

GHG Phase II – An Overview

The EPA and NHTSA recently released their joint advance notice of “Proposed Rulemaking: Phase 2 Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles.” The draft sets separate standards for vehicles, engines, and trailers, a scenario that has been the subject of much debate in the work leading up to the proposed standard.

Highlighted benefits include:

- Cutting GHG emissions by nearly 1 billion metric tons and eliminating the need for 1.8 billion barrels of oil over the life of the vehicles that will meet the new standards
- \$170 billion in fuel cost savings
- An estimated \$230 billion in net benefits over the life of the compliant vehicles at a cost of roughly \$25 billion
- A purported payback of less than two years from fuel savings

While there is no question that striving for a cleaner environment is the right and noble thing to do, trucking is once again being asked to bear significant costs as part of its contribution to the effort. By the agencies’ own estimates, the incremental vehicle cost will be in the \$12,000 range. If so, this could be a win-win for everyone involved. We are skeptical of the cost estimates and payback analysis provided in the proposed rulemaking. This is partly based on the agencies’ track record of estimating costs. Underlying assumptions and uncertainty of what the compliant solutions will end up being are the other factors.

A specific example assuming 7.5 MPG as a baseline suggests something in the neighborhood of 8.9 to 9.3 MPG. Coupled with an estimated 100,000 miles/year and \$3.00/gal diesel, going from 7.5 MPG to 9.3 MPG would reduce fuel consumption by about 2,600 gal/year, lowering costs by roughly \$7,700/year. The implied cost reduction of the new technology, using these assumptions and the EPA/NHTSA payback of two years, is a cost savings benefit of somewhere around \$15,000.

Inherent in both the agencies’ and our assumptions are the fuel consumption improvement targets. For Classes 7-8 combination tractors, the goal is for gains of 18-24% in MY 2027 vehicles compared to MY 2017 vehicles. Trailers are expected to contribute an extra 8% fuel savings (MY 2027 compared to MY 2017).

The standards also aim to reduce fuel consumption and CO₂ emissions of vocational trucks, though not as aggressively, purportedly because they recognize the difference in duty cycle, and the subsequent diminished opportunity. The agencies are seeking up to 16% improvement for vocational vehicles.

The proposed rulemaking is largely of the “more of the same” variety. The industry will be hard-pressed to achieve the desired gains with that approach. References to contribution rates of specific technologies used to set proposed standards include further improvements to aerodynamics, reduced rolling resistance, idle reduction (APU and other methods), transmission type (AMT, automatic, dual clutch), driveline (lubricants, two wheel drive, down speeding), accessory improvements (A/C and electrical), and other technologies (predictive cruise control, automatic tire inflation systems).

Note that waste heat recovery (WHR) was NOT listed as one of the technologies used to SET the Phase II standards, but is discussed in the legislation. Prior to Phase I, the National Academy of Sciences (NAS) estimated WHR had the potential to reduce fuel consumption by up to 10 percent. EPA/NHTSA do not believe such levels are achievable in Phase II. The agencies now expect WHR to contribute over a three percent reduction in fuel consumption in the 2021 to 2024 timeframe. Accordingly, they are estimating WHR adoption rates (market penetration of units sold) of 1% in 2021, 5% in 2024, and 15% in 2027.

Therein lies the rub. Initial impressions suggest that the aggressive fuel efficiency improvements will call for new and innovative solutions, such as WHR. New and innovative solutions that push the frontier of technology always come with significant uncertainty about cost, performance (uptime, fuel economy, reliability, durability, etc.), and benefit. Those were some of the key elements that drove violent cycles in equipment production and purchases during the U.S. emissions mandates of the 2000s decade.

Tables containing the proposed percent changes in CO₂ and fuel consumption for Classes 7-8 tractors from the 2017 baseline to the MY 2027 equipment appear on the following page. The changes are derived from the standards included in the proposed rulemaking document. Also displayed on the next page is a sample of incremental cost impact. There are numerous incongruous cost estimates throughout the document. As the saying goes, the devil is in the details.

HEAVY DUTY

2027 Model Year CO2 Grams per Ton-Mile Change from 2017 Baseline			
	Day Cab		Sleeper Cab
	Class 7	Class 8	Class 8
Low Roof	-18.7%	-18.6%	-21.5%
Mid Roof	-18.6%	-18.3%	-20.7%
High Roof	-20.7%	-20.0%	-23.9%

2027 Model Year and Later Gallons of Fuel per 1,000 Ton-Mile Change from 2017			
	Day Cab		Sleeper Cab
	Class 7	Class 8	Class 8
Low Roof	-18.6%	-18.1%	-21.9%
Mid Roof	-18.7%	-18.0%	-20.3%
High Roof	-20.8%	-19.7%	-23.5%

Table I-11 Per Vehicle Costs Relative to Baseline 1a

	3			4	
	MY 2021	MY 2024	MY 2027	MY 2021	MY 2024
Per Vehicle Cost (\$) ^a					
Tractors	\$6,710	\$9,940	\$11,700	\$10,200	\$12,400
Trailers	\$900	\$1,010	\$1,170	\$1,080	\$1,230
Vocational Vehicles	\$1,150	\$1,770	\$3,380	\$1,990	\$3,590
Pickups/Vans	\$520	\$950	\$1,340	\$1,050	\$1,730