

Are New On-Highway, Heavy-Duty Diesel NOx Standards Down the Road?

The heavy-duty industry should monitor California developments

Key Points:

- The Obama EPA initiated new rulemaking to further reduce NOx emissions from on-highway, heavy-duty diesel engines and vehicles.
- The Trump administration's regulatory pullback, however, could prompt California action with nationwide consequences.
- Component makers, in addition to engine and vehicle manufacturers, must now keep abreast of California developments as recent rulemakings have increasingly vehicle-wide impacts but also offer opportunity for competitive advantage.

At the tail-end of the Obama administration, the United States Environmental Protection Agency (EPA) formally responded to petitions for rulemaking — championed by various interests in California and elsewhere — calling for EPA to promulgate new “ultra-low” oxides of nitrogen (NOx) emission standards for on-highway, heavy-duty diesel engines. More specifically, the petitioners sought a 90% reduction from the current 0.2 g/bhp-hr NOx standard down to 0.02 g/bhp-hr. The Obama EPA agreed with the sentiment, if not with the exact result or aggressive timing set forth in the petitions. EPA expressed the need for a new, lower standard and, without pre-deciding what that standard would be, stated its intent to initiate rulemaking by collecting and analyzing technical data, with the goal of a new standard in effect by the 2024 model year.

Shortly thereafter, the administration changed. The Trump administration is taking a markedly different approach to new environmental regulation. The Trump administration has called for significant cuts in EPA resources and a freeze on most new rulemaking casts doubt about the data-gathering mission and timeline EPA set for itself in response to the petitions. Yet because California has the ability to pursue its own rules, the state may respond to federal inaction with its own action. As a result, component makers who have increasingly been impacted by more stringent emission standards, as well as traditional engine and vehicle manufacturers, must monitor California developments and participate when necessary to protect their interests.

California Petitions Set the Stage

On June 3, 2016, a group of state and local California regulators — joined by their counterparts in additional states — filed a [petition for rulemaking](#) with the EPA for a new “ultra-low” NO_x exhaust emission standard of 0.02 g/bhp-hr for on-highway, heavy-duty diesel engines. Because the Clean Air Act requires at least four years of lead time, the petitioners urged EPA to expedite its rulemaking process and complete a final rule by December 31, 2017, with the new regulations to take effect by January 1, 2022. EPA received additional petitions on June 22, 2016 and December 9, 2016.

According to the petitions, a more stringent NO_x standard is necessary to enable portions of California and other states attain National Ambient Air Quality Standards (NAAQS) for ozone, of which NO_x is a precursor. The petitions argued the 90% reduction is both technologically and economically feasible as the result of “evolutionary enhancements” to current aftertreatment technologies at “relatively low” incremental costs, as well as improvements in existing natural gas engines.

The Obama EPA [responded](#) to the petitions on December 20, 2016. EPA agreed with the petitioners that the existing 2010 NO_x standards were in need of an update. Instead of immediately promulgating a new rule, however, EPA indicated it would begin collecting data and stakeholder input, and set the contemplated regulation on a trajectory to begin with model year 2024. This timeline would coincide with the new tier of Phase 2 greenhouse gas (GHG) and fuel efficiency standards governing the same engines and vehicles pursuant to a [joint rule](#) by EPA and the National Highway Traffic Safety Administration (on behalf of the Department of Transportation). NO_x and GHG emissions are related in that diesel engine designs that improve fuel efficiency can increase NO_x emissions. This relationship requires a balance in their respective regulations.

EPA stated in its December 2016 response that a more stringent NO_x standard is feasible without adversely affecting the promulgated Phase 2 GHG reductions. According to the agency, a number of cost-effective GHG-reducing technologies, such as engine down-speeding and idle reduction, can also potentially achieve more NO_x reductions. EPA stated that these GHG technologies, along with advances in NO_x aftertreatment technologies, “demonstrate that there are feasible approaches where GHG reductions and fuel efficiency do not have to be sacrificed to achieve greater NO_x reductions.”

In one important way, the Obama EPA’s December 2016 response to the California petitions went further than the relief sought. In addition to the requested lower NO_x emission standard, EPA stated a desire to develop “a new, harmonized comprehensive national NO_x reduction strategy” that goes beyond current regulatory test procedures and test cycles in order to achieve “cost-effective real-world reductions.” According to the agency, such a strategy could include changes to test procedures and test cycles, updated certification and in-use testing protocols, lengthened emissions-related component warranties, longer regulatory useful life, modifications to re-build practices, and incentives to encourage adoption of new technologies. In short, EPA is — or at least was — considering a major revamp of its heavy-duty diesel NO_x program. Such an effort might result in wider-ranging impacts beyond diesel engine manufacturers.

