UPDATE ON PHASE 2 OF THE HEAVY-DUTY GREENHOUSE GAS AND FUEL EFFICIENCY STANDARDS

Matt Spears
U.S. Environmental Protection Agency
Jim Tamm
National Highway Traffic Safety Administration

Topics

• Significance of MD/HD Emissions
• Phase 1
  Program Overview
• Phase 2
  Scope & Current Status
• Federal Research
• California Regulatory Landscape

Phase 1
• Model Years 2014-2018/19
Phase 2
• Beyond Model Year 2018
MD/HD Phase 1 – Implementation Highlights

First ever Medium- & Heavy-Duty Standards Implemented in 2014

Reducing fuel consumption, CO2 emissions, and operating costs for thousands of businesses

Allows manufacturers to produce a single fleet of vehicles to meet requirement

EPA & NHTSA conducted significant stakeholder outreach as part of this rulemaking development

Phase 1 focused on off-the-shelf technologies

No 2014 pre-buy: 2014 tractor sales up 33%, trailers up 42%, vocational up 10.5% vs 2013 (ACT Research Aug 26, 2014)

530 million barrels less oil

270 MMT lower GHGs

$50 billion in fuel savings

$49 billion in net benefits
From Climate Action Plan: “During the President’s second term, the Administration will once again partner with industry leaders and other key stakeholders to develop post-2018 fuel economy standards for heavy-duty vehicles ….”

From WH Fact Sheet: “This second round of fuel efficiency standards will build on the first-ever standards for medium- and heavy-duty vehicles (model years 2014 through 2018), and will reach well into the next decade.”

Heavy-duty Phase 2 Rulemaking – objectives discussed in Phase 1 rule

Joint NHTSA/EPA rulemaking process with notice and opportunity for public review and comment.

Heavy-duty Phase 2 May Include:

- Looking beyond off-the-shelf technology
- Potential inclusion of trailers
- Additional and new technologies beyond Phase 1
- Refined test procedures and updates to the GEM vehicle simulation compliance model—a full vehicle approach that includes engines
- Full SBREFA panel process to develop solutions for small businesses
- Updated technology, economic and environmental assessments
Phase 2 – NHTSA/EPA Research

Technology Evaluations

In-house and contractor modeling and testing of fuel-efficiency technologies for medium- and heavy-duty vehicles in the years prior to and in the Phase 2 timeframe

Evaluating the effectiveness and the costs

Test procedure development, refinement and validation studies

Evaluating improvements to Phase 1 drive cycles, and additional idle cycle
Validating new aerodynamic and powertrain test procedure approaches
Validating a wide range of improvements to Greenhouse Gas Emissions compliance model (GEM) to fully recognize new technologies

NHTSA/EPA Research: Engine Technologies

- Advanced Bottoming Cycle
- Air Handling Improvement
- Coolant Pump
- Cylinder Deactivation
- Down-sizing & Boosted vs. NA
- Electric Turbo-compounding
- Engine Down-sizing
- Engine Down-speeding (reduced cruise RPM, combined with transmission technology)
- Engine Friction Reduction
- Engine Oil Pump Improvement
- GDI + Cooled EGR
- Improved Selective Catalytic Reduction (SCR) Conversion, combined with reducing or removing EGR
- Lean Burn GDI w/ SCR
- Lower Friction Engine Oil
- Mechanical Turbo-compounding
- Natural Gas
- Reduced After-treatment Backpressure
- Stoichiometric Gasoline Direct Injection (GDI)
- Stop / Start
- Turbo Efficiency Improvement
- Variable Valve Timing

Technology application varies by vehicle class, vocation, and engine fuel type
### National Academies of Science

**2010**
- Issued, “Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles”
- EPA and NHTSA considered this study in support of Phase 1; similar for Phase 2

**2014**
- NHTSA sponsored a second NAS study for heavy-duty
- Published an interim report in April 2014 to help inform Phase 2
- Final report expected in 2016 to inform considerations beyond Phase 2
What’s Happening in California?

2008: ARB adopted mandatory fleet-level requirements for tractors and trailers
   Based on EPA SmartWay performance

2012: ARB Released 2050 Vision for Clean Air document
   Calls for significant additional NOx and CO2 reductions from heavy-duty sector

2013: Adopted EPA GHG Phase 1 Standards
   Board hearing in December 2013
   Similar to ARB’s adoption of HD criteria emissions standards
   Also adopting new voluntary Low NOx standards for heavy-duty
   Signaled intent to move beyond Federal Phase 1
   Sunsetted CA fleet-level program for tractors, but not for trailers

2014: ARB is significantly engaged on Phase 2

Wrap-up

• The fastest growing transportation sub-sector is heavy-duty. Reducing GHGs and fuel consumption from this sector will be vital toward addressing climate change and energy security.

• EPA and NHTSA are currently implementing the first-ever national program for medium- and heavy-duty GHG and fuel efficiency, & the program has been a success.

• EPA and NHTSA are committed to fulfilling the President’s Climate Action Plan by proposing and finalizing “Phase 2” of this national program.

• Significant technical and analytical work is underway to develop Phase 2.

• For Phase 2 EPA and NHTSA are continuing our significant stakeholder outreach, which helped make Phase 1 a success.