Comments of the
Motor & Equipment Manufacturers Association (MEMA)
to

U.S. Environmental Protection Agency

RE: Advanced Notice of Proposed Rulemaking for Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine Standards

Docket No. EPA-HQ-OAR-2019-0055; FRL-10004-16-OAR

February 20, 2019

The Motor & Equipment Manufacturers Association (MEMA) submits these comments to the U.S. Environmental Protection Agency (EPA) on the "Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine Standards" Advanced Notice of Proposed Rulemaking, also known as the Cleaner Trucks Initiative (CTI) (CTI ANPR or ANPR).[1] MEMA appreciates that EPA is issuing an ANPR and providing an important opportunity for stakeholders to provide early feedback on the CTI. Collaboration between the agency and a wide variety of stakeholders is key to the success of such a significant and complex technical initiative and initiates a complete rulemaking process for the CTI.

MEMA represents more than 1,000 companies that manufacture new original equipment (OE) and aftermarket components, systems and materials for use in passenger cars and heavy trucks. MEMA represents its member companies via the Automotive Aftermarket Suppliers Association (AASA); Heavy Duty Manufacturers Association (HDMA); MERA – The Association for Sustainable Manufacturing; and, Original Equipment Suppliers Association (OESA). The motor vehicle components manufacturing industry is the nation's largest sector of manufacturing jobs – employing over 871,000 workers in all 50 states – with a total employment impact of 4.26 million jobs. The HDMA member companies make up about 60 percent of the U.S. market for heavy-duty (HD) commercial vehicle components. The HD suppliers provide original equipment parts, systems and materials used to manufacture new commercial vehicles and related equipment as well as aftermarket replacement parts needed to repair and maintain in-service vehicles. The MERA member network of remanufacturers and their suppliers operates primarily in the automotive and commercial vehicle sectors and promotes the environmental, economic and product performance benefits of remanufactured goods. A 2012 U.S. International Trade Commission (ITC) report found that remanufacturing supports at least 180,000 full time jobs in the U.S. Further, the ITC report states that production of remanufactured goods in the U.S. increased by 15 percent from 2009 to 2011 and exports totaled $11.2 billion annually.[2]

Suppliers' Role in Developing Innovative Technologies

Motor vehicle suppliers develop and produce a multitude of technologies and wide range of products including complex, highly integrated vehicle systems to make vehicles more efficient and lower emissions. Suppliers are committed to providing affordable technologies needed to increase fuel efficiency and continue to reduce vehicle emissions – including greenhouse gases (GHG), oxides of

[1] 85 Fed Reg 3306

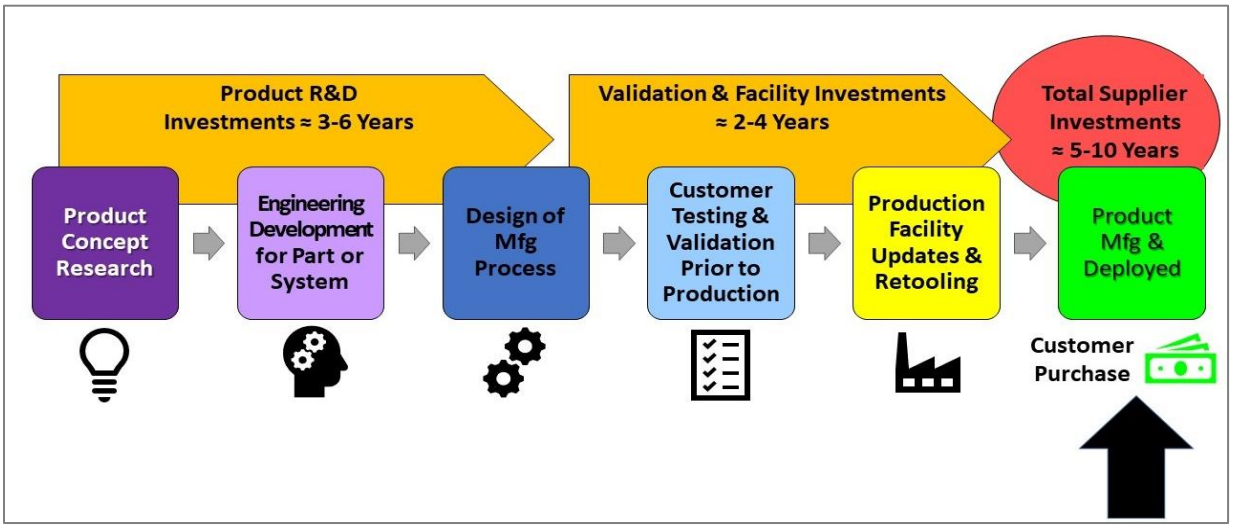
[2] "Remanufactured Goods: An Overview of the U.S. and Global Industries, Markets, and Trade" Report, U.S. International Trade Commission (ITC), Investigation No. 332-525, USITC Publication 4356, Oct. 2012.

nitrogen (NOx), and particulate matter (PM). A typical HD vehicle contains thousands of components and subsystems, the majority of which are developed through supplier innovation.

