complying with the ZEB purchase requirements, and preserve access to incentive funds. The discharge thresholds are based on CARB’s latest survey on procurement of California transit agencies. The number of buses required are realistic thresholds based on the survey results of what transit agencies can meet. The discharge thresholds provide some large transit agencies that currently have less ZEB infrastructure additional time to comply with regulatory requirements. It also provides earlier and greater emissions reductions benefits, because the thresholds are higher than the minimum number of ZEBs that would be otherwise achieved under the regulation. A different schedule would not be as effective in carrying out the purpose of the regulation and would not be less burdensome.

G-4 ZEB Rollout Plan Requirements

G-4-1 ZEB Rollout Plan Submittal Date for Small Transit Agencies

Comment:

MST strongly supports the delayed compliance for small operators to adopt the rollout plans and purchase mandates. MST and other small operators in the state agree that additional time will be needed to secure funding for developing and adopting the plans. In some cases operators will need to locate, purchase, and build new storage facilities because of inadequate space or because they currently rent space from another public entity. The additional time needed to develop the roll-out plans support the need for the later purchase mandate timeline. The later purchase mandate should also benefit small operators, allowing them to take advantage of lower vehicle prices as demand increases and supply chains mature. **(15-1-MST)**

Comment:

CalACT also strongly supports the delayed compliance for small operators with adopting the rollout plans and purchase mandates. CalACT's members are predominantly small operators and additional time will be needed to secure funding for developing and adopting the rollout plans. In some cases operators will need to locate, purchase and build new storage facilities because of inadequate space, or the operators currently rents space from another public entity. The additional time needed to develop the rollout plans support the need for the later purchase mandate timeline. The later purchase mandate should also benefit small operators to take advantage of lower vehicle prices as demand increases and supply chains mature. **(15-1-CALACT)**

Comment:

As CARB Board member De La Torre stated at the most recent hearing, "22 years is plenty of time to work through any issues." We believe the proposed timeline remains realistic and provides transit agencies an appropriate amount of time to comply. However, the Zero Emission Bus (ZEB) Rollout Plan for small transit agencies, the deadline for which is currently June 30, 2023, could benefit from the same requirement plan deadline as the large transit agencies to forecast and prepare for the transition by June 30, 2020. It is critical to establish a plan sooner rather than later, so transit agencies, manufacturers and utilities will be able to plan and ensure a smooth transition to zero-emission vehicle technology. **(15-1-CalZEV)**

Agency Response:

The Rollout Plans themselves are not binding and transit agencies may choose to deviate from their plans over time as the market and technology changes per conditions directed by its Board, management, or resolution. They are not required to be updated for CARB. Nonetheless, the plans will provide information needed by the State, utilities and other stakeholders to make a successful transition. The requirements in section 2023.1(d)(2) balance the State's need for the information to address barriers with resource constraints at smaller transit agencies. Planning is the first step for an agency in transitioning to ZEBs. Small transit agencies have a smaller pool of resources with which to plan for, to purchase ZEBs, and to invest in ZEB infrastructure. The later submittal date for small transit agencies allows them additional which provides opportunities for them to learn from the experience of large transit agencies, more time to allocate resources, and may reduce their planning costs. Providing more time for small transit agencies does not prevent them from planning early. In addition, transit agencies will still have the option of adjusting their deployment strategy after the submittal date as more information become available with time. Similar to the due date for large transit agencies, given the non-binding characteristic of the plans, advancing the due date forward would not be as effective at achieving the purposes of the regulation and would not be less burdensome.

G-4-2 Elements of the Rollout Plan

Comment:

MST continues to believe that facilitating a transition to cleaner transit buses is best done by allowing transit agencies to craft individualized zero emission bus (ZEB) deployment plans that are consistent with their unique financial and operational requirements; however, we also recognize the value in providing ARB staff with constructive feedback on the proposed regulation as currently drafted. We believe this feedback better ensures that if you proceed with a purchase mandate, the worst impacts to transit service will be minimized. **(15-1-MST)**

Comment:

The commenters states that: "We appreciate CARB's work on this important regulation, and strongly recommend incorporation of the following roll-out plan requirements, which were proposed by the California Hydrogen Business Council before the last CARB Board meeting on this issue:

- That transit agencies (initially large ones) be required to develop a ZEB plan in which they **assess the build-out of utility generation, distribution and transmission infrastructure** to suit the transit agency procurement plans, as submitted by the transit agencies for the 2020 deadline. These assessments would include consideration of ALL new transportation and industrial electrification efforts and their required generation and T&D capacities, **designating ratepayer costs and utility investor costs, and estimated**

build schedule. As part of that plan, resiliency impacts must also be assessed.

