

### **Advanced Clean Cars II Amendments**

Second Public Workshop June 26, 2024

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### **Tech Support and Reminders**

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**Contact** <u>Natalie Reavey</u> at natalie.reavey@arb.ca.gov

#### Reminders

- Meeting materials are available at the <u>Advanced Clean Cars Website</u>
- 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
  - Comment period will close Friday, July 26
- Submitted comments can be viewed on the ACC II workshop comments log webpage
- Reach out to us at <u>Clean Cars</u> (cleancars@arb.ca.gov)



## Workshop Agenda

- Staff Introductions
- Background and Timeline
- Criteria Air Pollutant Standards
- Light-Duty Greenhouse Gas Fleet Average Standards
- Zero-Emission Vehicle Assurance Measures
- Request for Alternatives for the Standardized Regulatory Impact Assessment
- Next Steps



### **Meet Our Staff**

| Staff Person    | Role   | Staff Person | Role   |  |
|-----------------|--|--------------|--|--|
| Belinda Chen    | Manager:<br>• ACC II Amendments Rulemaking<br>• GHG regulation<br>• LEV regulation | Ugo Obieshi  | Light-duty criteria and GHG technology and emissions control |  |
|                 |  | Kevin Sothy  | Medium-duty vehicle criteria standards                       |  |
| Anna Wong       | Manager: ZEV regulation  | Jason Gordon | Evaporative emissions  |  |
| Anna Scodol     | Cody Livi  |              | GHG standards, modeling, and analysis                        |  |
| Anna Scoder     | Lead stall. ACC II Amendments Kulemaking   | Xiaoli Hu    | Light-duty GHG standards and analysis                        |  |
| Natalie Reavey  | Outreach and community engagement  | Seungju Yoon | Manager overseeing motor vehicle air conditioning            |  |
| Lisa Chiladakis | sa Chiladakis Outreach and community engagement                                    |              | Motor vehicle air conditioning                               |  |
|                 |  | Ryan Hart    | ZEV technology   |  |

Jeff Ongnok

Stephanie Palmer

Banpreet Bhambra

Adrienne Harris

Joyce Wong

ZEV technology

ZEV infrastructure

ZEV infrastructure

ZEV infrastructure

Environmental performance label



### Timeline





#### **Scope of Advanced Clean Cars II Amendments**







#### **Criteria Air Pollutant Standards**



## **Criteria Air Pollutant Standard Topics**

- Light-Duty Criteria Pollutant Standards
  - NMOG+NOx
  - Particulate Matter
- Medium-Duty Criteria Pollutant Chassis-Certified Standards
  - NMOG+NOx
  - Particulate Matter
  - Certification Test Procedure
  - In-use Requirements
- Evaporative Emission Standards
  - Onboard Refueling Standards
- Q&A



### **Light-Duty Criteria Pollutant Standards**



#### Light-Duty NMOG+NOx Fleet Average Standard

- LEV IV maintained NMOG+NOx fleet average at 30 mg/mi for MY 2026+ while excluding ZEVs starting in MY 2029
- EPA's Tier 4 standards lowered NMOG+NOx fleet average to 15 mg/mi by MY 2032 while continuing to include ZEVs in the average
- No changes needed as both standards require similar levels of emission controls



## **Light-Duty NMOG+NOx Certification Bins**



CARB will not amend existing LEV IV bin structure for light-duty vehicles



## **Proposal: Eliminate "Cleaner Car" Provision**

- LEV IV (13 CCR 1961.4(c)(6) currently prohibits manufacturers from certifying vehicles in California at a dirtier bin than they certify to with EPA
  - For example, if a vehicle certifies to 35 mg/mi for EPA, it must certify in California to 35 mg/mi or lower
    - LEV IV does not offer a bin for 35 mg/mi, but manufacturer cannot certify to 40 mg/mi under this provision
- Eliminating this provision provides manufacturers with greater compliance flexibility especially when differences in available bins exist
  - LEV IV fleet average does not include ZEVs which reduces risk of manufacturers certifying to dirtier bins when still held to a 30 mg/mi fleet average