In many cases suppliers lead the industry's technology development. Suppliers anticipate the needs of vehicle manufacturers and work independently creating and investing in multiple technology solutions to assist their customers in meeting the next set of emissions standards. Suppliers then work collaboratively with vehicle and engine manufacturers. In the case of HD NOx, many suppliers have invested significant resources in research and development (R&D) in various technologies to help their customers comply with future lower NOx standards while also helping to improve efficiency.

Because suppliers have a leading role in technology development, suppliers take on the associated risks by developing technology advancements needed to comply with standards for future lower HD NOx emissions and other emissions. Development of these technologies requires substantial lead-time, major economic resources, and product planning that includes several stages. Importantly, suppliers do not get return on their capital investment until these technologies are deployed (see graphic below). The return on investment is estimated very carefully and amortized over several years. Therefore, more stringent HD NOx emissions standards and a comprehensive HD rulemaking have enormous implications on the motor vehicle supplier industry. The regulatory process provides the industry the needed certainty to develop and improve future products and systems.

Motor Vehicle Parts Suppliers Product Planning and Investments Timeframe



Summary of MEMA Comments

MEMA's comments on the CTI ANPR will discuss the following:

- **MEMA Supports U.S. EPA and California Air Resources Board (CARB) Collaboration –** MEMA encourages EPA and CARB to harmonize their HD low NOx programs as closely as possible. A coordinated program of test cycles, standards and timelines will provide the domestic supplier industry with stability for long-term planning and investments and would lower cost of compliance for vehicle manufacturers.
- **MEMA Supports Implementation of Best Available Technologies –** The CTI provides an opportunity for further reduction to HD NOx emissions standards and setting a signal for innovative emission and efficiency control technologies. MEMA supports a program that enables multiple technology and product paths to achieve compliance and brings the best available, cost-effective emissions reductions technologies to the marketplace. MEMA requests

EPA references HD propulsion or powertrain in the rule title to reflect the rule goes beyond engines.

- **MEMA Supports New Standards and Test Cycles –** MEMA supports EPA consideration of HD NOx standards in the range of 0.015 to 0.030 grams per brake horsepower per hour (g/bhp-hr) for Federal Test Procedure and the Ramped Modal Cycle Supplemental Emission Test (FTP/RMC) for MY2027. This range in standards has been proven feasible.[3,4,5] MEMA also supports EPA adopting a new low-load, idling certification cycle and Moving Average Windows (MAW) for evaluating emissions performance of HD powertrains. These certification cycles and in-use testing better represent real-world use and will encourage best-in-class technology adoption while effectively providing lower NOx emissions requirements.
- **MEMA Supports Remanufacturing Practices –** MEMA strongly requests that the agency adjust its definitions of "remanufacturing" and "rebuild" to align with definitions currently used by the U.S. Federal Trade Commission (FTC) and the U.S. ITC. MEMA does not support the proposal that remanufacturers collect an on-board diagnostics (OBD) codes report from truck owners that are having their engines remanufactured as this requirement would be extremely burdensome.
- **Extended Full Useful Life Could Pose Challenges –** If the agency significantly extends the full useful life (FUL) for HD vehicles, MEMA supports a phased-in approach and research opportunities to provide data flow and time for suppliers to understand and improve durability issues.
- **Extended Emissions Warranty Could Pose Significant Challenges –** Suppliers would take on significant cost implications early and currently do not have access to the necessary data to help make the needed improvements. If an extended warranty is proposed, MEMA requests a carefully structured warranty requirement program that addresses suppliers' need for data, lead-time and serviceability improvements.
- **MEMA Supports Serviceability Improvements –** If emissions warranties are extended, it will be critical to suppliers that dealer and independent service providers improve diagnostic routines, tools, and training in order to repair the correct fault and to control repair costs.
- **MEMA Supports Incentives for Early Compliance –** Incentivization for early compliance with the ultimate HD NOx MY2027 standard could encourage early adoption of supplier technologies and help ease into a nation program.