- Equivalently, all hydrogen powered vehicle procurement plans must show **cost and schedule assessments for build-out of hydrogen production, distribution and dispensing**, along with resiliency impacts.
- ARB should establish a deadline for the **completion of these ZEB and fuel infrastructure plans** in concert with procurement plans **by 2023**. (emph. orig **15-1-Ballard**)

Agency Response:

CARB agrees that the Rollout Plan should be specific and tailored to each transit agency in order to be effective. This is also how the ICT regulation is structured. The ICT regulation also allows sufficient time (three years) between the Rollout Plan and the first purchase requirement in order for transit agencies to successfully implement their Plans. Zero-emission bus technologies available for transit agencies include both battery and fuel cell electric bus technologies. The regulation does not limit transit agencies to study and deploy one type of zero-emission bus technology; however, it requires them to plan, familiarize themselves with zero emission technologies before the purchase requirements start and to learn about potential challenges and available solutions to achieve a smooth transition. Transit agencies have discretion to choose which type of technology is best suited for their operation. In addition, transit agencies have the option of adjusting their Rollout Plan after the submittal date as more information become available. Further, the ICT regulation also requires a schedule for construction of facilities and infrastructure modifications or upgrades, including charging, fueling, and maintenance facilities, to deploy and maintain zero-emission buses, as well as identifying funding sources to cover the costs.

G-5 ZEB Bonus Credits

G-5-1 Number of Bonus Credits for FCEB and BEB

Comment:

The proposed bonus credit structure for zero-emission buses differs for battery-electric and hydrogen fuel-cell buses. CalETC recommends that all zero-emission buses receive the same amount of bonus credits for the same early-compliance period. (**15-1-CalETC**)

Agency Response:

The ICT regulation uses bonus credits to recognize early adopters of ZEB and maintain eligibility for incentive funding. Early adopters started operating ZEBs ahead of the regulatory requirements by taking more risks in deploying early technologies with higher costs. The bonus credit for a FCEB is higher than that of a BEB because FCEBs are

more expensive and require more complex infrastructure. Additional credits are allocated to early deployment of FCEB during its pre-commercialization stage to recognize its higher costs, and to ensure early adopters of FCEB are able to remain eligible for incentives in the future. A uniform credit structure would not be as or more effective at carrying out the purposes of the regulation.

G-5-2 Bonus Credits for Electric Trolleybuses

Comment:

Trolley buses are distinct from both light and heavy rail modes of transportation. Even though rail cars are also powered by electricity, they should not be awarded zero-emission bus credits in the Innovative Clean Transit standard. Muni also operates light rail trains yet has not requested credits for their operation. (15-1-UCS-3)

Agency Response:

The ICT regulation incorporates criteria for electric trolleybuses to earn zero emission bonus credits. The credits would be for electric trolleybuses placed in service between January 1, 2018, and December 31, 2019. Providing these bonus credits would recognize trolleybuses' contribution to expanding zero emission technology. The credits would expire by the end of 2024 and would provide additional flexibility for transit agencies deploying electric trolleybuses for early health and environmental benefits. Denying credits would not be as or more effective in carrying out the purpose of the regulation and would not be less burdensome.

G-6 Exemptions Provisions

G-6-1 Exemptions Provisions- Daily Mileage Need

Comment:

CalETC also agrees with other stakeholders that the range/mileage needs exemption should be more clearly defined, in keeping with the intent of the regulations, to ensure that transit agencies will transition all buses with routes that can be served by zero-emission buses before requesting this exemption. For example, a transit agency should not be allowed to use this exemption if it: chooses to begin its proposed implementation with its longest routes and requests an exemption when it could instead begin its transition with its shorter routes; claims that all of its buses must meet the needs of its longest routes; and if it claims that a zero-emission bus must meet the maximum range of the combustion-engine bus on a given route, when that route does not require the full range of the combustion-engine bus. (15-1-CalETC)

Comment:

