Zero-Emission Powertrain Certification (ZEP Cert) Proposed Concept

Battery Electric Vehicle Workgroup

January 30th, 2018

Workshop materials available on the ZEP Cert Website:

https://ww2.arb.ca.gov/our-work/programs/zero-emission-powertrain-certification

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Agenda

- Introduction
  - Discussion topics
    - Definition of a zero-emission powertrain
    - Vehicle vs powertrain certification pathway
    - Tiered certification approach for manufacturers

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Agenda (cont.)

- Sales volume based certification tiers
- Required Testing
  - Usable battery energy
  - Range
- Warranty period and language
- Reporting of warranty claims
- System monitoring / diagnostics
- Service information
- Durability /useful life
- Repair/service locations within California
- Fuel fired heaters
- Next steps and adjourn

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Definition of a Zero-Emission Powertrain

- Any system of components capable of providing vehicle tractive effort or providing stationary on/off vehicle power for a given application without producing emissions.
  - Includes
    - Motor/generator
    - Power electronics
    - Battery system
    - Fuel cell system
  - Not included
    - Charger (?)

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Vehicle vs Powertrain Certification

- Staff originally proposed requiring certification of a ZEP, similar to a HD engine certification
  - Staff's Goal
    - Allow pathway to market for ZEP manufacturers
    - Reduce certification burden
  - Stakeholder Concerns
    - Vehicle GHG EO still required
    - Separate ZEP Cert would be redundant
- Revised framework
  - Wrap the proposed certification requirements into the Vehicle GHG certification
  - Streamlines certification for vehicle manufacturers and CARB staff
    - Achieves same goal of providing a value added process for manufacturers and consumers

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ZEP Cert Tiered Approach (Draft – Deliberative)

Certification Level (Based on Sales Volume)	Level 1 (Includes Off-Road Equipment)	Level 2 (Builds on Level 1 requirements)	Level 3 (Builds on Level 2 requirements)
CA Sales Volume	• <51 per year	• 51-250 per year	• >250 per year
Applicability	• Class 2B/3 (incomplete); Class 4-8	• Class 2B/3 (incomplete); Class 4-8	• Class 2B/3 (incomplete); Class 4-8
Testing	• N/A	• Usable battery energy	• Range testing • Battery durability (cycle life, other)
Warranty	• Manufacturer defined • CARB clear language provision	• Disclose warrantable battery energy	• Minimum warranty of X years, Y miles
Other	• N/A	• Disclose repair/service location information within California • System Monitoring/Diagnostics • Standardized Communication Protocol • State of Health Information on Dash • Warranty reporting	• Useful life • Recall • Service information

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Vehicle Manufacturer Sales Volume Tiers

- On-Road
  - Level 1 (1-50/year)
  - Level 2 (51-250/year)
  - Level 3 (251+/year)
- Off-Road (optional)
  - No sales volume limits
  - Level 1 certification requirements for equipment
    - Goal is to support funding and incentive programs
  - May revisit mandatory requirements in a future rulemaking.

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Required Testing

- Usable Battery Energy
  - Stakeholder feedback
    - Inconsistencies in reporting this value
    - Seen as value added metric/comparison criteria for manufacturers and purchasers
  - Staff's Proposal
    - Perform a battery test at the pack level
      - Potential tests: C/3, pulsed power, dynamic
- Fuel Cell Performance Testing
  - SAE J2615 – power and efficiency

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Required Testing (cont.)

- Vehicle Range
  - Chassis Dynamometer
    - SAE J1634 (BEV) and SAE J2572 (Fuel Cell)
    - Limited availability
    - High cost
  - Track/On-Road Closed Course
    - More available/flexible option
    - Lower cost
    - Reference EPA SmartWay Fuel Efficiency Test Protocol for Medium- and Heavy-Duty Vehicles (SAE J1321)
  - Required Test Cycles
    - HD-UDDS
    - HFEDS

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Warranty Period and Language

- Staff is proposing to have a clear language provision for warranty
  - Full replacement period
  - Prorated period

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System Monitoring / Diagnostics

- Stakeholders input
  - SAE J1939 communications network suggested
  - Already widely used across on- and off-road heavy duty equipment
- What parameters should be made available to operators?

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Service Information

- CARB's current service information regulation requires automobile manufacturers to provide all emission-related information about their vehicles, via service manuals, technical service bulletins, OBD II descriptions, and diagnostic tools
- Staff is proposing to adopt similar provisions to allow service technicians access to the tools and information needed to repair heavy-duty electric vehicles

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Durability / Useful Life

- Stakeholder feedback
  - Battery testing varies greatly
    - Some vehicle manufacturers perform extensive / custom battery cycle life testing in-house
    - Others rely heavily on battery supplier tests
- Staff's Proposal
  - Wait on setting useful life requirements
  - Require that durability test data be submitted with certification application
    - Staff considering to allow in-house or supplier generated data, as long as it is reflective of usage through warranty period

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Reporting of warranty claims

- Consistent with legacy internal combustion powered vehicles/engines
- Allows CARB to investigate if a recall would be warranted

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Repair/Service Locations Within California

- Staff is proposing that repair and service location information be provided with the vehicle at the time of sale
  - Address
  - Phone number
  - Map
  - Including mobile repair options, if offered

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Fuel Fired heaters

- Stakeholders have requested flexibility to include fuel fired heaters in heavy-duty zero-emission vehicles
  - Low cost option for vehicles with large passenger occupied space
    - Shuttles
    - School buses
    - Transit buses

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Next steps

- Ongoing stakeholder engagement
- Second workshop February 13th, 2018
- Board date June 2018

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