MEMA Supports Progress in the HD NOx Emissions Standards

MEMA supports the goals and principles for the CTI summarized in the ANPR.[6] MEMA encourages these goals because there have been important emissions reductions from HD vehicles and advancement in technologies since EPA last revised the federal standards. MEMA supports EPA's vision for the CTI as a "holistic rethinking of emissions standards and compliance."[7] HD suppliers would benefit from a HD NOx emissions reduction strategy that is aligned with market forces and drives

[3] This range has been proven feasible at the current full useful life of 435,000 miles. Work is ongoing, including EPA's own low NOx demonstration program, to evaluate strategies to optimize MY2027 architectures to enable them to maintain this level of performance at extended durability.
[4] Manufacturers of Emissions Control Association (MECA), "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020.
[5] C. Sharp, "Update on Heavy-Duty Low NOx Demonstration Program at SwRI," September 2019.
[6] 85 Fed Reg 3307 and 3311
[7] 85 Fed Reg 3307

adoption of these HD emissions-reducing technologies. The framework outlined in EPA's ANPR will foster both technology innovation and development opportunities.

In order to emphasize acceptance of new propulsion architectures, MEMA recommends that the rule's current title of "Heavy-Duty Engine Standards" should be reworded to reflect HD propulsion or powertrain and not just HD engines.

MEMA comments outline support for a CTI that that encourages the best available, cost-effective technologies; a harmonized national program; incentivization for early compliance; and, streamlining of regulatory requirements.

Stringency of HD NOx Standards is Critical for U.S. Leadership in Global Innovation

EPA's last update of the HD NOx standards was nearly 20 years ago. CTI presents a unique opportunity for further reductions in HD NOx emissions standards and sets a signal for best-in-class emission control technologies that will ultimately preserve U.S. competitiveness globally. Similar to light vehicles, the U.S. has a strong history of being a global leader in HD emissions technology innovation. The U.S. is uniquely positioned to continue to lead the world in HD advanced fuel efficiency and emissions-reducing technologies. A comprehensive federal CTI with stringent, aligned standards with the California's HD NOx program will advance U.S. innovation in these technologies. Maintaining stringency in the HD NOx standards is necessary to continue strengthening supplier manufacturing sector jobs, which is the largest sector of manufacturing jobs in the U.S. and is critical for the U.S. to secure its position as the global technology leader.

MEMA Supports U.S. EPA and CARB Collaboration

EPA requests feedback on the "extent to which EPA should adopt similar provisions" as the elements under consideration for CARB's Omnibus HD low NOx program, noting that these elements are the agency's "early views and considerations on possible CTI elements."[8] MEMA encourages EPA and CARB to continue to coordinate on their HD low NOx programs and to work to harmonize the programs as closely as possible.

MEMA supports federal collaboration with CARB on the CTI. A true national program with stringent, long-term targets and adequate lead-time will provide regulatory certainty for the domestic supplier industry. This certainty and alignment will sustain U.S. innovation, global competitiveness and strong job growth in the U.S. motor vehicle parts supplier sector. Motor vehicle parts suppliers have seen employment grow 19 percent since 2012 – an increase three times that of any other major U.S. manufacturing sector.

An EPA and CARB harmonized program of unified test cycles, targets and timelines is important for suppliers to make necessary long-term business planning decisions. A closely coordinated low HD NOx rule will provide the stability and predictability that motor vehicle suppliers need for controlling capital costs and drives significant domestic technological investments.

A consistent approach would provide vehicle engine manufacturers with improved market availability and optimal economies of scale for technologies which would ensure the lowest possible compliance cost is achieved.

California, since it will set a new HD NOx standard starting in MY2024, can serve as the initial market of early adopters to provide early evaluation of the technologies. CARB and EPA's proposals should align after a few years of variance during the initial phase-in period to create a national program starting in MY2027. Federal adoption of aligned MY2027 HD NOx standards offers the volumes for

[8] 85 Fed Reg 3311

providing investment payoff for HD emissions technology suppliers and drives down initial costs of new technologies for vehicle manufacturers.

MEMA provides input below on the elements CARB and EPA are considering. We outline the elements MEMA generally supports and the elements that could provide challenges for motor vehicle suppliers.

MEMA Supports Implementation of Best Available Technologies: Emission Control Technologies

MEMA appreciates that EPA has collaborated with industry stakeholders early in the development process, including technology suppliers, for in-depth technology discussions to understand which technologies are currently available and which technologies will be available by MY2027.

