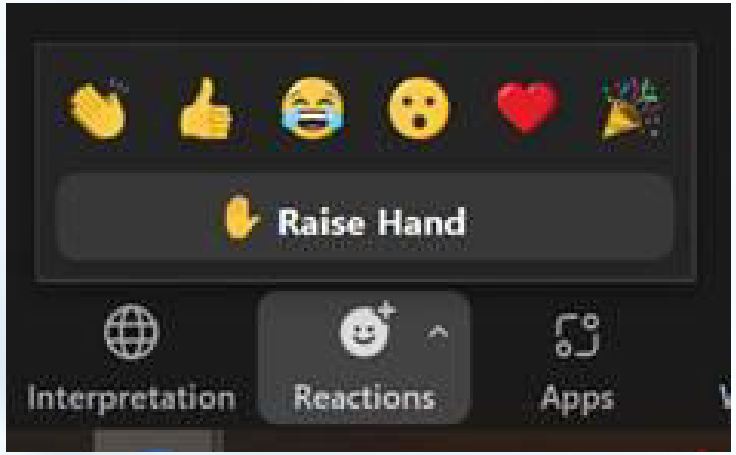
CALIFORNIA
AIR RESOURCES BOARD

Advanced Clean Cars II Amendments Kick-Off Workshop

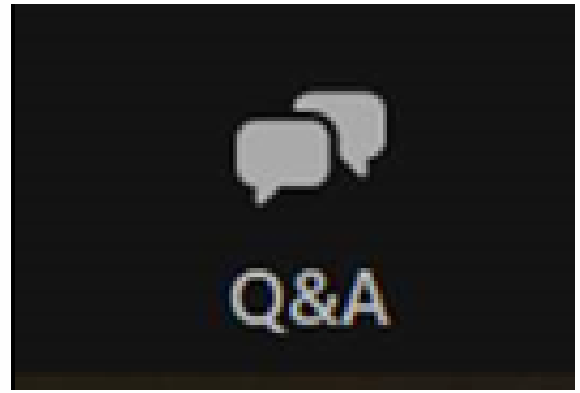
November 15, 2023

How to Participate on Zoom



To be added to the speaking queue, use the **Raise Hand** feature

Phone: Press ***9** to Raise Hand and *6 to Unmute



Submit questions using the Zoom Q&A Box

Tech Support and Reminders

Please reach out for help if you have any technical challenges

Contact Joyce Wong at joyce.wong@arb.ca.gov

Reminders

- Meeting materials are available at the Advanced Clean Cars Website
- Zoom recording will be made available at the link above

Public Comment and Engagement

- Written comments may be submitted using the ACC II Amendments informal comment submittal form
- Submitted comments can be viewed on the ACC II workshop comments log webpage
- Reach out to us at Clean Cars (cleancars@arb.ca.gov)

Tour Reminder

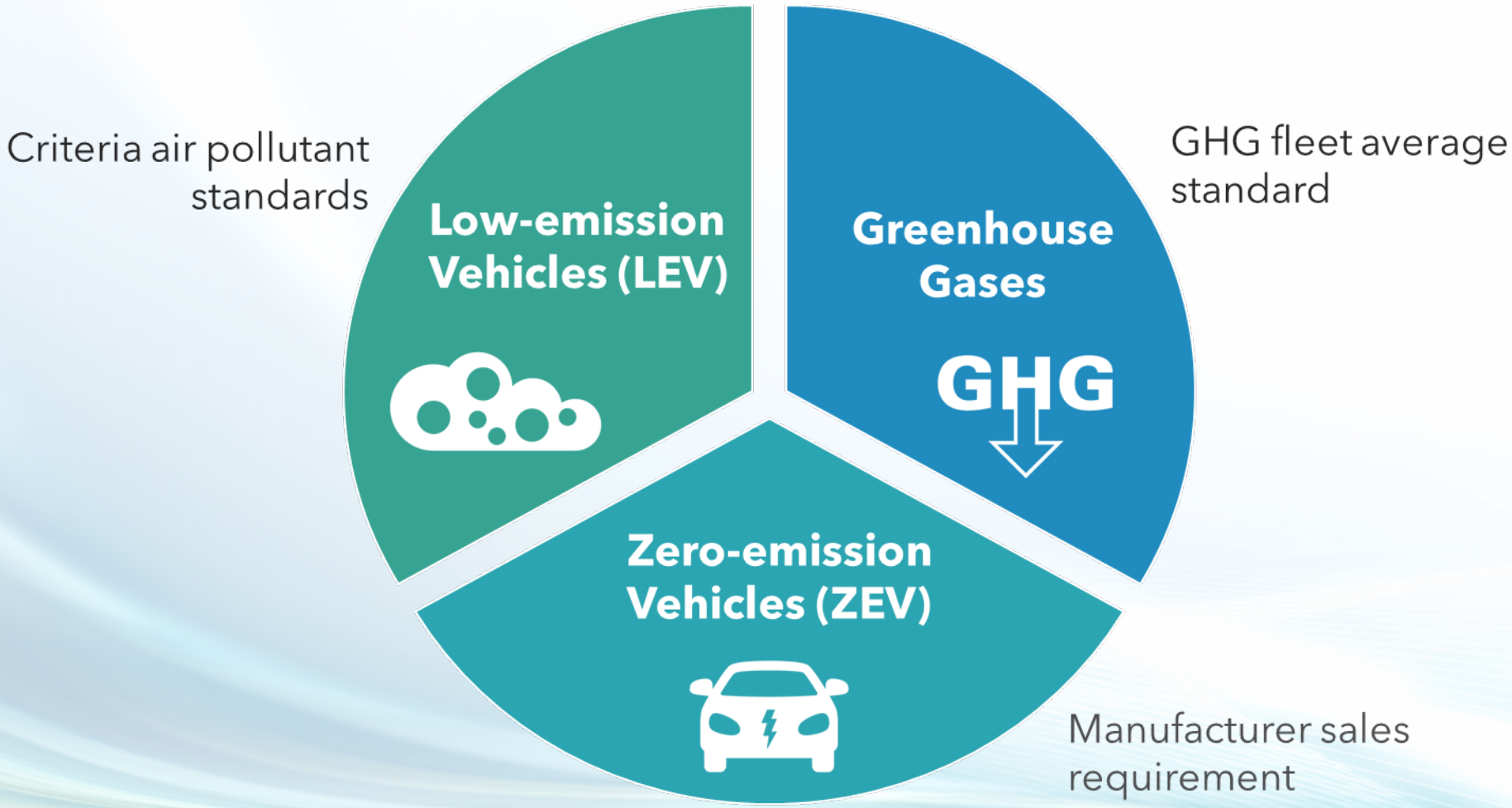
- If you pre-registered for the tour, it begins at 1:30 pm. Please meet in the lobby.

  (No walk-ins allowed if you did not pre-register.)

Agenda

1. Staff introductions
2. Background on California's Advanced Clean Cars regulations and EPA's Proposed Multi-Pollutant Emissions Standards
3. Overview of Potential Amendments to CARB's Advanced Clean Cars II Regulations
4. Initial Concepts and Q&A
   a. Greenhouse Gas Standards
   b. Criteria Air Pollutant Standards
   c. ZEV Assurance Measures
5. Timeline and Next Steps

Advanced Clean Cars I
2017 – 2025 Model Years



CARB

Meet our staff!

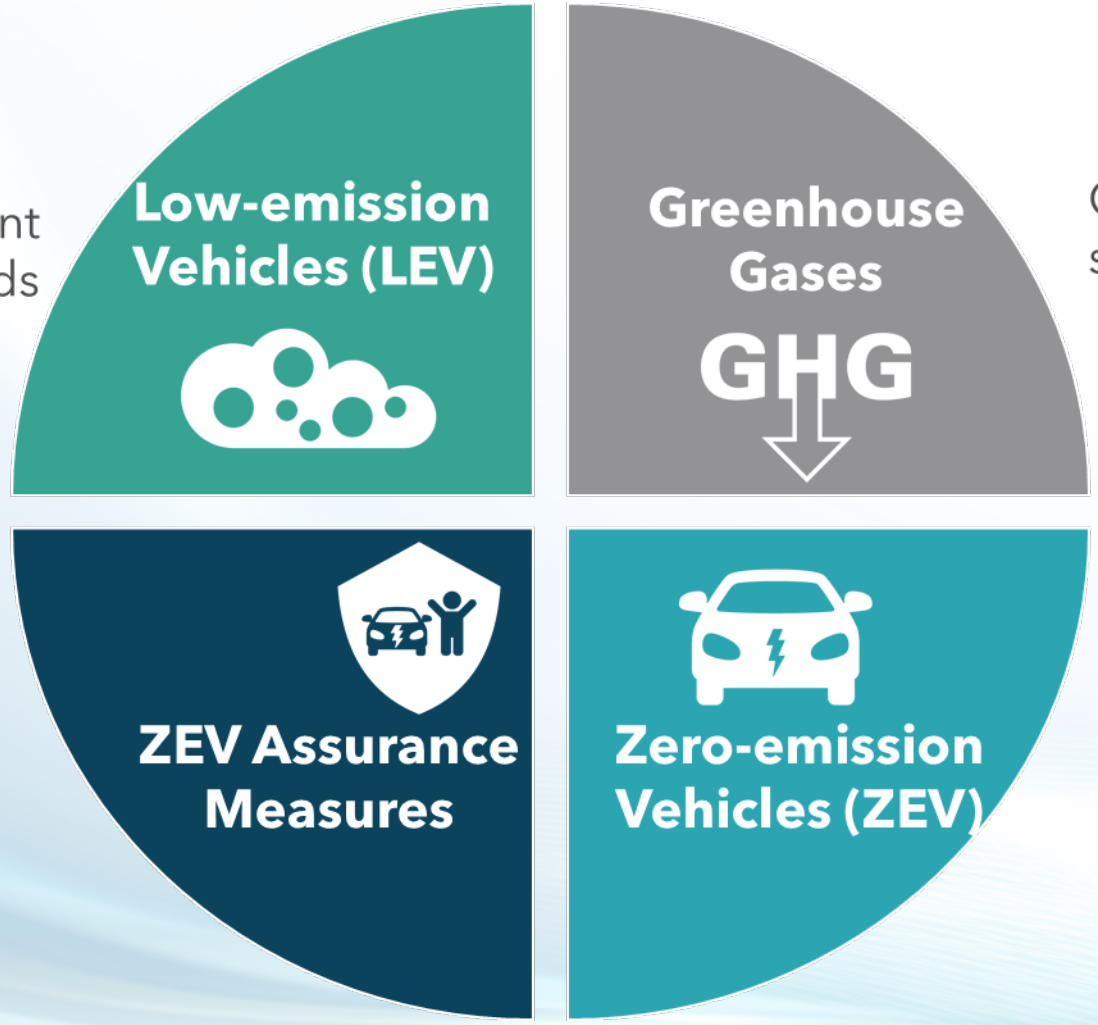
Staff Person	Role
Belinda Chen	Manager: • ACC II Amendments Rulemaking • GHG regulation • LEV regulation
Anna Wong	Manager: ZEV regulation
Mike McCarthy	Technology and policy advisor
Anna Scodel	Lead staff: ACC II Amendments Rulemaking

