Report Fact Sheet:

Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027

February 2020

In this report, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," MECA presents test results from emission control and fuel efficiency technologies installed on heavy-duty diesel on-road engines that offer several cost-effective compliance pathways to reduce NOx emissions by 90% below today's certification levels with simultaneous CO_2 emission reductions in the 2027 timeframe.

The report is a companion to a report released by MECA in June 2019 in which we provided our assessment of technologies being commercialized by component suppliers to help their customers comply with a future NOx standard of 0.05 g/bhp-hr by model year 2024 ("Technology Feasibility for Model Year 2024 Heavy-Duty Diesel Vehicles in Meeting Lower NOx Standards").

The main conclusions in the new report include:

Engine and aftertreatment technologies can achieve a certification emission limit of 0.02 g/bhp-hr NOx and a low-load cycle (LLC) limit below 0.075 g/bhp-hr NOx.

New aftertreatment architectures that employ a close-coupled SCR catalyst before the DOC+DPF in a twin SCR system with dual-urea dosing can meet future NOx limits that phase in from 2024 to 2027. The approaches discussed for meeting these proposed 2027 NOx limits utilize commercially available engine technologies, improved thermal management, and advanced aftertreatment system designs based on high-efficiency catalysts and coating strategies.

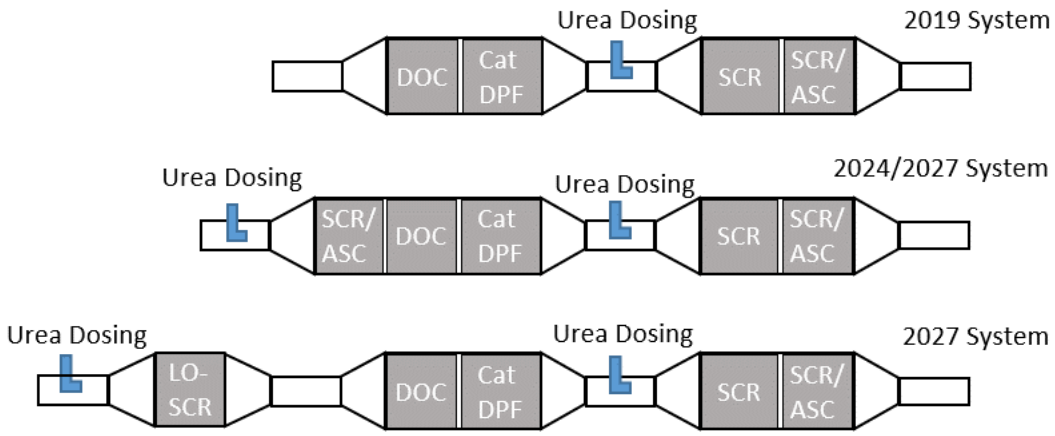

Figure 1. *System configurations tested to demonstrate the feasibility of MY 2027 engine emissions. The first system is based on MY 2019 engines in production today. The second system employs a twin SCR arrangement that could be implemented in 2024. The third system adds a close-coupled SCR to a 2019-type underfloor system containing a DOC, DPF, and second SCR.*