Component Makers May Feel Impact

Until the advent of the GHG limits in 2014, EPA had typically set emission standards for criteria pollutants, such as NO_x, only for on-highway, heavy-duty diesel engines, and not for the heavy-duty vehicles in which those engines are used. As a result, diesel engine manufacturers most directly bore the brunt of EPA’s regulations and more stringent standards. With the GHG limits, however, EPA promulgated vehicle emission standards. As with prior regulations, EPA set limits for diesel engines (see [40 C.F.R. Part 1036](#)), but EPA also set limits for vocational vehicles (e.g., refuse trucks, dump trucks, buses, utility service,

etc.), for different types of combination tractors (e.g., sleeper or day cabs), and for other heavy-duty pickup trucks and vans (see [40 C.F.R. Part 1037](#)).

Compliance with these new GHG-vehicle standards is determined in part based on a new customizable vehicle performance simulation model known as the Greenhouse Gas Emission Model or “GEM.” This model is a significant change from traditional engine dynamometer testing, which measures engine characteristics and direct outputs. In switching to vehicle modeling, EPA began to impact component makers more directly because GEM results depend on a wider range of vehicle characteristics that are measured and used as inputs. Some of the measured inputs include, for example, aerodynamic features, weight reductions, tire rolling resistance, idle-reducing technology, and vehicle speed limiters. Because component characteristics are now accounted for in determining vehicle compliance, the makers of those components are under even more pressure to design and incorporate emission-reducing technologies. And those impacts became even more pronounced in 2016 when EPA finalized its Phase 2 GHG rule. In Phase 2, EPA further reduced the GHG standards for engines and vehicles. Importantly, EPA also further refined GEM, increasing both required and optional inputs and removing many of the fixed defaults that could not be changed. As a result, the new GEM both recognizes a broader range of technologies and components, and also addresses the actual tested performance of certain components.

This whole-vehicle approach presents new burdens for component makers (e.g., added testing), but also offers greater opportunities for product differentiation where a given component can help a vehicle achieve incrementally lower emissions than a competitor’s product. For example, one of the inputs in GEM is vehicle weight reductions. The applicable regulations contain tables listing how many pounds of weight reduction may be claimed — and thereby used to calculate fuel efficiency and GHG emissions — for using a lighter weight material for a variety of specific components. See [40 C.F.R. § 1037.520\(e\)](#). For example, in Phase 2, potential weight reductions for various components can be credited down to even the single pound reduced by switching to high-strength steel in an instrument panel support structure, or the six pounds saved for using lighter-weight material in the steps up to a tractor cab. See § 1037.520, Table 7. And because the rules provide a process to account for component weight reductions that are not listed in the provided tables (see § 1037.520(e)(5)), weight reductions in a wide variety of components can now contribute to GHG regulatory compliance and factor into manufacturer purchase decisions.

EPA’s path forward on new NOx regulation is not clear. The agency’s December 2016 response signaled the agency’s then intent to “look beyond simply reducing the NOx standard over the test procedures and test cycles that we currently require.” EPA’s response made numerous references to new, lower NOx standards for “engines or vehicles.” EPA’s response also made repeated references to certain GHG-reducing technologies that could carry over to lower NOx emissions. Because NOx emissions may be impacted by some of the same technologies and components as those targeted in EPA’s recent GHG standards, there may very well be similar new burdens (and opportunities) that present themselves with any new NOx regulation.

Federal Inaction Could Provoke California Action

Since 1967, Section 209 of the Clean Air Act (codified at [42 U.S.C. § 7543](#)) has granted California the ability to set emission standards for motor vehicles and engines more stringent than federal standards that would otherwise preempt state regulation. To do so, California must seek a “waiver” under the Clean Air Act from EPA. If a waiver is granted, certain other states may then adopt California’s standards pursuant to Section 177 of the Act (codified at [42 U.S.C. § 7507](#)), and nine states have done so with respect to emission standards for heavy-duty diesel engines and vehicles.

In their 2016 request for rulemaking, the petitioners expressed their preference for nationwide regulatory action, as opposed to California pursuing its own state-specific limit on NOx emissions. EPA agreed and indicated its intent to work with California regulators to develop a nationwide standard. But the petitioners' preference assumed a federal rule was forthcoming.

The Trump administration has given no public indication that it still plans to press ahead. And if it does not, California, which had been examining the feasibility of a more stringent NOx standard for heavy-duty diesel engines and vehicles and which already has optional low NOx emission standards below the current federal standard, may end up issuing its own rule with a mandatory "ultra-low" NOx standard of 0.02 g/bhp-hr for all heavy-duty diesel engines and vehicles. Whether the Trump EPA would grant a waiver request by California is not clear, but past administrations have routinely granted waivers.

Component Makers Are on Notice

The new Trump administration is unlikely to carry out the Obama EPA's plan to promulgate a new, federal, on-highway heavy-duty diesel NOx program with an "ultra-low" NOx standard. However, more stringent NOx emission standards may still be coming down the road. If federal action fades, California may take up the charge. As a result, component makers would be wise to monitor California regulatory developments. Given the increasing vehicle-wide impacts from ever more strict standards, component makers may need to take an active role to both protect and promote their interests.

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