Staff Person	Role
Jason Gordon	Evaporative emissions
Ryan Hart	ZEV technology
Xiaoli Hu	Light-duty vehicle criteria standards and analysis
Cody Livingston	GHG standards, modeling, and analysis
Ugo Obieshi	GHG technology and emissions control
Kevin Sothy	Medium-duty vehicle criteria standards
Tao Zhan	Motor vehicle air conditioning

Advanced Clean Cars II

2026 – 2035 Model Years

Criteria air pollutant standards



GHG fleet average standard (not updated)

Minimum requirements for ZEVs

Manufacturer sales requirement

EPA Proposed Multi-Pollutant Emissions Standards

- GHGs and criteria air pollutants
- 2027-2032 and later model year
- Light- and medium-duty vehicles

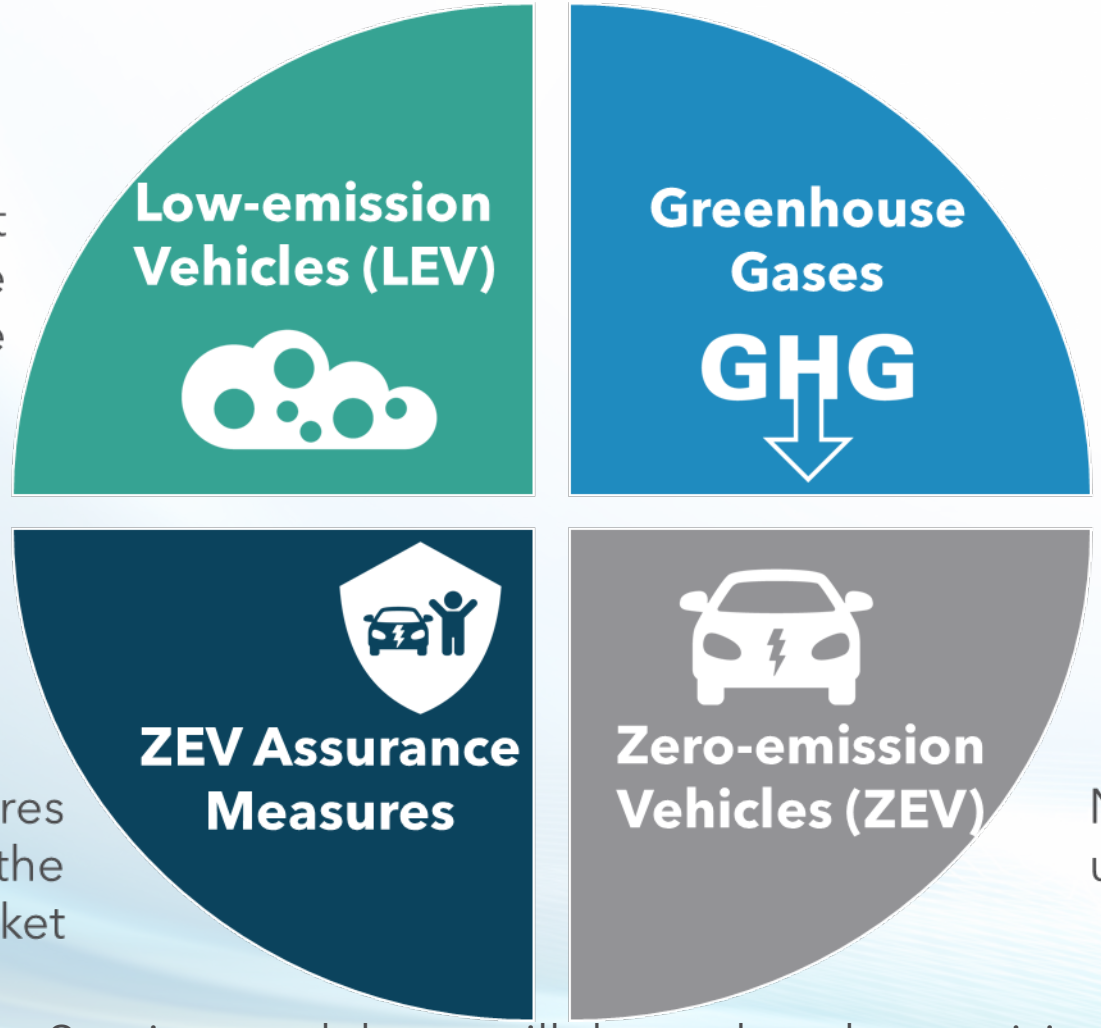
May 2023
Proposal released for public comment

July 2023
Public comment period closed

Spring 2024
Final rule expected

Scope of Advanced Clean Cars II Amendments

Consider alignment with EPA where appropriate



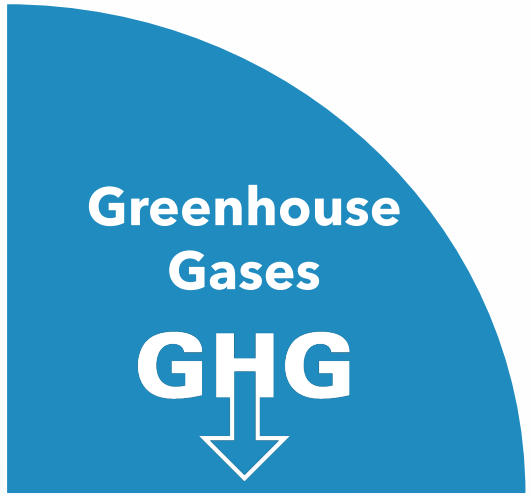
Develop new standards beyond 2025 model year to support climate goals; consider alignment with EPA where appropriate

Consider new measures to further support the ZEV market

No amendments currently under consideration

Starting model year will depend on the provisions

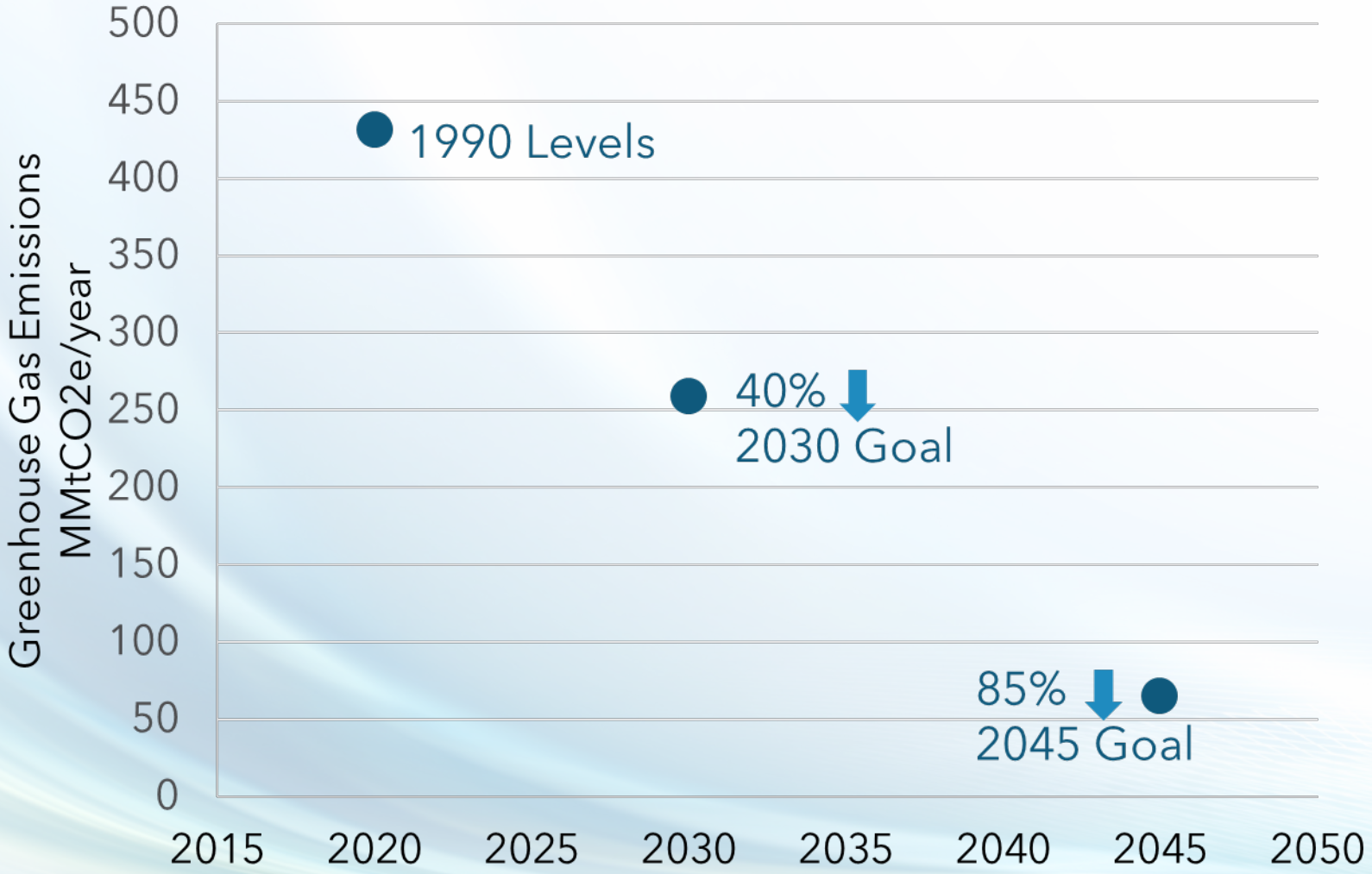
Low-emission Vehicles (LEV)



Develop new standards beyond 2025 model year to support climate goals; consider alignment with EPA where appropriate

