Proposed California Phase 2 Greenhouse Gas Standards and Amendments to the Tractor-Trailer GHG Regulation

February 8, 2018
Sacramento, California
Background
Phase 2 Standards
California Phase 2 Differences
Proposed Federal Changes and our Response
  - Trailers
  - Gliders
Recommendation
Medium- and Heavy-Duty Vehicles are a Significant Source of GHG Emissions

Medium- and Heavy-Duty Trucks are fastest growing segment of transportation sector


Phase 1 covers engines and three vehicle categories:
- Tractors (Class 7–8)
- Vocational Vehicles (Class 2b–8)
- Pickup Trucks & Vans (Class 2b-3)

CARB harmonized with federal Phase 1 program in December 2013.
- Allowed CARB to enforce and manufacturers to certify in California.
- Will reduce heavy-duty truck CO₂ in California by ~12% in 2030.
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Collaboration with U.S. EPA and NHTSA

- 2014-2016: Close coordination as Phase 2 program developed
- CARB staff submitted extensive comments in October 2015 on proposal
  - U.S. EPA modified their proposal
- Outcome: Phase 2 program California can support
  - Allows manufacturers to continue to build a single fleet of vehicles and engines for the U.S. market
Final Rulemaking published in October 2016
- CARB staff informational update to the Board
- Technology forcing
- Reduce fuel consumption by 82 billion gallons; Lower GHG emissions by 1,100 MMT; Save vehicle owners $170 billion in fuel costs
- Payback to truck owners in 2 to 4 years
- Tractor-trailer fuel economy increase from ~6 mpg to ~9 mpg
- Closed loophole that was allowing glider makers to circumvent emission standards
Phase 2 Covers Engines, Three Vehicle Categories, and Trailers

<table>
<thead>
<tr>
<th>Tractors (Class 7-8)</th>
<th>Vocational Vehicles (Class 2b–8)</th>
<th>Pickups &amp; Vans (Class 2b-3)</th>
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</thead>
<tbody>
<tr>
<td>![Tractor Image]</td>
<td>![Vocational Vehicle Images]</td>
<td>![Pickup &amp; Van Images]</td>
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</tbody>
</table>

- Engines
  - $g(\text{CO}_2)/\text{bhp-hour}$

- Trailers
  - $g(\text{CO}_2)/\text{ton-mile}$
Federal Phase 2 includes trailer standards starting with 2018 MY
- Truck Trailer Manufacturers Association challenged the standards in court, saying U.S. EPA lacks authority over trailers
- U.S. Court of Appeals actions stayed the trailer requirements

Federal Phase 2 contains restrictions on dirty gliders (limits to 300 glider/year)
- Glider industry petitioned U.S. EPA for reconsideration in July 2017
- U.S. EPA released proposal on gliders in November 2017
  - Would repeal the current U.S. EPA Phase 2 glider requirements
  - U.S. EPA now says glider vehicles and engines are not “new” so they lack authority
Largely harmonizes with U.S. EPA’s Phase 2 standards
- Same structure and stringency levels
- Same timing (except CA trailer standards take effect in model year 2020)
- Would allow CARB to certify engines/vehicles and enforce Phase 2 in California

Some distinctions to credit, labeling, and rule flexibility provisions

Concurrently, amend TTGHG Rule to allow trailer fleet owners to comply using Phase 2 certified trailers/technology
Projected Phase 2 CO₂ Benefits

- **Overall Phase 2 Benefits:** 207.6 million metric tons (MMT) of CO₂ equivalent cumulative emission reductions in California from 2019 to 2050

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Phase 2 CO₂ Reductions</th>
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<tr>
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<td>From Baseline</td>
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<tr>
<td>2030</td>
<td>23%</td>
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<tr>
<td>2050</td>
<td>34%</td>
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California Phase 2 Differences

- Must certify separately in California
- Special provisions for California-certified transit buses to encourage zero-emission buses
- Minor changes to credit provisions
  - Encourage low-GWP refrigerants and better hybrids
- Minor additional reporting
  - Verify refrigerant leakage is limited
  - Cross-reference vehicle information to engine family to improve inventory and enforcement
- Additional label information to aid in enforcement and inform consumers
CARB staff will verify compliance independent of U.S. EPA (no “deemed to comply”)

Manufacturers must California-certify all vehicles (including trailers) and engines that are manufactured for sale in California

Future rulemaking: CARB staff could develop an expedited certification option that could streamline upfront certification in exchange for in-use data
Less stringent custom chassis standards not necessary for transit bus category

- Bus manufacturers in California already easily meet primary standards: ~450 zero-emission buses (ZEBs) already here

To discourage transit bus manufacturers from custom chassis certification, California Phase 2 would require:

- Certify California transit buses to more stringent primary vocational standards; or
- Surrender federal emission credits to make up for certifying to less stringent custom chassis standards

Demonstrate compliance based on percentage of ZEBs
Advanced Technology Credits for zero- and near zero-emission technologies

- To encourage development, deployment of advanced technologies
- California Phase 2 includes credits for Low-GWP refrigerants as well
- To protect Phase 2 benefits, staff proposed ATCs only for actions that go beyond requirements