AC Transit supports the clarifications made to the exemption provisions. In particular, the exemptions related to vehicle range, gradeability, and financial hardship. With respect to financial hardship, the recent amendments allow for an exemption based on the inability to offset the electricity cost for depot charging a battery electric bus. However, this does not include the potential high cost of electricity to produce hydrogen or the cost of purchasing hydrogen for fuel cell buses. We urge you to expand this exemption to recognize the fiscal impacts of both electricity and hydrogen costs. **(15-1-AC Transit)**

Comment:

we would like to specifically comment here on the proposed language in the following section:

§ 2023.4. Provisions for Exemption of a Zero-Emission Bus Purchase. (C) (2)
When available zero-emission buses cannot meet a transit agency's daily mileage needs.

A transit agency may submit a request for exemption from the zero-emission bus purchase requirements if no battery electric bus can meet the daily mileage needs of any similar bus type in the fleet.

This language is too broad, does not sufficiently define the limits of its application and is not in keeping with the intent of this section of the rule. CARB's survey of transit agencies two years ago showed that 56% of daily bus routes in the state had ranges of 150 miles or less. Today's electric buses can easily meet the needs of these routes in addition to many longer routes on a single depot charger.

The intent of this potential exemption is to address the exceptional circumstance in which an agency may have some much longer daily route ranges not met by available electric bus ranges. Two key unstated assumptions are that (1) transit agencies will begin their transition to ZEBs on shorter routes first and hold off on longer routes until future years (timing counts) and (2) bus makers will continue their progress on making buses with longer ranges in the future.

We support the intent and spirit of this exemption which is that as agencies transition their fleets in a logical priority with shorter routes first and that if they get to their longest routes and electric buses cannot meet those needs, they may receive an exemption. But we want to make sure that this legitimate potential exemption is not inappropriately utilized. **(15-1-Sierra Club)**

Agency Response:

It is the intent of the exemption options to ensure transit service is not adversely affected. CARB survey data from transit fleets shows that for 40-foot buses, about 50 percent of buses operate less than 150 miles per day, and about 85 percent of buses operate less than 200 miles per day. Currently, there is no range issue for FCEBs. Depot charging BEBs are commonly available with a nominal range of 150 miles per day. Longer range BEBs are also available with larger battery capacity at higher prices. CARB also recognizes that some transit agencies have a few very long duty cycles that current technology cannot adequately service considering costs and infrastructure. Section 2023.4(c)(2) provides an exemption so that a transit agency does not have to purchase ZEBs that cannot meet its daily mileage need or multiple ZEBs to provide services currently supplied by one bus. An exemption for an entire transit agency rather than for a required purchase would be overbroad and thus not be as effective at carrying out the purpose of the regulation.

G-6-2 Exemptions Provisions- Gradeability Need

Comment:

SFMTA operates buses in one of the most challenging topographies and requires that buses be able to operate on up to 23% grade with Gross Vehicle Weight Rating (GVWR). As a result, SFMTA also appreciates the addition of new language to address gradeability. **(15-1-SFMTA)**

Comment:

AC Transit supports the clarifications made to the exemption provisions. In particular, the exemptions related to vehicle range, gradeability, and financial hardship. With respect to financial hardship, the recent amendments allow for an exemption based on the inability to offset the electricity cost for depot charging a battery electric bus. However, this does not include the potential high cost of electricity to produce hydrogen or the cost of purchasing hydrogen for fuel cell buses. We urge you to expand this exemption to recognize the fiscal impacts of both electricity and hydrogen costs. **(15-1-AC Transit)**

Agency Response:

CARB agrees with the comments and appreciates the support. The exemptions are intended to ensure transit service is not adversely affected. Section 2023.4(c)(3) of the ICT regulation addresses stakeholder concerns about gradeability performance for zero-emission buses that would be operated on steep grades, and the required documentation that a transit agency must provide to the Executive Officer to receive an exemption from the zero-emission bus purchase requirement. Please refer to section G-6-4 of this Chapter for the financial hardship exemption response.