Greenhouse Gas Standards

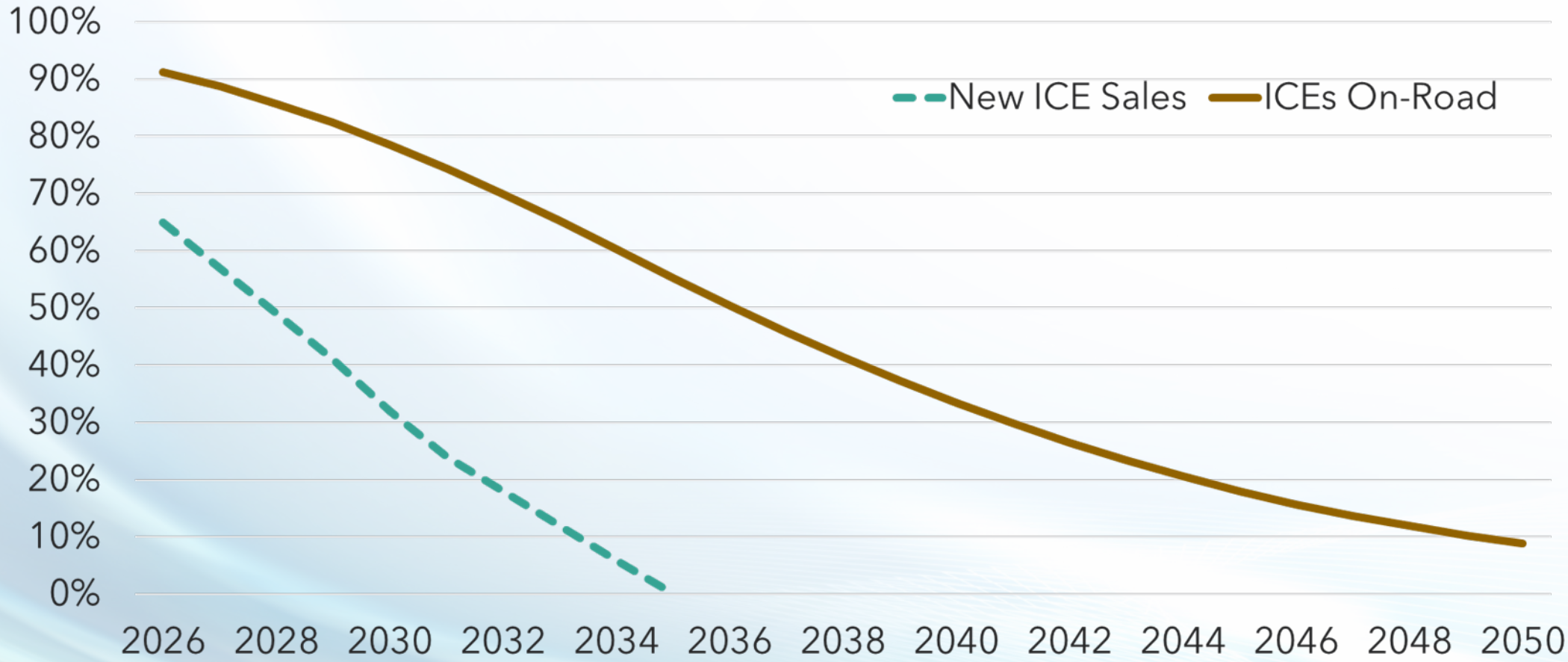
California's Climate Targets



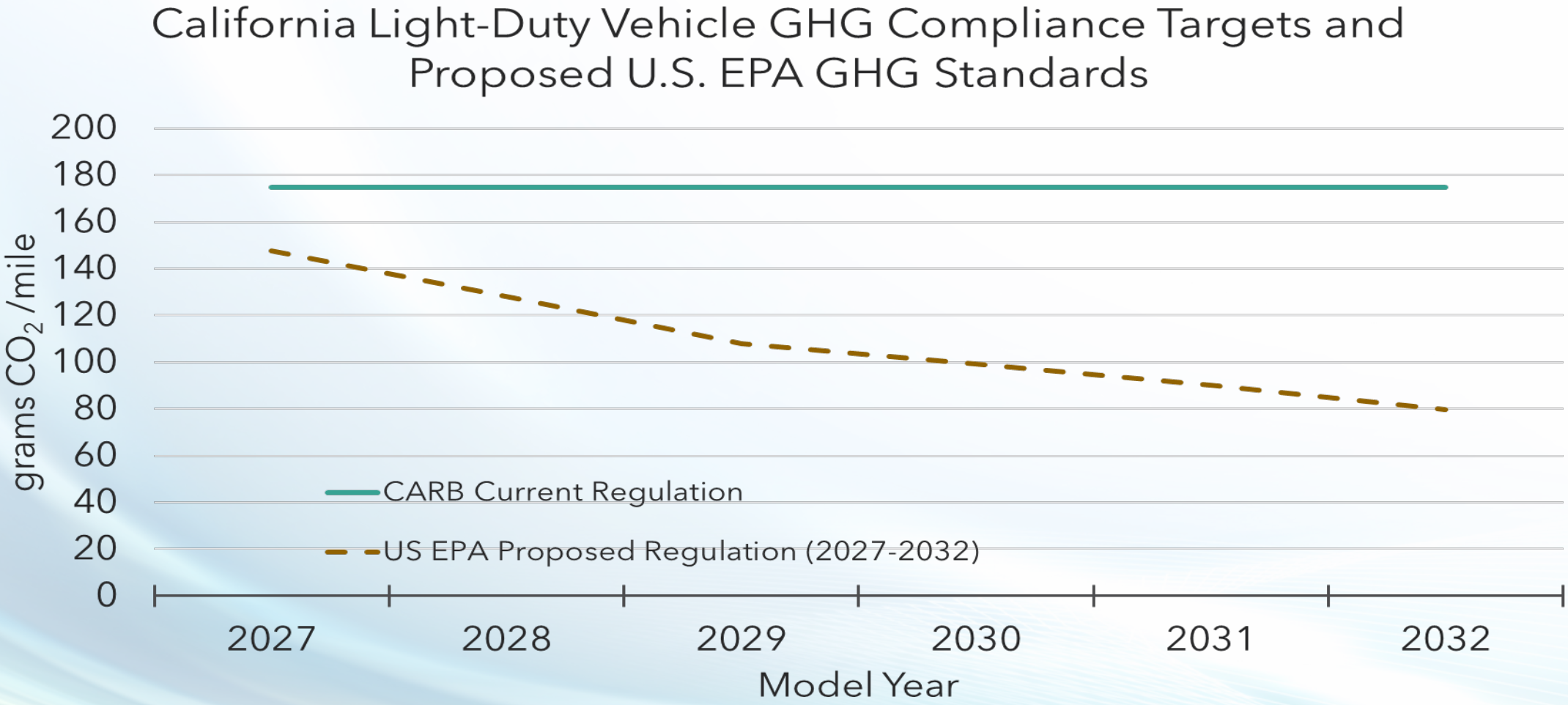
ACHIEVING
CARBON
NEUTRALITY
BY 2045

CARB

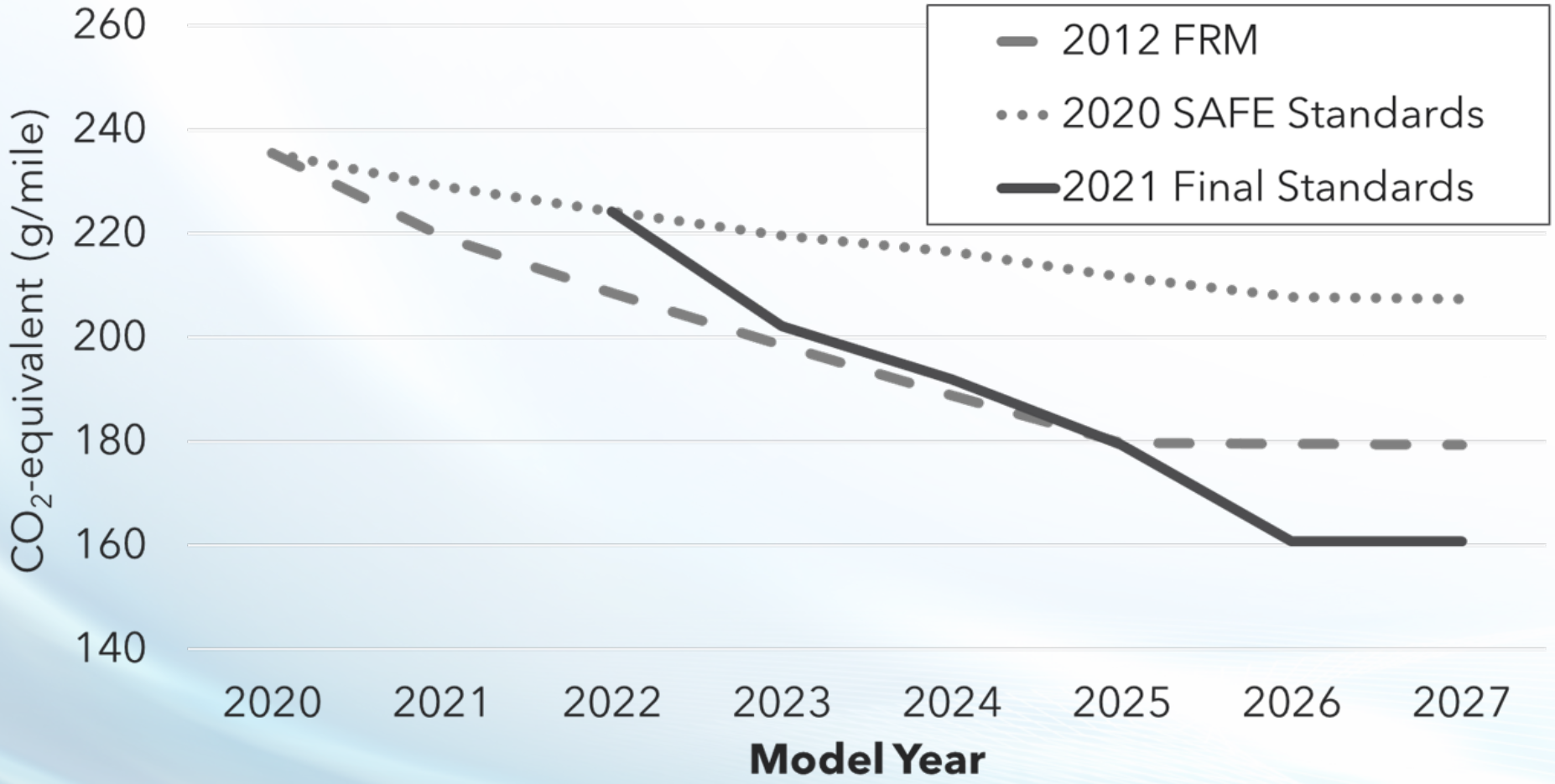
ICE vehicles will comprise a significant portion of the fleet even beyond 2035



Without updated standards, the program will no longer be sufficiently protective of emissions reductions