## LD Particulate Matter Emission (PM) Standards

#### ACC II

- **FTP:** Maintained phase-in to **1** mg/mi standard by MY 2028.
- US06:Reduced US06 standard from 6 mg/mi to 3 mg/mi by MY 2030
- Phase-in excludes ZEVs

#### EPA Final Rulemaking

- **0.5** mg/mi requirement across three test cycles (-7°C FTP, 25°C FTP, US06)
- Phase-in schedule for LDV, LDT1-2: 20/40/60/100% from 2027 to 2030
  - Includes ZEVs
- Applies to all LDT3-4, MDPV in 2030

#### **CARB** Proposal

- Lower PM standard for same test cycles from 1-3 mg/mi to 0.5 mg/mi for MY2030+ (no phase-in)
  - Harmonizes with EPA final rulemaking



#### Medium-Duty Criteria Pollutant Chassis-Certified Standards



### **MDV NMOG+NOx Fleet Average Standard**

#### ACC II

- Lowered NMOG+NOx fleet average for Class 2b to 150 mg/mi and for Class 3 to 175 mg/mi by 2030
- Excludes ZEVs from average

#### EPA Final Rulemaking

- Lowered NMOG+NOx fleet average for combined Class 2b and Class 3 to 75 mg/mi by 2033
- Includes ZEVs in average
- Allows MDVs with GCWR > 22k lbs. the option to chassis certify or engine certify

#### CARB Proposal

- Further reduce MDV ACC II NMOG+NOx fleet average standards for MY2030+ to achieve equivalent stringency as EPA's projected ICE MDV fleet average
- Would align with EPA on ICE portion of the fleet and achieve further emission reductions



## **Proposed CA MDV Fleet Average Standard**



-O-CARB Proposed Combined 2b and 3 Standard

#### Seeking input on:

ARB

• Should MY 2030 remain as separate or combined standards

#### MDV NMOG+NOx Certification Bin Comparison

#### **Requirement Advanced Clean Cars II MDV Bins**



MDV Class 3 (10,001-14,000 lbs GVWR) Bins (mg/mile)

#### **Requirement EPA Tier 4 MDV Bins**



## **Proposed MDV NMOG+NOx Certification Bins**

Proposed MDV LEV IV Class 2b and Class 3 Bins MY 2030+

Current LEV IV requirement phases out highest emitting MDV bins after MY 2028

Proposal simplifies bin structure requiring all MDVs to certify to same bin range 75-170 mg/mi for MY 2030+



#### Seeking input on:

• Should CARB add a bin lower than 75 mg/mi



## **MDV Particulate Matter (PM) Standard**



\*Low power to weight ratio vehicles have the option to certify to a partial US06 (bag 2) standard at 6 mg/mi

#### ACC II

- Maintain **8-10** mg/mi FTP PM standard
- US06 and Unified ("UC" or LA92) PM standards lowered to
   **5-8** mg/mi

#### EPA Final Rulemaking

 Tier 4 PM standard for 25°C FTP, -7°C FTP and US06 lowered to 0.5 mg/mi phases-in through MY 2027-2031

#### **CARB** Proposal

- Adopt 0.5 mg/mi standard for MY2031+ for the FTP and US06 standards
- Aligns with EPA requirement and achieves further PM reductions



### **MDV US06 Test Cycle**

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US06 Test Cycle



#### ACC II

- Class 2b MDVs utilize the US06 cycle
  - But low power to weight ratio vehicles have the option to use only a portion of the cycle
- Class 3 MDVs utilize the Unified cycle ("UC" or LA92)

#### EPA Final Rulemaking

- Require all Tier 4 MDVs to utilize full US06 cycle with phase-in MY 2027-2031
- Eliminates the UC and partial US06 cycle options