G-6-3 Exemptions Provisions- ZEB Types Not Available

Comment:

In addition, we encourage CARB to remove the exemption for cutaway, over-the-road (motor coaches), and articulated buses. These vehicles are presently excluded from the ZEB purchase requirements until January 1, 2026. While we support that these bus types may be excluded from this rule initially, we recommend that transit agencies should be required to purchase buses in these categories two years after at least two commercial buses have been Altoona tested and are CARB certified, and they should be included in infrastructure planning. This will allow transit agencies to prioritize their initial efforts on ZEB transition with standard transit buses that make up the majority of transit agencies' vehicles, while ensuring manufacturers are encouraged to certify existing shuttle bus types to allow transit fleets to use those solutions to serve their paratransit needs. **(15-1-CalZEV)**

Agency Response:

The regulatory exemptions are intended to ensure transit service is not adversely affected. Transit agencies have experience with 30 to 40-foot zero-emission transit buses, but there is less information available about other buses and the market is not as advanced for these less-common buses. To ensure transit service provided by these types of buses is not adversely impacted, the ICT regulation provides a later phase-in date on the purchase requirements for less common bus types. Further, a transit agency may request an exemption from the ZEB purchase requirements of section 2023.1(a) when a required ZEB type for the applicable weight class based on GVWR is unavailable for purchase. CARB concluded that the available exemptions strike an appropriate balance encouraging development of various kinds of zero-emission buses considering the constraints of transit agencies. Removing the exemption would not be as or more effective in carrying out the purposes of the regulation and would be more burdensome.

G-6-4 Exemptions Provisions- Financial Hardship

Comment:

AC Transit supports the clarifications made to the exemption provisions. In particular, the exemptions related to vehicle range, gradeability, and financial hardship. With respect to financial hardship, the recent amendments allow for an exemption based on the inability to offset the electricity cost for depot charging a battery electric bus. However, this does not include the potential high cost of electricity to produce hydrogen or the cost of purchasing hydrogen for fuel cell buses. We urge you to expand this exemption to recognize the fiscal impacts of both electricity and hydrogen costs. **(15-1-AC Transit)**

Comment:

Lastly, AC Transit supports the clarifications made to the exceptions provisions with respect to financial hardship, the recent amendments allowed for exemption based on the inability to offset the electricity cost.

However, this does not include the potential high cost of electricity to produce hydrogen or the cost of purchasing hydrogen for fuel cell buses. We urge you to expand this exemption to recognize the fiscal impacts of both electricity and hydrogen costs. **(B-O-2-AC Transit)**

Agency Response:

Each transit agency should follow the blueprint set out in its Rollout Plan to deploy the most suitable technologies based on the best information available. If the cost of hydrogen is a barrier, then the transit agency could instead opt to purchase BEBs or to seek an exemption if a depot charge BEB could not meet the transit agency's daily needs. The provision in section 2023.4(c)(2) was provided to avoid requiring a transit agency to purchase ZEBs if a BEB cannot meet its daily mileage need on a single charge. In addition, section 2023.4.(c)(2)(A) will ensure a transit agency operate ZEBs of a given bus type on the shortest routes or blocks first before an exemption can be granted. An exemption would not be granted if, for example, a depot-charging battery-electric bus were sufficient to meet the needs of a conventional internal combustion engine bus in the fleet, under section 202.4(c)(2)(A)(1)(b). However, the exemption would be available if on-route charging or fuel cell electric buses were available. In this case, the transit agency could purchase combustion engine buses and would not have to purchase other ZEBs. The regulation also provides an exemption if a transit agency to declare a fiscal emergency, which could provide the transit agency more time. CARB concluded that the available exemptions strike an appropriate balance encouraging development of various kinds of zero-emission buses considering the constraints of transit agencies. Expanding the exemption would not be as or more effective in carrying out the purposes of the regulation and would be more burdensome.

G-7 Mandating Assessment in the Regulation

Comment:

To protect transit agencies, and more importantly the riders who rely on this service from these challenges and any unintended consequences of this regulation, we had called for establishing cost and performance benchmarks in the regulation. We had called for mandating a regulatory assessment in the regulation. We had called for funding for transition, meaning compliance funding, not just incentive funding. Most of those things are not in the regulation itself. **(B-O-2-CTA, B-O-2-Santa Cruz METRO)**

Agency Response:

The commenters suggested requiring cost and performance benchmarks as conditions of the regulatory requirements. Cost and performance data were considered in the

ISOR and SRIA, and will be considered as part of the program review CARB will conduct prior to the first purchase requirements and the annual board update thereafter. A regulatory benchmark would not be as or more effective in carrying out the purpose of the regulation and would not be less burdensome.