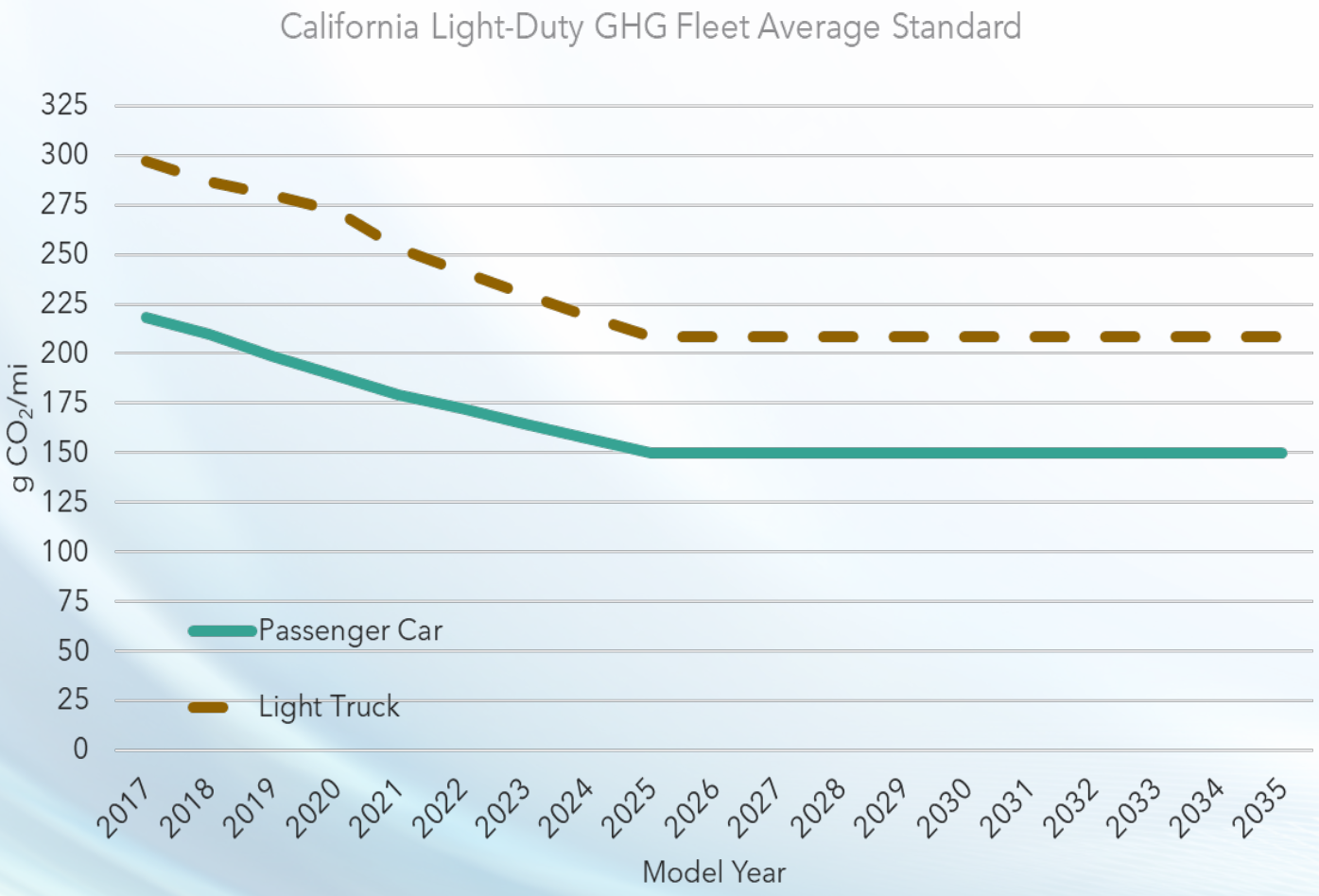


Maintaining a California program protects against federal volatility



CARB

Existing California Light-Duty GHG Standards



- Separate standards for cars and trucks
- Sales-weighted average, including ZEVs
- Vehicle footprint-indexed targets
- Accounts for incremental upstream emissions ZEVs/PHEVs
- Technology-specific credit opportunities

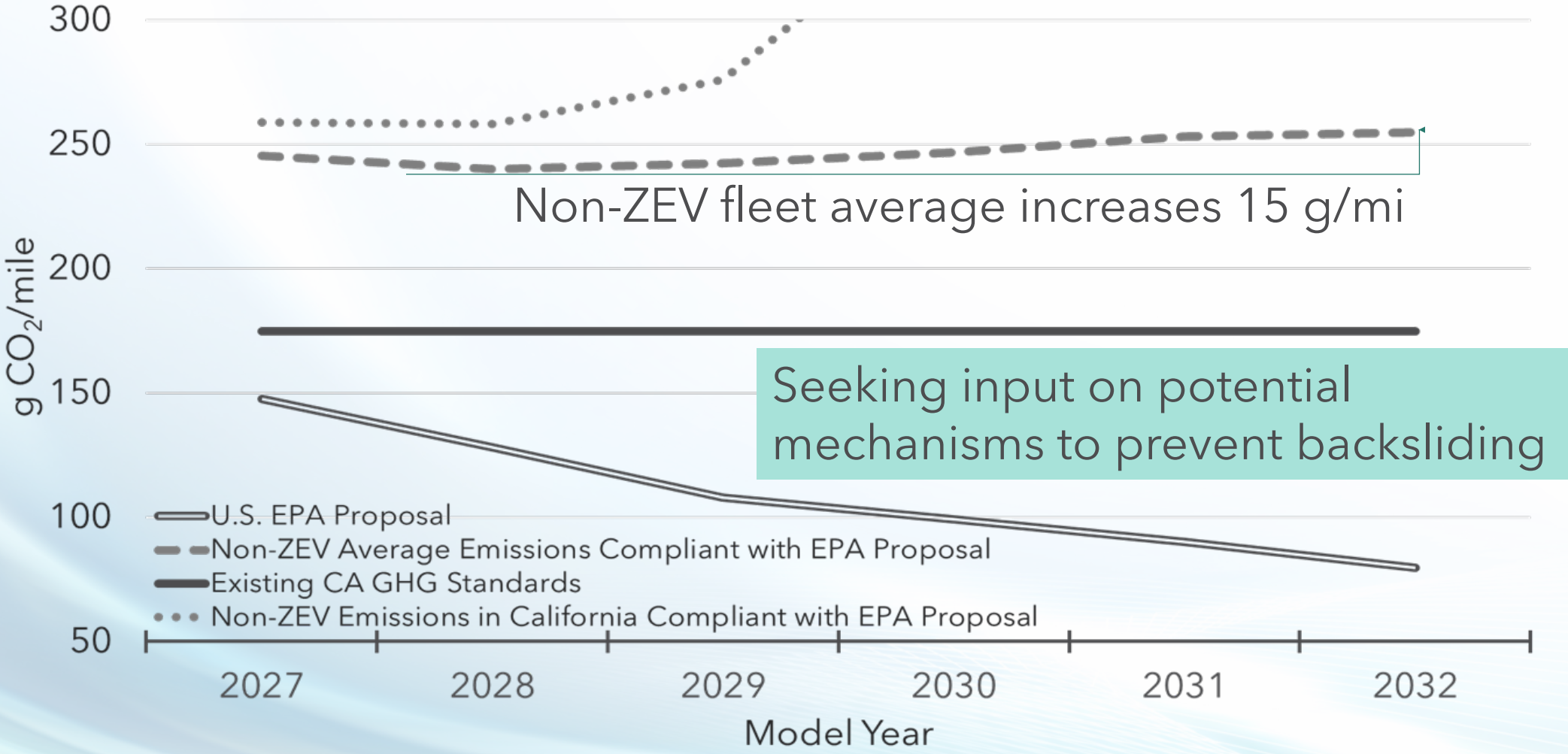
Light-Duty GHG Program Elements Under Consideration

- Fleet average standard
- Anti-backsliding mechanism
- Treatment of plug-in hybrid electric vehicles (PHEV)
- Motor vehicle air conditioning credits
- Use of ethanol

Light-duty GHG Fleet Average Standard: EPA Proposal

Program Element	EPA Proposal
Timeframe	2027-2032 and later model years
Fleet average standard (g CO2/mi)	Estimated to be 82 g CO_2/mi in 2032
Footprint curves	• Flatten the slope (i.e., reduce variation in standards between small and large cars) • Narrow difference between cars and trucks
Sales-weighted fleet averaging	Includes ZEVs
ZEV upstream emissions	Assigns 0 g CO_2/mi
Off-cycle credits	Phases out/eliminates

Fleet average standards do not prevent backsliding as more ZEVs enter the fleet



Treatment of PHEVs: Fleet Utility Factor

- CARB and EPA programs use Fleet Utility Factor (FUF) to calculate PHEV emission rates for fleet average standard
- Real-world data suggest current FUF overstates emissions benefits from PHEVs
- EPA has proposed to lower the FUF (i.e., reduce assumed GHG benefits from PHEV usage)

Seeking input on:

- Additional data sources for PHEV eVMT
- Alternative utility factors
- Additional standardized vehicle data parameters to be implemented and reported to CARB to verify PHEV usage

Motor Vehicle Air Conditioning (AC) Credits

EPA Proposed GHG Regulation

- Limit AC efficiency credits to internal combustion engine vehicles for 2027+ MYs
- Eliminate LDV leakage credits and MDV leakage standard for 2027+ MYs

CARB Rulemaking Considerations

- Ensure vehicles continue to use low-leak system designs to minimize risk of refrigerant escape to atmosphere

Seeking input on:

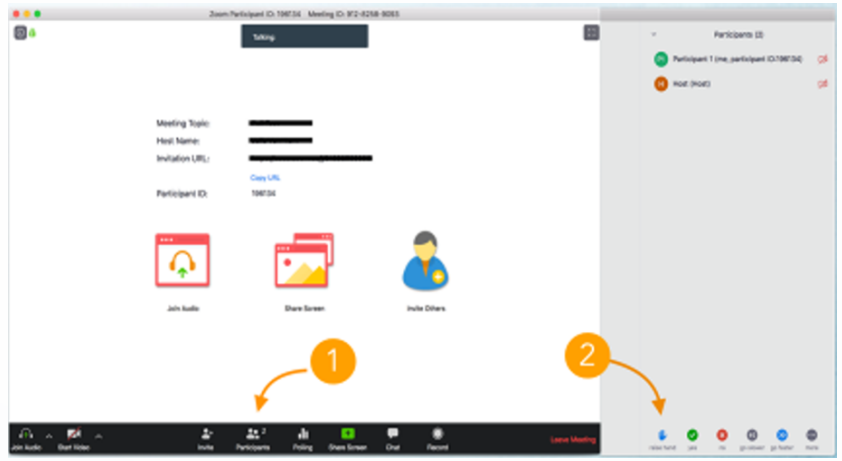
- Options to ensure robust designs (e.g., leakage standard, design review)