Since EPA finalized HD Phase 2 Greenhouse Gas (GHG) Standards (Phase 2)[9] in 2016, motor vehicle suppliers have continued to improve innovative HD fuel efficiency and emissions technologies. Phase 2 provided a long lead time to allow for development and phase-in of the many GHG emissions-reducing technologies. Today there are several technologies that were not considered as compliance options for the Phase 2 GHG standards that may have limited deployment in MY2024 and broader deployment in MY2027. Many of these technologies that assist in CO_2 emissions reduction and NOx reduction are being tested as part of CARB's Low NOx demonstration program with Southwest Research Institute (SwRI). There are many technologies that can be used to reduce both CO_2 and NOx simultaneously and many others that can also reduce NOx emissions without increasing CO_2.[10,11] These innovative technologies could continue to improve as they are implemented as part of a comprehensive HD NOx program.

Diesel Engine Technologies Under Consideration:

Advanced Catalyst Formulations[12]

Advanced catalyst formulations have made advancements that offer improved performance at lower temperatures without significant degradation, enabling even close coupled options to more quickly activate and reduce emissions sooner.

Passive Thermal Management[13]

Passive thermal management applies effective insulation strategies and positions catalysts to offer the best thermal performance. Insulation can be applied as fiber blankets or as air-gapped pipes to leverage the thermal insulation properties of the air. Inner pipe layers are often thinner to reduce thermal mass and enhance light-off, while relying on the outer pipe for structural support. Passive thermal management enables the catalyst system to remain active by maintaining the system above catalyst light-off temperatures, to ensure that emissions, such as NOx, are properly converted. Catalyst positioning, such as with a close-coupled SCR, is critical in managing the thermal light-off response, but the entire catalyst volume cannot be close-coupled due to packaging constraints. Therefore, the downstream catalysts also must achieve minimum temperatures for

[9] 81 Fed Reg 73478
[10] ICCT, "Future Heavy-duty Emission Standards: An Opportunity for International Harmonization," November 2019, p.8. Available at https://theicct.org/publications/future-hdv-standards-harmonization
[11] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, p. 2.
[12] 85 Fed Reg 3312 - 3313
[13] 85 Fed Reg 3313

activation, which can be achieved using passive thermal management to improve temperatures over time.

Active Thermal Management[14]

Active thermal management, such as mini-burners, offer an effective and efficient means to accelerate catalyst light-off by raising catalyst temperatures quickly. Mini-burners can be placed in various positions to accelerate SCR temperatures and they offer a direct and efficient way to apply the fuel energy directly to the SCR catalysts. Variable Geometry turbo could also be used for active thermal management by closing the flow capacity of the stage to create back pressure and increased exhaust temperature.

Variable Valve Actuation (VVA)

EPA requests comment on cylinder deactivation (CDA) and early or late intake valve closing (E/LIVC, respectively) strategies for NOx reduction.[15] Under both the proposed regulatory low-load cycle and, more importantly, under real urban conditions, NOx reductions of 50-80 percent were demonstrated using current aftertreatment solutions. Depending on the amount of time an engine spends in low-load operation, fuel efficiency benefits can range anywhere from 6 percent to 35 percent. CDA technology can also help achieve NOx emissions rate of 0.018 g/bhp-hr (cold plus hot) over the FTP. CDA technology allows the emissions controls to stay hot during the idle or motoring portions of the cycle.[16] Early exhaust valve opening (EEVO) is a technology already demonstrated in the medium-duty market as a fast warm-up system for active thermal management.

Dual-SCR Catalyst System[17]

Dual-SCR systems offer an effective means to accelerate SCR light-off by moving part of the SCR volume upstream. Close-coupling of catalysts has been done in light-duty vehicle applications, i.e. passenger vehicles, as part of the emissions reduction strategy, with many applications now capable of being packaged directly after the turbocharger. In addition, turbo-bypass systems are being developed in light-duty applications to support further emissions reductions.

Aftertreatment Durability[18]

From a canning and structural standpoint, the systems can be appropriately designed to accommodate necessary life, including materials and thicknesses adjustments.

Closed Crankcases

EPA explains that it is considering a requirement for "a closed crankcase ventilation system for all highway compression-ignition engines to prevent crankcase emissions from being emitted directly to the atmosphere."[19] MEMA supports requiring closed crankcase systems for HD compression-ignition engines. Closed crankcase technology is readily available and in-use on turbocharged spark ignited applications.