#### **CARB** Proposal

- Require full US06 cycle for all class 2b and 3 MDVs beginning with MY 2030
- Allow for optional early compliance in MY 2027-2029
- Aligns with EPA and simplifies the MDV certification requirements

## **MDV Optional Engine Certification**



#### Class 3 Diesel Vehicles



**Class 3 Incomplete Vehicles** 

#### ACC II

- All Class 2b vehicles must chassis certify
- Optional HD engine certification allowed for Class 3 diesel and incomplete gasoline vehicles

#### EPA Final Rulemaking

- Allows chassis certification for all MDVs
- Optional HD engine certification allowed for all MDVs with a GCWR > 22k lbs (diesel and gasoline)
- CARB is not changing the current ACC II optional engine certification path that applies only to Class 3 (diesel and incomplete gasoline vehicles)
- Not inconsistent with EPA options; manufacturers still have an ability to certify to both programs using a single certification pathway



## **MDV Moving Average Window (MAW) In-use** Standard



#### 2-Bin MAW Methodology

#### ACC II

Chassis-certified MDVs with GCWR > 14k lbs must meet **3-Bin** MAW standards (diesels) and **1-Bin** MAW standards (gasoline) starting MY 2027 +

#### **EPA Final Rulemaking**

Require Tier 4 MDVs with GCWR > 22k lbs to meet **3-Bin or 2-Bin** MAW standard (diesel) and 1-Bin MAW standard (gasoline) for MY 2031+

#### CARB Proposal

- Require chassis-certified diesel MDVs to meet a 2-Bin MAW standard starting MY 2027+.
- Aligns with forthcoming proposed amendments to HD Omnibus standards

(CARB is not changing the current ACC II 1-Bin MAW standard or GCWR requirement.)



### **Evaporative Emissions: ORVR standards**

- EPA Requirement:
  - Extends a current standard to (most) remaining vehicle classes previously not covered
  - Require ORVR (captures refueling emissions) for <u>heavy-duty incompletes</u> by MY 2027 (CTP)\* and
  - <u>Medium-duty incompletes</u> by MY2030 (Tier 4 FRM)
- Proposal: Apply ORVR for <u>all incompletes</u> starting MY 2030. Allow optional certification before this to harmonize with EPA's various phaseins.
  - Rationale: align with EPA
    - Light-duty incompletes already meeting ORVR

\*CTP is EPA's Clean Trucks Plan, Heavy Duty final rule signed December 2022



### **Evaporative Emissions: Other Minor Changes**

- Additional preconditioning drive for MDV + HDV w/ fuel tanks >50 gallon
  - Additional FTP drive
  - Aligns with EPA Clean Trucks Plan
- NIRCOS: extend preconditioning procedure to all vehicle types (not just PHEV)
  - Aligns with current certification practices



### **Future Workshop Topics**

- Altitude Emissions Standards
  - Seeking input on amendments to high-altitude standards that balance test burden and protecting for emissions controls in realworld driving conditions



#### **Q&A**



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### **Light-Duty Greenhouse Gas Standards**



## Light-Duty Greenhouse Gas (GHG) Standards

- Background and Updates Since November 2023 Workshop
- CA Fleet Average Standard Proposal
  - Policy Design and Stringency
  - Plug-in Hybrid Electric Vehicle Crediting
  - Off-Cycle Credits
  - Motor Vehicle Air Conditioning Credits
  - Medium-Duty Passenger Vehicle Definition
- Update on Analysis of Real-World Emissions
- Q&A



#### Developing Updated Light-Duty GHG Standards Through 2035+



PHEV = ICEV ■ ZEV

- Existing standards flatline after the 2025 model year
- Beginning in 2035, the only new vehicles with tailpipe emissions sold in California will be plug-in hybrid electric vehicles (PHEVs)

#### Key question:

• What policy design best supports California's GHG goals?