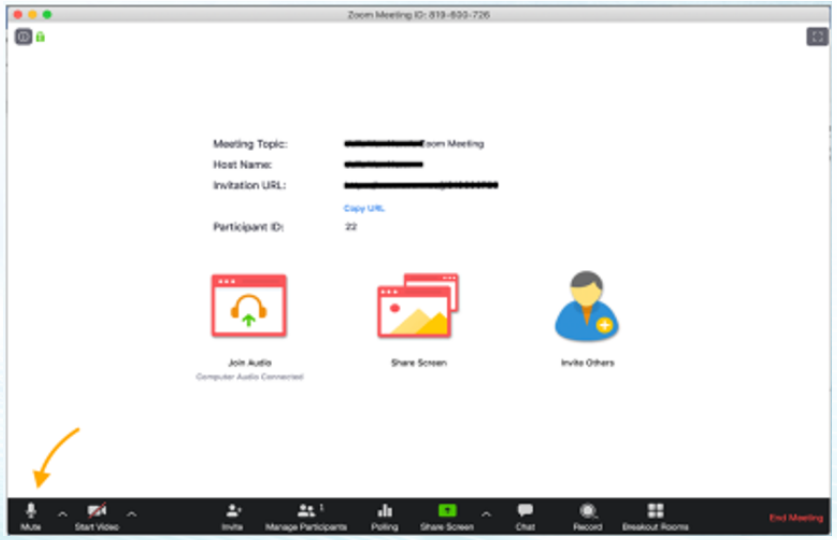
Use of Ethanol

- Seeking input on projected availability of E85 at fueling stations and propensity of drivers to fuel using E85
- Seeking input on greenhouse gas and equity impacts from increased usage of ethanol fuel
- Seeking input on hardware and calibration costs associated with flex-fuel capability, including costs of complying with criteria pollutant emission standards using E85 fuel

Q&A

- Zoom process
  - Raise hand or Press *9 to enter the speaking queue
  - Press the mute/unmute button or *6 to unmute
- In-person process
  - Raise hand





Consider alignment with EPA where appropriate

Criteria Air Pollutant Standards

ACC II LEV IV Regulation Overview

- Require manufacturers to meet criteria emission fleet average requirements without including ZEVs
- New light-duty vehicle standards to reduce tailpipe emissions during aggressive driving and cold-starts
- More stringent evaporative emission standards
- More robust in-use emission control for medium-duty vehicles

Summary of LEV IV Program Elements Likely Under Consideration

- Certification bins
- Consistency with federal particulate matter standards
- Alignment with federal onboard refueling vapor recovery requirement for incomplete vehicles
- Updates per Clean Truck Partnership agreement for chassis-certified medium-duty vehicles
- Assorted alignment of medium-duty vehicle provisions
- Test procedure and regulatory language updates

Light-duty NMOG+NOx Fleet Average Standard

CARB LEV IV Requirement

- Maintain NMOG+NOx fleet average at 30 mg/mi
- Excludes ZEVs from the fleet average after 2029 MY
  - Ensures ICE fleet gets clean and stays clean

EPA Proposed Tier 4

- Reduce NMOG+NOx fleet average from 30 mg/mi to 12 mg/mi by 2032 MY
- Includes ZEVs in average
  - EPA assumes ICE fleet at 30mg/mi and increasing ZEVs sales will be sufficient to meet overall fleet average

No amendments expected to be needed

Light-Duty NMOG+NOx Certification Bins

CARB LEV IV Bins [mg/mi]

EPA Proposed Tier IV Bins [mg/mi]

Watch for EPA's final, consider changes

Light-duty Particulate Matter (PM) Emission Standard

CARB LEV IV Requirement

- Maintained FTP standard of 1 mg/mi beginning with 2025 MY
- Reduced US06 standard from 6 to 3 mg/mi
- Phase-in excludes ZEVs

EPA Proposed Tier 4

- Reducing standard for all test cycles to 0.5 mg/mi (from 3 or 6 mg/mi)
  - Feasible to achieve with gasoline particulate filters
- Phase-in counts ZEVs

Watch for EPA's final, consider potential changes

Evaporative Emission Standards

CARB LEV IV Requirement

- Lowered running loss standard from 0.05 to 0.01 g/mi
- Added minimum canister size to better control refueling emissions from sealed fuel systems (mostly PHEVs)

EPA Proposed Tier 4

- No change to 0.05 g/mi running loss standard
- Eliminate exemption from refueling ORVR requirements for medium-duty incomplete vehicles
  - Requesting comment on doing the same for light-duty incomplete vehicles

Watch for EPA's final, consider potential changes

Aligning LEV IV with EPA's Clean Trucks Plan

- MDV chassis-certified in-use standards are based on the adopted HD Low NO_x Omnibus requirements
  - Board committed to maintain alignment with HD regulations as needed
- CARB recently reached agreement with HD industry to revise the CARB HD requirements to align with EPA's 2027 HD regulations (Clean Trucks Plan)
  - Affects engine standards that HD engines will be certified to which also changes the in-use standards.
  - Also changes the data sampling and analysis procedures for the in-use standards

Medium-duty Vehicle Applicability

CARB LEV IV Requirement

- Maintain separate standards for Class 2b (8,501-10k lbs GVWR) and Class 3 (10,001-14k lbs GVWR)
- All Class 2b and complete gasoline Class 3 vehicles must chassis certify
- Heavy-tow capable vehicles (GCWR >14k lbs) must additionally meet HD in-use standards enforced with PEMS

EPA Proposed Tier 4

- Heavy-tow vehicles (GCWR >22k lbs) must comply with HD engine standards
  - Effectively all diesel class 2b/3 pickups must meet HD engine standards with engine dyno certification
  - Longer useful life requirements

Watch for EPA's final, consider potential changes to align with upcoming HD amendments

Medium-duty NMOG+NOx Fleet Average Standard

CARB LEV IV Requirement

- Lowers Class 2b fleet average to 150 mg/mi and Class 3 fleet average to 175 mg/mi by 2030 MY
- Excludes ZEVs from average

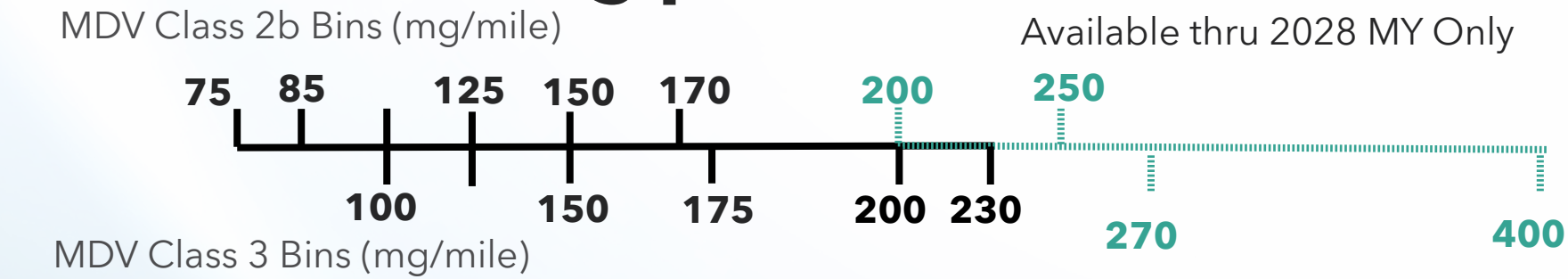
EPA Proposed Tier 4

- Lowers combined class 2b/3 NMOG+NOx fleet average to 60 mg/mi by 2032 MY
- Includes ZEVs in average
  - EPA assumes non-ZEVs to emit at 100 mg/mi and increasing ZEVs sales can lower fleet average below standard
- Excludes heavy-tow diesels that must meet HD engine standards

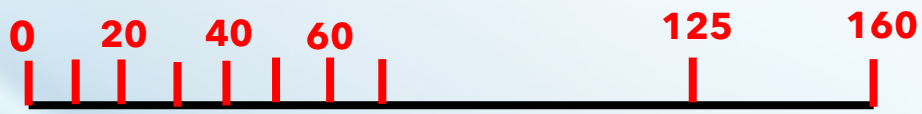
Watch for EPA's final, consider potential changes

Medium-duty NMOG+NOx Certification Bins

CARB LEV IV Bins [mg per mile]



EPA Proposed Tier 4 Bins [mg per mile]



EPA MDV (<22,000 lbs GCWR) (mg/mile)

Watch for EPA's final, consider potential changes

Medium-duty Particulate Matter (PM) Emission Standard

CARB LEV IV Requirement

- Maintained FTP standard at:
  - Class 2b: 8 mg/mi
  - Class 3: 10 mg/mi
- Lowered US06 standard to:
  - Class 2b: 8 mg/mi (Full US06), 6 mg/mi (US06 bag 2)
  - Class 3: 5 mg/mi (Unified cycle/LA92)
- Phase-in excludes ZEVs

EPA Proposed Tier 4

- Reducing standard for all test cycles to 0.5 mg/mi
  - Feasible to achieve with gasoline particulate filters
- Phase-in counts ZEVs