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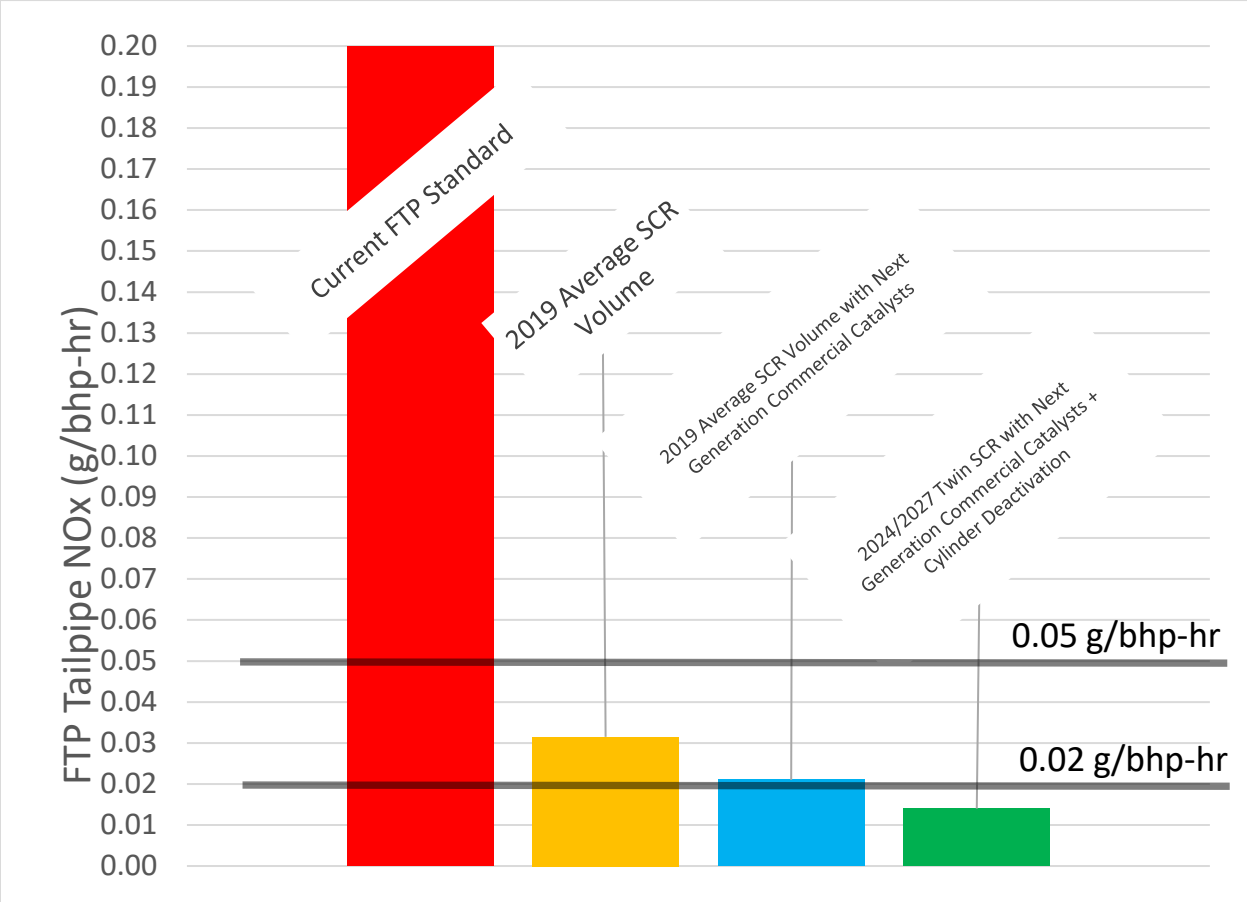

Figure 2. *Fully-aged aftertreatment combined with improved engine calibration and catalysts can achieve a 0.05 g/bhp-hr NOx limit with no major hardware changes. By 2027, a twin SCR design with cylinder deactivation can achieve a limit of 0.02 g/bhp-hr NOx, which is 90% below today's standards, with better fuel economy.*

Engine efficiency and powertrain emission control technologies can enable simultaneous reductions in CO_2 and NOx.

Component suppliers are commercializing vehicle and engine efficiency technologies, such as cylinder deactivation, advanced turbochargers, and electrification, in combination with advanced aftertreatment technologies. It has now been widely demonstrated that the traditional trade-off relationship between CO_2 and NOx emissions at the tailpipe has been overcome, and reductions of both pollutants can be achieved simultaneously through the use of commercially available technologies.

The estimated cost of emission controls for a Class 8 tractor meeting these future NOx limits is estimated to add about $1,500 to $2,000 to the cost of a model year 2027 truck.

MECA estimated the cost of emission control hardware, including engine efficiency improvements like those being demonstrated in a California ARB-funded test program, to meet an FTP tailpipe certification NOx value of 0.02 g/bhp-hr and a future LLC certification requirement. For a Class 8 tractor, these incremental improvements were estimated to add about 1% to the cost of a model year 2027 truck.