The comment also requests funding for meeting the regulatory requirements. CARB does not have the authority to appropriate funding. Funding is appropriated by the Legislature, and CARB distributes that funding as described above in developing and implementing its comprehensive Low Carbon Transportation Investments and Air Quality Improvement Program on an annual basis.¹²⁶ The effective dates of the purchase requirements and provision for delaying purchase requirements were established to ensure that incentive funding that has been appropriate would be available to transit agencies acting ahead of schedule. Going forward, the program review will provide CARB information to consider when making future decisions about funding levels and allocation. CARB will also use this information to inform the Legislature about the need for funding.

H. OTHERS

This section addresses comments that are not included in earlier sections. Except as otherwise described in the response to the comments, CARB declined to make changes to the proposed regulations, and did not find that any proposed alternative was more effective in carrying out the purposes of the proposed regulation, as effective and less burdensome, or more cost effective to affected private persons and equally effective.

H-1 Uncertainty in ZEB Investments

Comment:

Transits will now be asked to make significant investments again, but on a significantly great scale requiring an enormous dedication of resources by State, local, and State utilities, which we believe is still not fully understood. **(B-O-2-Clean Energy)**

Agency Response:

CARB recognizes the significant investments in zero-emission buses and related infrastructure. Therefore, the ICT regulation has built in several flexibilities to allow transit agencies to operate in a way that is consistent with their operation, provides opportunities for transit fleets to utilize incentives, and encourages innovative mobility options. The ICT regulation also contains exemptions that provide safeguards for transit agencies to ensure transit service is not adversely affected.

¹²⁶ See, e.g., California Air Resources Board (CARB). Fiscal Year 2017-18 Funding Plan for Clean Transportation Incentives, Part II - Three-Year Investment Strategy for Heavy-Duty Vehicles and Off-Road Equipment from Low Carbon Transportation Investments and AQIP. Released on November 9, 2017.

The requirement for a Rollout Plan is intended to ensure transit agencies timely plan to make the significant investments required under the regulation. CARB will conduct its own comprehensive program review before the purchase requirements begin and annually after to determine how and to what extent transit agencies are making the investments required.

These planning tools are intended to provide the Board with information to determine whether any additional actions may be necessary to ensure that the regulation will not result in adverse impacts.

H-2 Near-Zero Policy

Comment:

We must stress to you the importance of the Air Resources Board's support to provide broad policy more akin to the ICT for near-zero trucks in the Advanced Clean Transit proposal that ARB staff are currently considering. **(B-O-2-Clean Energy)**

Agency Response:

This comment is related to program for near-zero emission heavy-duty trucks and is not related to the ICT regulation or the process by which it was adopted.

H-3 Educational Programs

Comment:

Finally, we would like to recommend that CARB develop several educational programs through the years to help transit agencies learn how to do this transition. Two subject areas of importance are what are all the incentive programs available and how can we take advantage of them, and how do we go about designing and implementing the optimal charging infrastructure systems. **(B-O-2-Sierra Club-2)**

Agency Response:

CARB understands the need for supporting ZEB deployment. The ZEB technology symposium was an example of how CARB will provide additional resources to transit agencies. CARB will also make publicly available the results of its comprehensive program review, and is working to develop additional ways to support transit agencies. CARB is committed to working with the transit community and our sister state agencies, such as Employment Training Panel, the California Workforce Development Board, and Employment Development Department, to invest in workforce development and training in the operation and maintenance of zero-emission heavy-duty vehicle technologies. CARB staff's efforts in this area will seek to leverage, to the maximum extent possible,

existing and scalable curriculums already utilized by early adopters of zero-emission buses.

H-4 Dedicated Person in Infrastructure

Comment:

Then the other thing is a dedicated person on the side of GO-Biz. They've been very supportive on the light-duty side of things. But now we're moving into the heavy-duty side of things, be it now buses and then later trucks, there is not a dedicated person in that area that can support transit agencies or infrastructure providers to address things that they run into with regards the implementation of the infrastructure.

So one consideration - I realize it's most likely not part of the language, but something to think about for the future - that a person dedicated to -- on the heavy-duty side of things full time. **(B-O-2-CaFCP)**

Agency Response:

This comment is not directed at the proposed regulatory text or the process by which it was adopted. It is directed at other State agencies. CARB will convey the comment to the Governor's Office of Business and Economic Development (GO-Biz). CARB staff will support both the deployment of BEBs and FCEBs in the implementation of the ICT regulation.