Watch for EPA's final, consider potential changes

Q&A

- Zoom process
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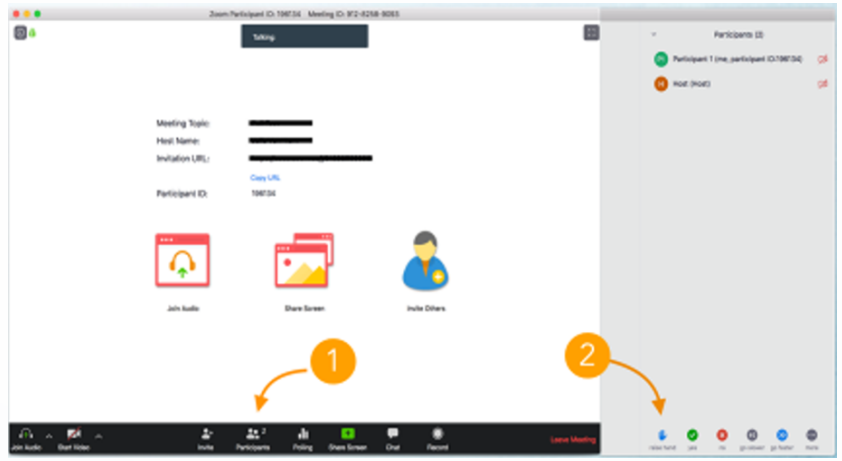
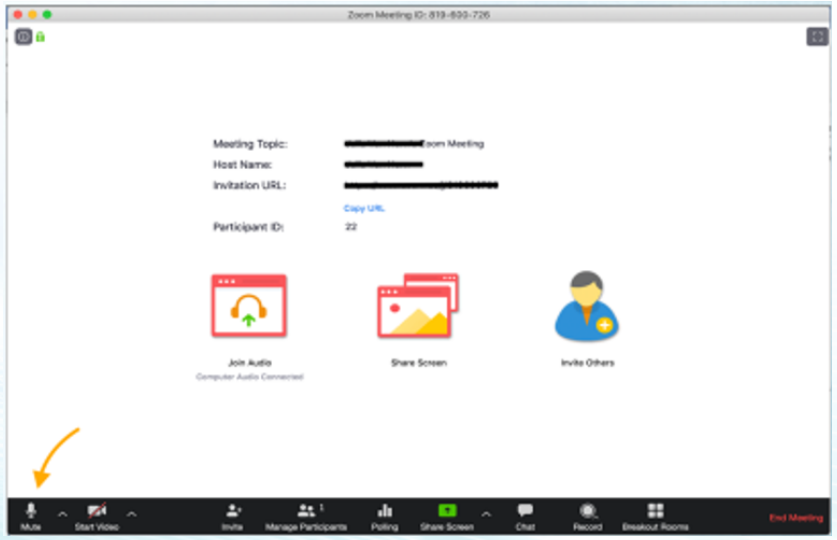
- In-person process
  - Raise hand

