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## THE U.S. SUPERTRUCK PROGRAM

### EXPEDITING DEVELOPMENT OF ADVANCED HDV EFFICIENCY TECHNOLOGIES

The SuperTruck program is a public-private collaboration, begun in 2010 and managed by the Department of Energy (DoE), with the aim of spurring research, development, and demonstration of energy-efficient design and technology for heavy-duty vehicles.

A new study by the ICCT provides a program-wide analysis of progress to date measured against the DoE program goals for improving overall vehicle efficiency and engine efficiency, comparing and assessing technical specifications, engineering results, and technology choices. The study is based on interim progress reports presented at the DoE's 2013 Annual Merit Review, supplemented by industry reports and communications with the industry-led R&D teams.

#### THE SUPERTRUCK PROGRAM

- » A public-private partnership effort, following on the US DOE [21st Century Truck Partnership](#), begun in 2010. Managed by the U.S. Department of Energy, with costs shared equally by industry and the federal government. Roughly \$284 million total invested in the program since 2013 by all parties.
- » Four R&D teams led by Cummins, Daimler, Navistar, and Volvo, and including dozens of additional original equipment manufacturers and research groups, pursuing multiple technical approaches to improving vehicle efficiency. The vehicle manufacturers collaborating in the program account for

approximately 80% of the U.S. Class 8 tractor-trailer market.

- » Specific efficiency targets relative to a 2010 technology baseline: a 50% increase in overall tractor-trailer freight efficiency, and a 20% increase in engine efficiency.
- » Target dates: 2015 for technology demonstration, 2020 for commercialization.

#### STUDY HIGHLIGHTS

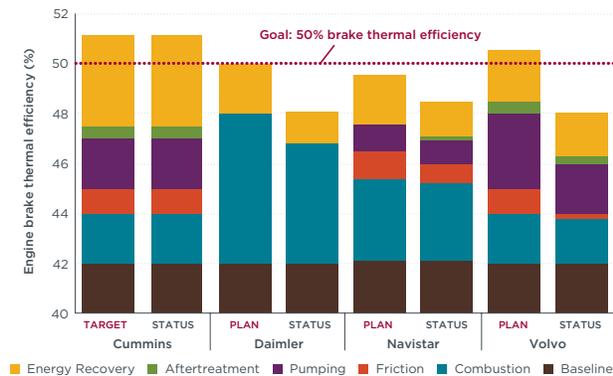
- » Overall vehicle technology. All four R&D teams had identified technology paths, and the teams led by Cummins and Daimler had already achieved the 50% freight-efficiency goal, several years ahead of schedule.



#### Targets and 2013 status for tractor-trailer freight efficiency in miles/ton-gallon.

Note: Each team was given the flexibility to select its own baseline vehicle and duty cycle to measure freight efficiency, therefore the efficiency improvements shown are not directly comparable.

» Engine technology. The program targets an increase in brake thermal efficiency to 50%, from an approximate 42% baseline, for a 20% increase in engine efficiency. Through mid-2013 all four R&D teams had achieved 48% brake thermal efficiency or higher, and one, Cummins, had already exceeded the 20% efficiency-improvement target (i.e., 50% engine efficiency).



#### Engine brake thermal efficiency targets and 2013 status.

Notes: Daimler “combustion” bin includes pumping, friction, aftertreatment and combustion improvements. Volvo “pumping” bin includes brake thermal efficiency gains from turbocompounding so the “energy recovery” bin only includes waste heat recovery.

- » Research and development. The program has helped vet innovative technologies more rapidly and extensively than would have been feasible otherwise.
- » Demonstration of technologies such as engine waste-heat recovery systems, advanced transmissions, and integrated tractor-trailer aerodynamic designs has gone beyond merely incremental developments already entering the marketplace, pushing leading-edge technologies and designs closer to commercialization.
- » The comprehensive full-vehicle focus required collaboration among many technology developers. That approach has identified multiple technical pathways to increased efficiency, focused on engines, advanced transmissions, full-vehicle integration, and aerodynamics.

The next DoE [Annual Merit Review meeting will occur June 15-20, 2014](#), at which time the SuperTruck program R&D teams will report on progress since the last update.

## PUBLICATION INFORMATION

*The U.S. SuperTruck program: Expediting the development of advanced heavy-duty vehicle efficiency technologies*

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