H-5 Disadvantaged Communities

Comment:

And so in implementing this rule, we strongly urge the staff to work closely with transit agencies to ensure that electric buses are deployed in disadvantaged communities as much as possible, and as early as possible to help alleviate some of the severe health impacts and air quality issues in our communities across the state. **(B-O-2-CEJA)**

Agency Response:

The ICT regulation requires a transit agency to develop a Rollout Plan. This Plan must include a description on how a transit agency plans to deploy zero emission buses in disadvantaged communities as listed in the latest version of CalEnviroScreen. This process creates a public process to ensure ZEB deployments best meet the community's needs.

H-6 Rulemaking Documents

Comment:

According to a presentation by CARB staff on September 27, 2018, the anticipated second hearing on the proposed ICT regulation was January 2019, with a Board vote scheduled for the same day. MTC was surprised to find the second hearing instead scheduled for the December board meeting after the agenda was published publicly. Furthermore, we encourage CARB to make available the staff report well in advance of the meeting in order to provide transparency and responsiveness to the many stakeholders that have provided comments on this major rulemaking. **(B-W-2-MTC)**

Agency Response:

In the first Board Hearing on this proposed action on September 28, 2018, the Board directed staff to return to for a second hearing in December 2018, or no later than January 2019. On November 9, 2018, CARB provided a notice period of at least 15 days of the proposed changes to the proposed ICT regulation and that it would consider the amendments at a future hearing, as required under the Administrative Procedure Act. On November 30, 2018, CARB posted notice of the second hearing that was held on December 14, 2018, (see <https://ww2.arb.ca.gov/ma121318>), as required under the Open Meeting Act. CARB provided notice of these actions to all interested persons that participated in this rulemaking.

VI. 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.

Peer review is not required for the ICT Regulation. The ICT regulation requires transit agencies to purchase zero-emission buses and write reports. Requirements to purchase zero-emission buses, calculate and report zero-emission miles traveled, track the number of buses in transit fleets, and other requirements of the ICT regulation do 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. It is thus not subject to peer review under section 57004 of the Health and Safety Code.

The scientific studies and assessments used to analyze the potential environmental impacts of these regulations, such as the findings that diesel particulate is a toxic air contaminant and that greenhouse gases contribute to climate change were developed previously and subject to public review.

APPENDICES

APPENDIX 1: COMMENT LETTERS SUBMITTED DURING THE 45-DAY COMMENT PERIOD

See disc attached to FSOR; file name: ICT FSOR Appendix 1

APPENDIX 2: ORAL COMMENTS GIVEN AT THE SEPTEMBER 28, 2018, BOARD HEARING

See disc attached to FSOR; file name: ICT FSOR Appendix 2

APPENDIX 3: WRITTEN COMMENTS GIVEN AT THE SEPTEMBER 28, 2018, BOARD HEARING

See disc attached to FSOR; file name: ICT FSOR Appendix 3

APPENDIX 4: COMMENT LETTERS SUBMITTED DURING THE 15-DAY COMMENT PERIOD

See disc attached to FSOR; file name: ICT FSOR Appendix 4

APPENDIX 5: ORAL COMMENTS GIVEN AT THE DECEMBER 14, 2018, BOARD HEARING

See disc attached to FSOR; file name: ICT FSOR Appendix 5

APPENDIX 6: WRITTEN COMMENTS GIVEN AT THE DECEMBER 14, 2018, BOARD HEARING

See disc attached to FSOR; file name: ICT FSOR Appendix 6

APPENDIX 7: RESPONSES TO COMMENTS ON THE DRAFT ENVIRONMENTAL ANALYSIS PREPARED FOR THE INNOVATIVE CLEAN TRANSIT REGULATION

See disc attached to FSOR; file name: ICT FSOR Appendix 7

Appendix 7 is the Responses to Comments on the Draft Environmental Analysis Prepared for the Innovative Clean Transit Regulation that was released on December 4, 2018, to be approved at the December 14, 2018, Board Hearing. These Responses to Comments address all comments related to the Draft Environmental Analysis that raised significant environmental issues or issues that raised or related to environmental concerns with or potential adverse impacts from the proposed regulations. The Board approved these Responses to Comments and certified the Final Environmental Analysis at the December 14, 2018, Board Hearing.