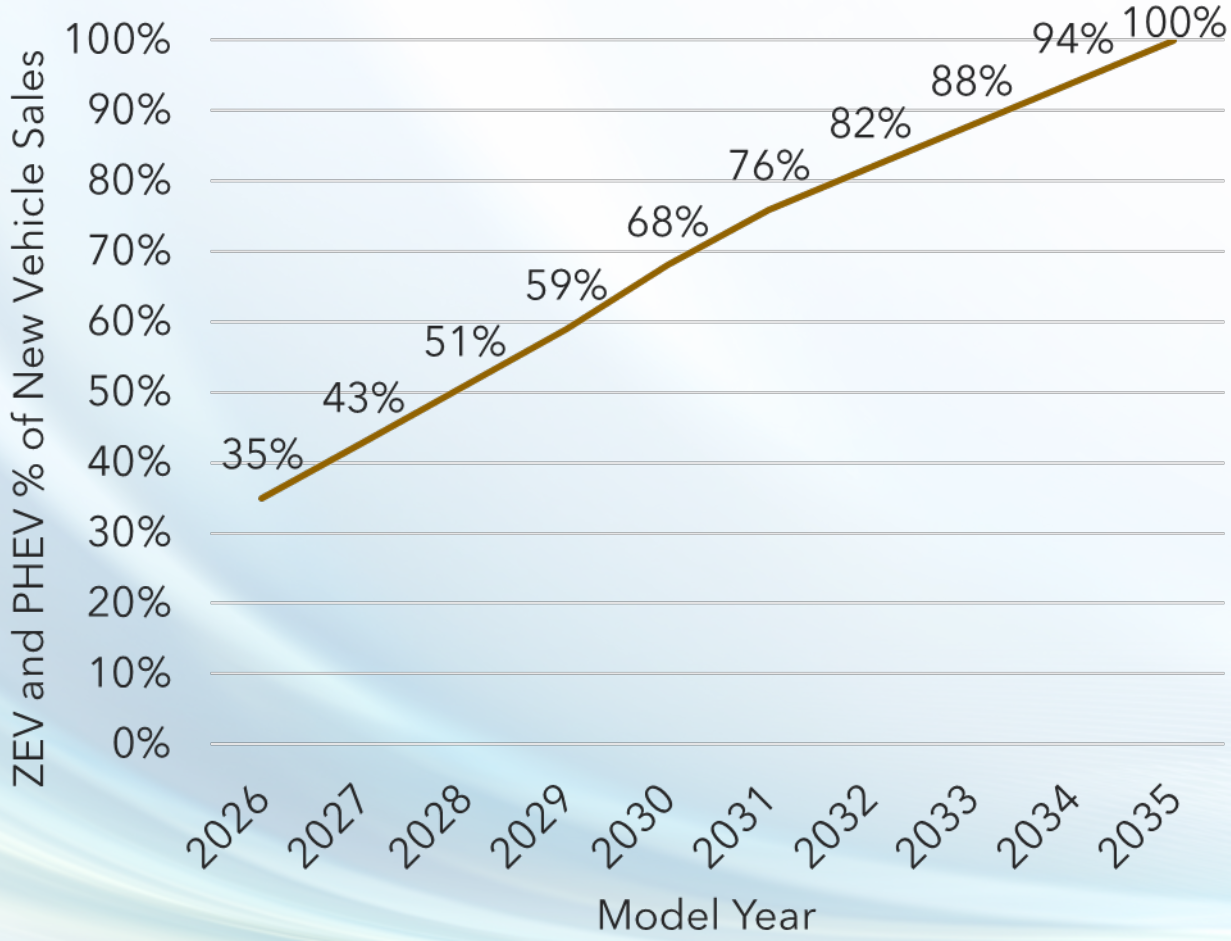




Consider new measures to further support the ZEV market

Zero-Emission Vehicle Assurance Measures

ACC II ZEV Regulation Overview



ZEV Assurance Measures

Range

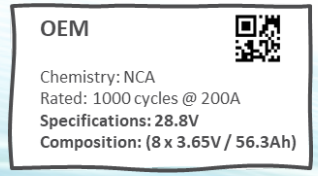
Durability

Warranties

Repair Information

Improved Charging

Standardized Data



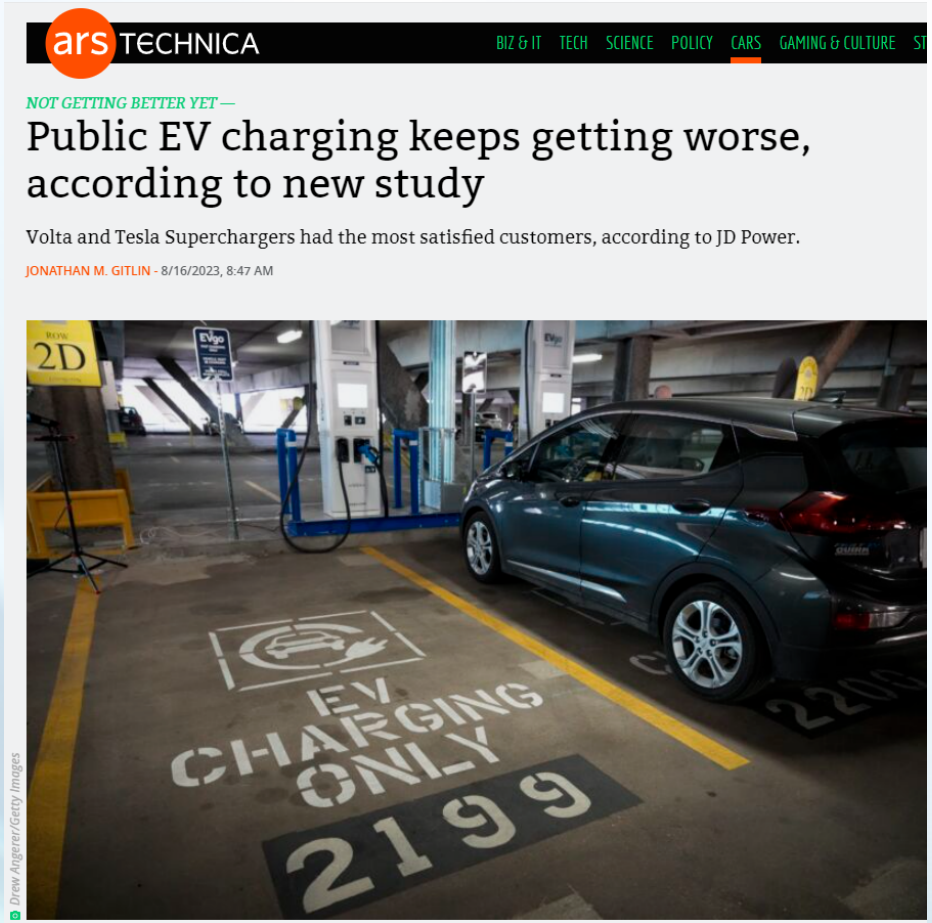
Battery Labeling

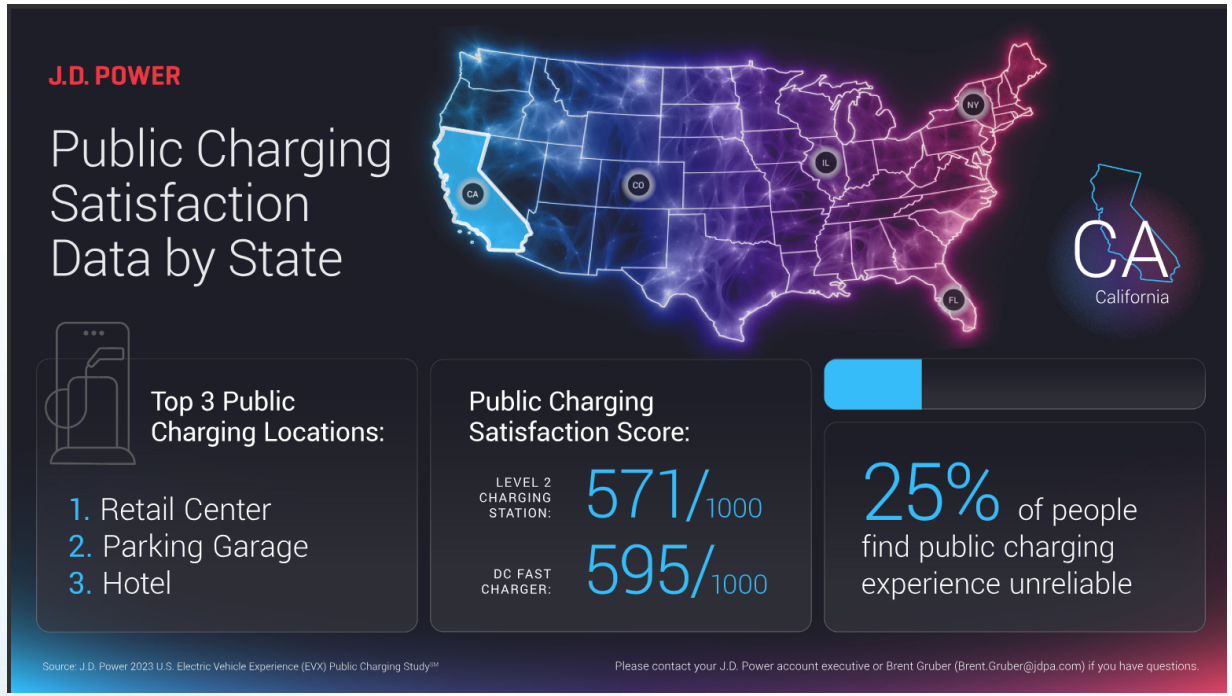
CARB

ZEV Program Elements Under Consideration

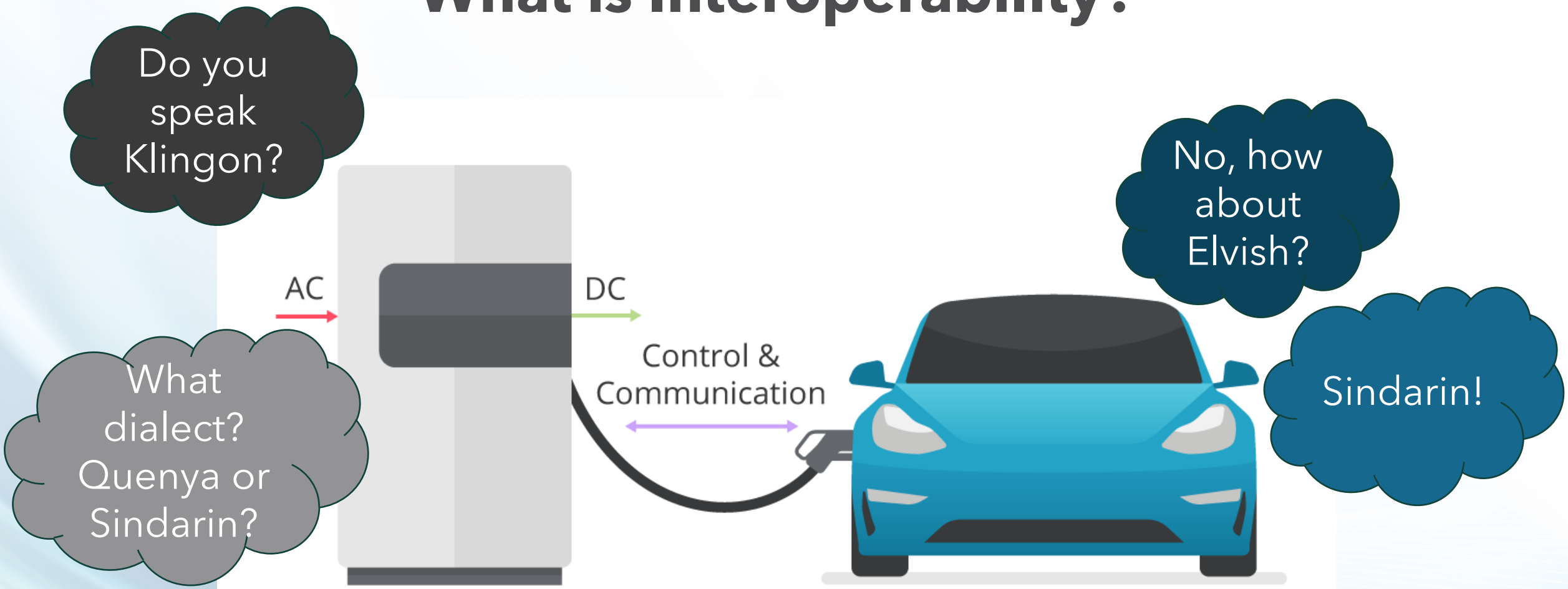
- New ZEV assurance measures
  - Interoperability standards
  - Consumer-facing vehicle labels
- Planning for Program Implementation
  - Process for connecting projects and manufacturers for Community-Based Clean Mobility Projects

The Public Charging Problem





What is Interoperability?



Vehicle Interoperability Standards Being Considered

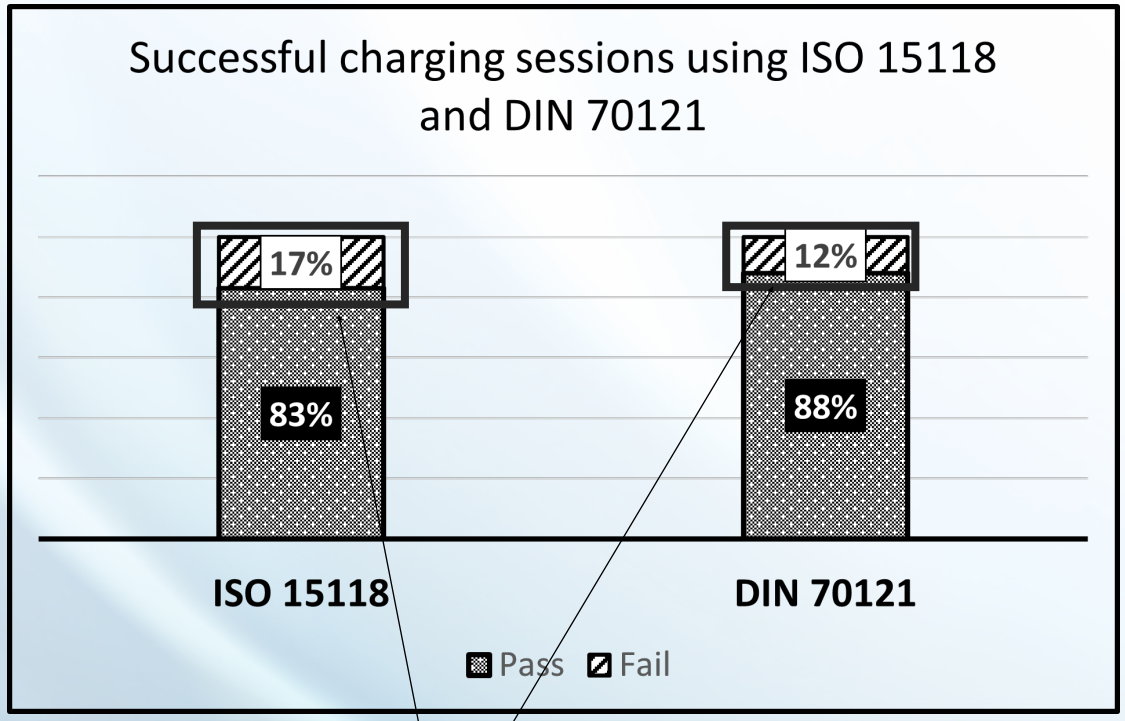
- Require vehicles to comply with existing standards beyond SAE J1772
  - ISO 15118-20
  - ISO 15118-2
  - DIN 70121

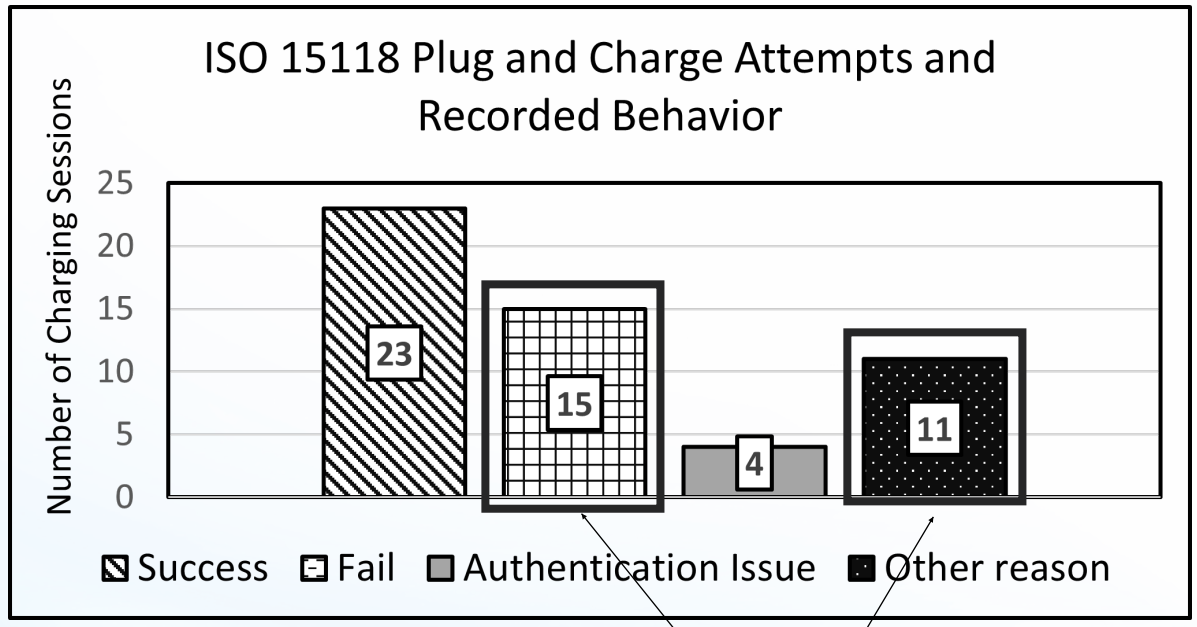
Seeking input on:

- Most relevant sections of referenced standards that should be adopted or avoided
- Other relevant vehicle standards to add to this list

Charging Communication Standards Alone Don't Guarantee Success

2023 VOLTS Event Interoperability Test Data





Despite charging standards in place, still having failures

Conformance Testing

What is it?

- Testing to verify that a product meets the requirements of a standard or specification

Where does CARB currently implement conformance tests?

- Confirmatory emissions testing on manufacturers' test vehicles
- On-Board Diagnostics (OBD)

How could conformance testing help charging interoperability issues?