## **EPA 2027+ Light-Duty GHG Standards**

| Program Elements                                       | EPA Final Rule  |  |  |
|--|---|--|--|
| Policy Design  | Sales-weighted fleet average including ZEVs   |  |  |
| Timeframe  | 2027-2032 and subsequent  |  |  |
| Projected ending fleet average standard (national)     | 85 g CO <sub>2</sub> /mi in 2032  |  |  |
| Footprint curves                                       | <ul> <li>Separate car and truck curves</li> <li>Slopes are flattened to reflect high ZEV shares</li> <li>Truck offset is reduced</li> </ul> |  |  |
| ZEV upstream emissions                                 | Assigns 0 g CO <sub>2</sub> /mi to ZEVs and PHEV eVMT   |  |  |
| Technology-specific credits<br>(g CO <sub>2</sub> /mi) | Phase down to 6.6 (car) and 9.2 (truck)   |  |  |



#### With ZEV Regulation, California Fleet Will Likely Outperform EPA's Standards



-O-CA Fleet Target Under ACC I -A-CA Fleet Target Under EPA Rule -Projected CA Fleet Average Emissions



### With Fleet Averaging, Increasing ZEV Sales Create ICE Backsliding Risk



- -O-CA Target Under EPA Standard
- -D-Maximum Allowed ICE Tailpipe Emissions

## What could lead to increasing ICE emissions?

- Conversion of relatively loweremitting models to ZEV platforms
- De-contenting individual models
- Discontinuing lower-emitting variants
- Recalibrating for performance improvement rather than emission reductions



#### Technologies Available Today Can Further Reduce Emissions from Light-Duty ICEVs







Lightweighting

#### Advanced Engine Technologies

Hybridization



### Staff Propose an ICE-Only Fleet Average Standard Beginning in the 2030 Model Year



CARB

✓ PHEV = ICEV ■ ZEV

#### Proposal:

- Remove ZEVs from the fleet average beginning in 2030
- Establish an ICEV+PHEV fleet average standard for 2030-2034
- Establish a PHEV-only fleet average standard for 2035+

#### Seeking input on:

 Appropriate ICE-only stringency and footprint curve design

### Proposed ICE-Only Fleet Average Standard Would Not Account for PHEV eVMT

#### **Existing Approach**

- Fleet average standard includes ICEVs, PHEVs, and ZEVs
- PHEV GHG emissions are lowered based on estimated electric operation
- The Fleet Utility Factor assigns an eVMT share based on all-electric range

#### **PHEV GHG Emissions** =

Charge Sustaining Emissions (Internal Combustion Engine) discounted by **eVMT share** 

#### Proposal

- Fleet average standard includes ICEVs and PHEV combustion emissions
- PHEV GHG emissions are based solely on gasoline operation
- Fleet Utility Factor no longer required

#### **PHEV GHG Emissions** =

Charge Sustaining Emissions (Internal Combustion Engine) discounted by **eVMT share** 

#### Seeking input on:

ARB

• Future PHEV charge-sustaining emissions rates and appropriate stringency

### Staff Are Developing Flexibilities to Accommodate a Dwindling ICEV Fleet



• Transfer of excess ZEV values

CARB

Additional flexibilities for manufacturers with limited ICEV models

### **Addressing ACC | Credit Banks**



CA Fleet Target (ACC I) = CA Fleet Target (EPA Final Rule) - Hypothetical Performance





**Credits Carry Forward** (still subject to 5-year credit life)

## **Off-Cycle Credits**

#### **Proposal:**

- Off-cycle technologies offer real benefits, but small magnitude and resource-intensive to implement
- CARB proposes to phase-out offcycle credits
- Phase-out schedule will depend on the stringency





## Motor Vehicle Air Conditioning Credits: Leakage

#### • EPA Final Rule

- Institutes a decreasing cap for A/C leakage credit.
- Retains a smaller A/C leakage credit if GWP≤150 for MY31+;

#### • Proposal

- Retain some A/C leakage credit, similar to EPA, to backstop reversion to higher-leak technologies.
- Evaluate specific values in the formulae to incentivize low-leak designs.
- Consider ZEV-specific leakage standard or design requirement.