Technology Multiplier

<table>
<thead>
<tr>
<th>Technology</th>
<th>Multiplier</th>
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<tbody>
<tr>
<td>PHEVs</td>
<td>3.5</td>
</tr>
<tr>
<td>All-electric vehicles</td>
<td>4.5</td>
</tr>
<tr>
<td>Fuel cell vehicles</td>
<td>5.5</td>
</tr>
<tr>
<td>Low-GWP refrigerants</td>
<td>1.8</td>
</tr>
</tbody>
</table>

The cap on credits for vehicles produced to meet another CARB requirement will be taken out of this rule and included in future technology mandate rulemakings
A/C System Leakage Rate Reporting Requirements

- A/C refrigerants have high global warming potential, need to control leakage
- Vehicle manufacturers to report detailed A/C system information at time of California certification
  - Detailed specifications of the system components associated with refrigerant leakage
  - SAE J2727 calculation leading to the leak rate estimate
- Helps CARB staff to:
  - Certify and enforce the A/C system leakage requirements
  - Verify manufacturers’ leak rate calculations
Rule requires a new consumer window label on new class 2b and 3 pickup trucks and vans

Provides consumers with easy to read information on the relative GHG and smog rating of a particular model

Letter grade rating (A+ to D)

Cleaner vehicle rating on left side of slider bar

Clarify the use of “Worst-Case” configuration
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Adopt California Phase 2 trailer standards equivalent to the U.S. EPA Phase 2 trailer standards (implementation begins with 2020 MY)

Modify California TTGHG regulation to give trailer fleet owners two new compliance options:
- Phase 2 certified trailer, or
- Trailer retrofitted with Phase 2 compliant aero and tires
TTMA filed petition with U.S. Court of Appeals requesting rescission of the U.S. EPA trailer standards and stay of implementation

- On August 17, 2017, U.S. EPA Administrator wrote that U.S. EPA will revisit the federal trailer provisions
- On October 27, 2017, U.S. Court of Appeals stayed the requirements while U.S. EPA reconsiders Phase 2 trailer provisions

CARB intervened representing California’s interests in this lawsuit

TTGHG interim provisions for MY 2018 and 2019 trailers

- CARB to review and approve Phase 2 aerodynamic performance and LRR tire test data not being processed by U.S. EPA due to stay
CARB’s Next Steps Re: Trailers

- Implement California Phase 2 trailer certification starting with 2020 MY, for trailers sold in California
- Implement modified TTGHG rule
- Provide flexibility to manufacturers left in limbo while U.S. EPA not implementing trailer requirements
- If U.S. EPA rescinds trailer requirements, propose further modifications to TTGHG to Board in ~2019:
  - Would impact owners of trailers that travel in California (regardless of State of origin)
  - Expand TTGHG applicability (e.g., long and short box-vans, non-box trailers)
  - Increase stringency in-line with Phase 2 trailer requirements
Glider Manufacturers are Circumventing Emission Standards

- Gliders are new chassis/cabs with refurbished engine, transmission and rear axle
  - Historically used to salvage engines from vehicles damaged by accidents
  - Now sold as new
  - Recent sharp increase in glider production to > 10,000/yr in 2015
  - Most gliders powered by pre-2002 engines with no exhaust aftertreatment
  - Glider manufacturers subverting emission standards:
    - “Dial back the emissions clock”
Glider Restrictions in Phase 2

- Phase 2 standards close glider loophole
  - Glider vehicles must comply with GHG standards
  - Glider engines must comply with GHG and criteria pollutant standards for model year corresponding to the vehicle’s date of manufacture
- Effective January 1, 2018, with some transitional flexibilities
  - limits to 300 glider/year
Current Glider Vehicles Are Gross Polluters

- U.S. EPA found:
  - Glider NOx: 4 to 40 times higher
  - Glider PM: 50 to 450 times higher

- CARB in-use heavy-duty emissions data and Portable Emissions Acquisition System (PEAQS)
  - Glider NOx: 4 – 10 times higher
  - Glider Black Carbon: 8 – 71 times higher
  - Glider black carbon in highest 4% of all vehicles measured
Dirty Gliders Imperil Public Health Gains California and Nationwide

- U.S. EPA Phase 2 projects over 128,000 gliders nationwide by 2025 (5% of entire fleet)
  - Would cause 9,000 to 21,000 premature deaths and $40 - 140 billion dollars in economic harm nationwide
- Dirty gliders are already on California roads (CARB testing, DMV registrations)
  - CARB press release; CARB testified
  - All but two testifiers oppose repeal
- CARB together with Pennsylvania, Vermont, Washington:
  - Submitted comments to U.S. EPA (1/5/2018) strongly urging U.S. EPA not to repeal glider requirements
CARB’s Next Steps Re: Gliders

- Adopt the final Phase 2 glider kit requirements with one change:
  - Modify the 300 glider/year exemption to allow only *2010 and newer model year* engines in gliders

- CARB's Options to Address U.S. EPA Repeal of Glider Requirements:
  - Challenge U.S. EPA’s action, as appropriate
  - Increase truck and bus enforcement to find noncompliant gliders
  - Work with states to opt-in to California’s truck and bus rule
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California Phase 2
- Allows California to certify engines, vehicles, and trailers
- Allows California to verify and enforce standards
- Paves way for future GHG reduction
- Restricts dirty gliders

TTGHG
- Aligns with Phase 2 standards
- Provides another pathway to compliance