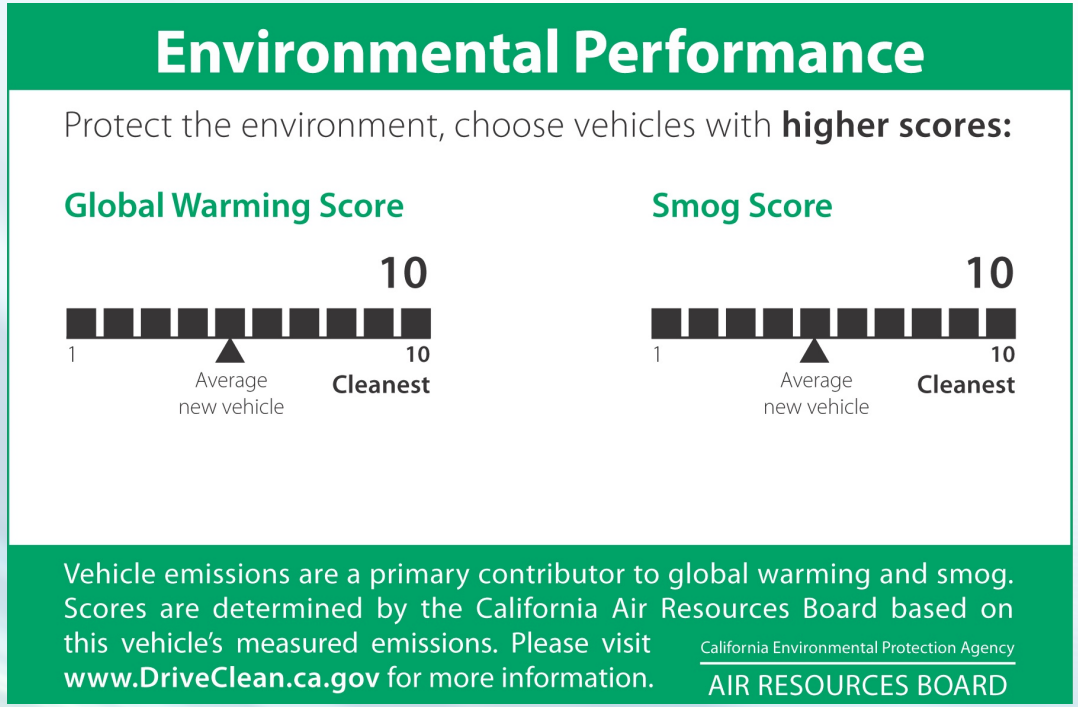
- Currently, no vehicle side charging conformance test is required
- Would ensure vehicles meet charging standards and specifications
- Provide certainty to charging equipment manufacturers and service operators that vehicles will work within certain set of parameters

Seeking input on:

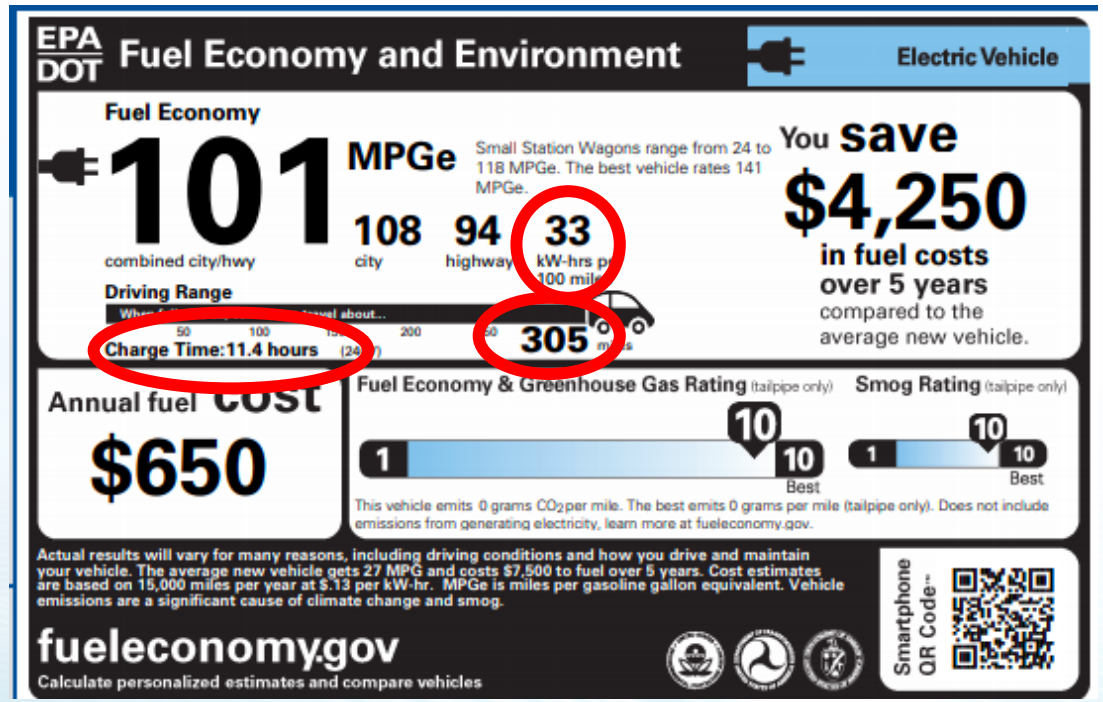
- Where the most charging event failures are happening on vehicles, and
- The most relevant portions of the charging communication standards that need to be checked for conformance

Background: Consumer-facing Vehicle Labels

California Environmental Performance Label

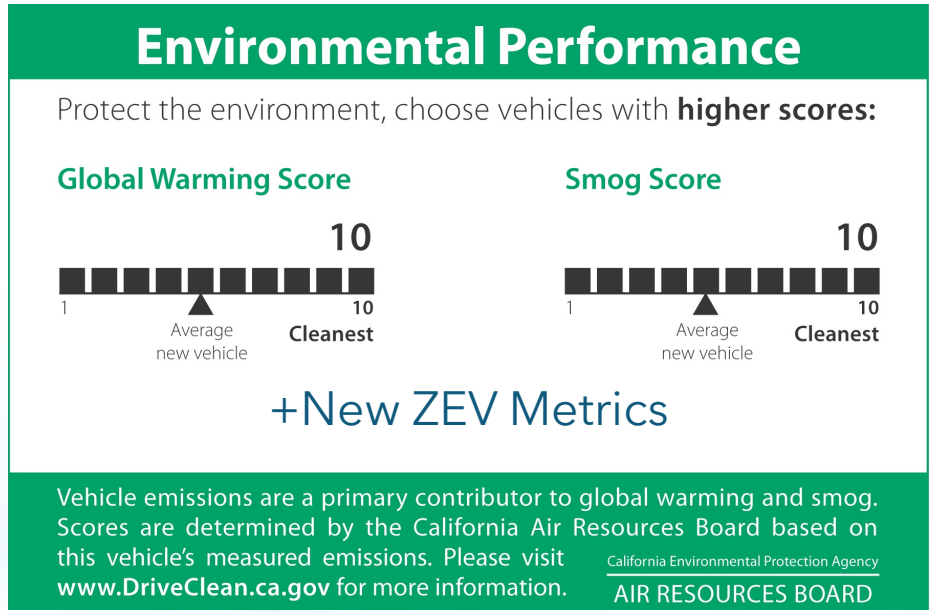


U.S. EPA/DOT Fuel Economy Label (Battery Electric Vehicle)



Opportunities for New ZEV Label Metrics

- Improved electric driving range information
  - Ranges that reflect higher speed highway driving
  - Impact of hot or cold weather on range
- Improved charge time information
  - Typical residential charging
  - Public fast charging
- Efficiency metrics relatable to what consumer observes or pays for
  - miles/kWh



Seeking input on:

- Key performance indicators that could be considered on a new ZEV label
- Data that could be collected to better inform potential buyers via the label

ACC II Implementation
EJ Values: Community-Based Mobility Projects

- Applicable: 2024 and subsequent MY
- To earn: Manufacturer must provide 25% discount off MSRP for sale or lease
- Next steps: Work with manufacturers and community-based clean mobility project developers to increase transparency
- Address key issues:
  - Establishing an equitable process
  - Increase transparency
  - Facilitating partnerships

To learn more, email zevequity@arb.ca.gov

Q&A

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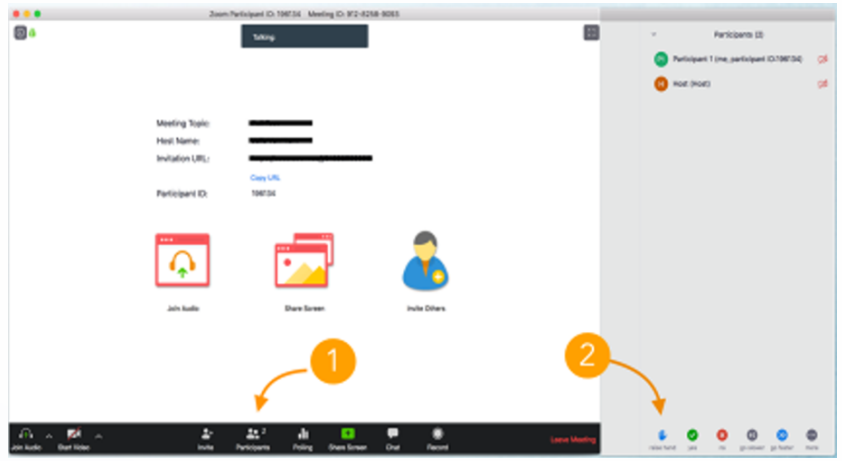

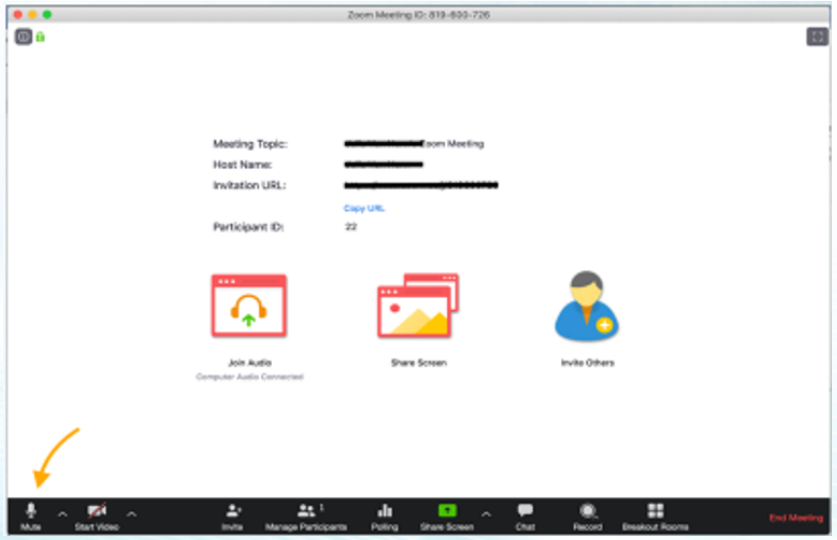

Draft Timeline

CARB

Community Outreach Plans

- Leverage existing meetings and processes wherever feasible
- Coordinate across CARB and with other agencies
- Diverse engagement approaches with interested and affected communities
- Support access to data on emissions and information on control technologies

Next Steps

- Staff to continue to develop proposals and consider stakeholder feedback
- Submit written public comment through January 15 to our comment docket
- Subscribe to our listserve for updates
- Reach out to us at Clean Cars (cleancars@arb.ca.gov)