### Motor Vehicle Air Conditioning Credits: Efficiency

#### • EPA Final Rule

- Removes A/C efficiency credit eligibility for ZEVs beginning with the 2027 model year.
- Retains A/C efficiency credit for ICEVs and PHEVs.

#### Proposal

 Consistent with ICE-only fleet average standard, restrict A/C efficiency credits to ICEVs and PHEVs in 2030

| Vehicle  | Existing Program        | EPA Final Rule          |
|----------|-------------------------|-------------------------|
| Category | (g CO <sub>2</sub> /mi) | (g CO <sub>2</sub> /mi) |
| ZEV      | Car: 5<br>Trucks: 7.2   | Car: 0<br>Trucks: 0     |
| ICEV or  | Car: 5                  | Car: 5                  |
| PHEV     | Trucks: 7.2             | Trucks: 7.2             |



## **Medium-Duty Passenger Vehicle Definition**

|          | Seating capacity                       | Weight threshold                   | Cargo Area Fixed<br>Interior Length  | Example Vehicles   |
|----------|--|------------------------------------|--|--|
| Existing | ≤12 or<br>≤9 rearward of the<br>driver | 8,500 lbs. < GVWR ≤<br>10,000 lbs. | <72 in   | Ford F150 Lightning,<br>GM Hummer EV, GM<br>Silverado EV, Rivian R1T |
| New      | ≤12 or<br>≤9 rearward of the<br>driver | 8,500 lbs. < GVWR ≤<br>9,500 lbs.  | <94.0 in   | Tesla Cybertruck,<br>Nissan Titan XD                                 |
|          |  | 9,500 lbs. < GVWR ≤<br>14,000 lbs. | Work Factor < 4,500<br>lbs.: <94 in<br>Work Factor ≥ 4,500<br>lbs.: <72 in |  |

**Proposal:** Adopt EPA's updated medium-duty passenger vehicle definition for the 2030 and subsequent model years (maintain current definition through the 2029 model year)



### Update on Analysis of PHEV Real-World Emissions

- Emission benefit analysis adjusts certification values for real-world emissions.
- Real-world data suggest existing certification values overstate PHEV benefits.
- Key analysis questions:
  - What are the real-world emissions of PHEVs relative to their certification values?
  - How does that relationship compare to other vehicle technologies?
  - Are there readily available explanations for any discrepancies?



#### **Real-World Emissions From PHEVs Disproportionately Exceed Certification Values**



CARB

#### High PHEV Emissions Are Not Unique to Outof-State Drivers





#### It Remains Difficult to Predict PHEV Consumer Behavior





#### Q&A



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#### **ZEV** Assurance Measures





### **ZEV Assurance Measure Topics**

- Consumer-facing vehicle label
- Interoperability
- ACC II Implementation
  - Battery labeling requirements
  - Data standardization requirements
- Q&A



## **Background: Consumer-facing Vehicle Labels**

- CA Environmental Performance
   Label
  - Supplemental label
  - Incorporated into the U.S. EPA/DOT Fuel Economy Label
- U.S. EPA/DOT Fuel Economy Label
  - Current information not informative for ZEVs
- Develop new CA Environmental Performance Label
  - Provide improved metrics



#### **U.S. EPA/DOT Fuel Economy Label**



## **Survey Development and Distribution**

- Distributed survey on CA Environmental Performance Label to the public in early May
  - Listservs, social media, air districts, nonprofits, CBOs, NGOs
- Understand which topic areas are most important to consumers
  - Range
  - Charging
  - Battery
  - Environmental scores
  - Current label information
- 2400+ respondents



## **Survey Results**

- Most respondents use the current EPA label and websites dependent on EPA label data
- Interest in real-world range numbers
  - Estimated highway range and lowest possible range
- Interest in DC fast charging capabilities and speed
- Battery warranty
- Vehicle efficiency
- Non-informative metrics
  - MPGe and smog/greenhouse gas scores



## **Charge Rate and Range on ZEV Label**

- Opportunities to improve on existing label range and charging speed.
- For range, CARB is supportive of changes to SAE J1634 that would allow calculating a range at a higher speed from data collected during current testing.
- For charge rate, CARB is proposing using SAE J2953/4 to collect charging speed.





