

# BIG FUEL SAVINGS AVAILABLE IN NEW TRUCKS

New federal fuel efficiency standards for medium- and heavy-duty trucks, which will be implemented in two phases, can dramatically reduce fuel consumption and greenhouse gas emissions from trucks on the nation's roads. Strong standards can improve our energy security and cut heat-trapping emissions while saving money for truckers and fleets. The first phase of fuel efficiency standards, adopted in 2011, will be implemented from 2014 through 2018. The second phase of standards, to be proposed in 2015, will extend this landmark program. By 2025, the first and second phases of standards together could cut fuel



consumption of new trucks by at least 40 percent compared to 2010 levels. Standards that extend beyond 2025 could achieve even larger savings.

The technologies to improve fuel efficiency are cost-effective. For example, a new truck that includes an advanced engine and transmission, new axle design, and improved aerodynamics to the tractor and trailer could save average tractor-trailer owners and drivers about \$30,000 per year in fuel. In 2025, these new efficiency technologies would increase truck purchase costs by about \$32,000, which is recovered by fuel savings in just 13 months.

**Table 1: Cost-Effective, Fuel-Saving Improvements across Vehicle Categories**

Vehicle Category	Portion of Total Medium- and Heavy-Duty Vehicle Fuel Use <sup>1</sup>	Fuel Consumption and Carbon Pollution Reduction from 2010	Estimated Fuel Efficiency Improvement from 2010 to 2025 (miles per gallon)	Payback (months)
Tractor-trailers (long-haul and regional)	66%	46%	5.8 to 10.7	13
Vocational vehicles*	19%	32%	9.7 to 14.3	48
Heavy-duty pickups and vans	15%	28%	11.3 to 15.7	35
<b>New fleet average**</b>		<b>40%</b>		<b>23</b>

\*The vocational vehicle payback calculations are based on a fleet with 25 percent hybrids. Non-hybrids would have shorter payback periods than hybrids. The vocational vehicle category covers a wide range of applications including refuse trucks, utility trucks, dump trucks, transit buses, motor coaches, shuttle buses, medium-duty delivery vehicles, motor homes, and other specialized vehicles.

\*\*Reductions include the first phase of standards, which are applicable from 2014 to 2018 and are projected to achieve a 16 percent reduction in fuel consumption and carbon pollution from 2010 levels.

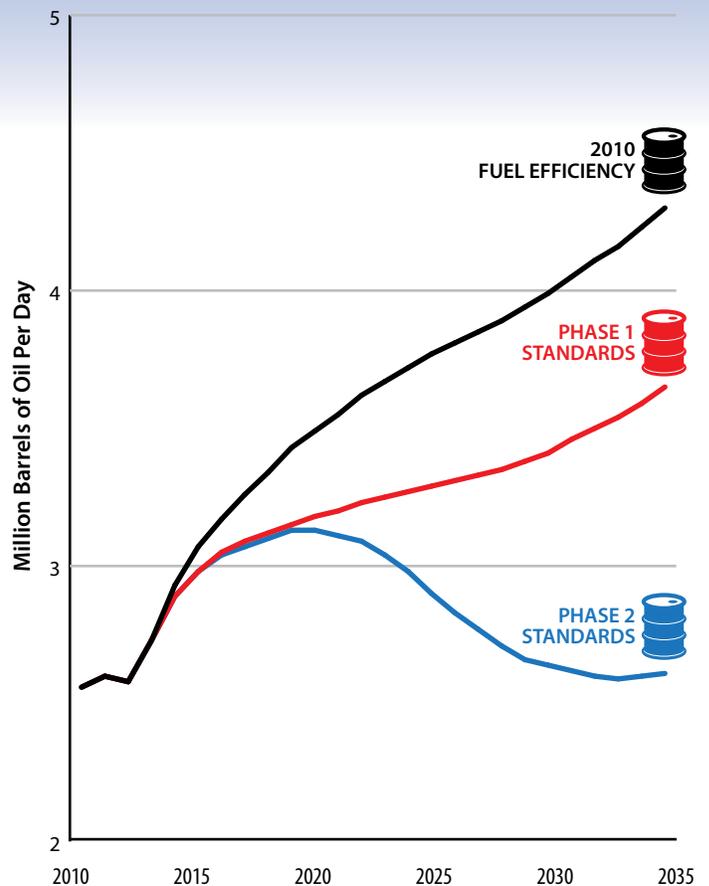
## NEW STANDARDS BRING INNOVATIVE TECHNOLOGIES TO THE MARKET

A wide range of technologies can cut fuel consumption from medium- and heavy-duty trucks. Forward-looking fuel efficiency standards provide the certainty that the industry needs to move these technologies into full-scale production and mass market sales. In a 2010 study, the National Research Council (NRC) identified technologies to reduce fuel consumption that could be adopted by 2020. Technologies identified in the NRC study and/or the 2014-2018 standards rule-making, together with selected technologies utilized in the Department of Energy's SuperTruck Program, could cost-effectively reduce fuel use by 38 percent, on average, compared to a new 2010 truck.<sup>2</sup> Our analysis slightly improves on this result using recent innovations. Table 2 describes many of the technologies considered to achieve an average fuel savings of 40 percent.

## NEW STANDARDS WILL REDUCE OIL USE AND CUT POLLUTION

In 2013, the on-road truck fleet consumed about 2.7 million barrels of oil-derived fuels per day and was responsible for emitting 530 million metric tons of carbon pollution.<sup>3</sup> In the coming years, the demand for goods shipped by truck is projected to increase, resulting in more ton-miles. However, a strong second phase of standards—which could achieve a 40 percent reduction from new trucks by 2025 compared to 2010 levels—will reduce fuel consumed by the entire on-road truck fleet to below today's levels, while the freight economy grows. By 2030, the combination of both phases of standards will cut fuel use by 1.4 million barrels per day and reduce carbon pollution by 270 million metric tons, compared to the fuel use and emissions that would occur without fuel efficiency improvements.

**Figure 1: Truck Standards Reduce Total On-Road Fleet Fuel Consumption**



**Table 2: Example Technologies to Improve Truck Efficiency**

### ENGINE

- Dual-stage turbocharging
- Improved combustion through higher fuel injection and cylinder pressures
- Reduced friction with improved lubricants and oil temperature control
- Electrification of engine-driven accessories
- Engine downsizing
- Bottoming cycle waste heat recovery
- Aftertreatment improvement

### TRANSMISSION AND DRIVELINE

- Automated manual transmissions (enabling engine down-speeding)
- Reduced friction with improved lubricants
- Efficient tractor axle design (single drive axle or 6x2 configuration)
- Hybridization and electric drive

### VEHICLE AND TRAILERS

- Tractor aerodynamic enhancements and integration with trailer
- Trailer aerodynamic enhancements (side skirts, boat tails, and fairings, which include advanced undertray, gap, and end fairings)
- Single-wide, low rolling resistance tires
- Idle reduction/auxiliary power unit
- Weight reduction

## Endnotes

- 1 NHTSA, *Medium- and Heavy-Duty Fuel Efficiency Improvement Program – Final Environmental Impact Statement*, Table 3.2.3-1, June 2011.
- 2 American Council for an Energy-Efficient Economy (ACEEE), "Further Fuel Efficiency Gains for Heavy-Duty Vehicles", September 25, 2013. Available at <http://aceee.org/fact-sheet/heavy-duty-fuel-efficiency>.
- 3 Values calculated using the Argonne National Laboratory's VISION 2013 AEO Base Case model.