### **Charge Rate and Range Data Collection**

- Proposed DC charge rate metric: X miles added / 10 minutes
- Proposed AC charge rate metric: X miles added / 1 hour
- Proposed collection method: SAE J2953/4
  - Proposed to be used to obtain AC and DC charge rates
  - Specifies vehicle preparation and test procedure



### Vehicle and Charging Communications Interoperability



Cable connected to charger

Communication protocols are essential to establishing charge session

- ✓ Ensure charger cable is connected
- ✓ Ensure payment is authenticated and secure
- Negotiate appropriate charging parameters



### **Charging Interoperability: Communication Plays a Role in Failures**

**2023 VOLTS Testing Event -Charging Failure Causes** 



- ~20% of charging attempts reported as failed or unsuccessful
  - Of those failures, nearly 80% were caused by EV and EVSE talking incorrectly to each other

• No failures occurred in the middle of a successful session

### Charging Interoperability: Plug and Charge

#### What is it?

- Subset of ISO communication standard
- Simplifies charging by allowing drivers to plug in and walk away
- Payment information is stored with the vehicle
- Helps reduce payment failures

#### Vehicle Manufacturers

• 15% of available vehicles implement Plug and Charge

#### Infrastructure Funding Requirements

 Federal and California funding for new public infrastructure requires Plug and Charge



## **Charging Interoperability: Proposal**

- Beginning in 2028 model year
  - Applicable to battery electric vehicles and fast charge capable plugin hybrid electric vehicles
  - Require DIN SPEC 70121 and ISO 15118-2
    - Require implementation of Plug and Charge feature
  - Test conformance to DIN and ISO standards at time of certification
    - Work in progress on SAE J2953/3 Recommended Practice to incorporate tests



### **Updates on ACC II Battery Label Requirements**

- California Code of Regulations 1962.6
- Early implementation issues
- Proposed changes
  - Remove requirement that vehicle, pack, and module labels remain identical, and specify information for each label
    - Date
    - Voltage
    - Label position
  - Non-substantive changes

For illustrative purposes only: OEM XYZ Li - NRMC.GR/XYZ. 2904 Vmin<sub>0</sub>: 280V Vmin<sub>0,cell</sub>: 2.9V Capacity: 100Ah



#### Updates on ACC II Data Standardization Requirements

- California Code of Regulations 1962.5
- Early implementation issues
- Proposed changes
  - Battery State of Health (SOH): Vehicle display should be rounded to nearest whole number (zero decimal places)
  - Update SAE J1979-3 and J1979 DA references to latest version
  - Non-substantive changes, such as subsection reference updates



#### **Q&A**



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#### Standardized Regulatory Impact Assessment (SRIA) Request for Alternatives

- CARB welcomes public input on alternatives to the draft regulatory proposal discussed in this workshop
- In particular, CARB encourages public input on alternative approaches that:
  - may yield the same or greater benefits than those associated with the proposed regulation, or
  - may achieve the goals at lower cost



### Standardized Regulatory Impact Assessment (SRIA) Request for Alternatives

- Please ensure the submission discusses the alternative's ability to fulfill the purposes of the draft regulatory proposal as CARB has presented it
- Please submit the associated cost/benefit information and data sources to enable comparison of economic impacts
- Please also submit a clear description of the basis for any cost calculations

#### Public Comments Due: July 26, 2024



## **Next Steps**

- Consider stakeholder feedback
  - Submit written public comment through July 26 to our comment docket
  - Reach out to us at <u>Clean Cars</u> (cleancars@arb.ca.gov)
- Conduct community meetings this summer/fall
- Evaluate costs and benefits of proposal and alternatives
- Present updated proposals at future workshop

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