Electrification including Start-Stop Technology

There are several electric technology options that will be available prior to 2027 to allow OEMs to use electrification for improving NOx and CO_2 emissions simultaneously. For example, 48-volt

---

[14] *Ibid.*
[15] 85 Fed Reg 3314
[16] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, pp. 8-10.
[17] 85 Fed Reg 3314
[18] 85 Fed Reg 3315
[19] *Ibid.*

mild hybrid electric systems and components are expected to be available for HD vehicles by 2024 and a greater amount in 2027. Also, Start-Stop technology provides thermal management benefits to aftertreatment during hot idle conditions. Significant synergies are achieved by combining 48-volt mild hybridization, CDA, and Start-Stop technology.[20] Full battery electric vehicle (BEV) technology can work well for HD vehicles that regularly return to a central location. Full hybrids are currently used the most in food and beverage distribution vehicles and parcel delivery vehicles. Strong hybrids are commercially available and are forecasted to see increased vocational application partnered with a low NOx engine to reduce CO_2 emissions.[21] There are also an increasing number of electric drivetrain solutions suitable for Class 8 vehicles up to 300 kW. These are often used with fuel cell or battery sources.[22] Hybrids and Start/Stop solutions, by shutting off the engine at idle or other lower engine-load conditions, can also help to maintain aftertreatment temperature by avoiding the undesirable cooling air flow that would occur otherwise.

Fuel Quality[23]

Current diesel engine regulations set sulfur limits allowed in fuel aiming to (1) reduce emissions of sulfur oxides (SO_2) and sulfur particulate matter and (2) reduce impact on the performance of precious metal and selective catalyst reduction (SCR). If aftertreatment architecture changes to meet more stringent HD NOx standards, it is likely that a twin SCR arrangement with close-coupled SCR will be deployed and will be exposed to SO_2 and may impact durability. Further, other metals found in engine oils and fuels including phosphorus, calcium, sodium, potassium and magnesium can result in deterioration in catalyst performance. Also as more biofuels could be required to meet RFS and the desire for renewables grows, the alkaline content in these fuels need to be low as they can also poison catalysts.

Catalysts suppliers are currently evaluating longer durability beyond today's FUL. MEMA supports EPA conducting accelerated aging and durability demonstration out beyond 435,000 miles using new aging protocols to evaluate long-term impacts of sulfur levels in diesel fuel on SCR catalyst in MY2027 architectures. SwRI is also conducting research of the durability of the close-coupled SCR during the final stage of full-engine aging out to 435,000 miles. Further, catalyst suppliers are working to make catalysts more durable and robust.[24]

EPA should consider addressing current aftermarket additives available and their certification criteria. The current certification requirements for these products are very low, which could have negative consequences for air quality and could impact emissions technology performance. Consequently, more due diligence is certainly possible and necessary. There are many products that cause more harm than good.

Lightweighting

Lightweighting is an important part of the overall strategy for reducing emissions and improving product performance. The use of lighter weight materials (high strength steel, aluminum, plastics, polymer composites, carbon fiber, magnesium, etc.) and designs – otherwise known as mass reduction or lightweighting – continues to be an important cost-effective strategy in meeting emissions reduction standards. Furthermore, lightweighting does not only consider mass reduction

[20] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, pp. 8-10.
[21] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, p. 16.
[22] *Id.,* pp.16-17.
[23] 85 Fed Reg 3316-3317
[24] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, pp. 25-26.

from the body structure, it also includes the unsprung mass of suspension and brake components as well as, but not limited to, aluminum wheels.

Gasoline Engine Technologies Under Consideration:

Technologies to Reduce Exhaust Emissions

EPA asks about the "performance characteristics of engine and aftertreatment technologies from chassis-certified vehicles when applied to engine certified products, specifically placing the catalyst in a location more consistent with chassis-certified applications."[25] Close-coupling offers an easy way to achieve significant emissions reductions without risk, as it is already applied in significant volumes in HD trucks.

EPA also requests input on the need for more stringent PM standards for HD gasoline engines.[26] MEMA agrees with EPA that "there may be an opportunity for further reductions in PM from HD gasoline engines."[27] Gasoline particulate filters (GPFs) are readily available and already applied in great volumes across a range of applications for PM emissions reduction for gasoline engines in both the European Union and China. Because MEMA supports regulations and standards that would promote implementation of the best available technology, MEMA supports a more stringent PM standard for HD gasoline engines.

Evaporative Emissions

EPA explains that as exhaust emissions from HD gasoline engines decrease, evaporative emissions become an increasing percentage of the total hydrocarbon emissions.[28] MEMA supports EPA considering extending the usage of refueling evaporative emissions control and evaluating a tighter standard on evaporative emissions. We also believe that engineering analysis is appropriate to use in adapting existing test procedures, provided that fuel tank characteristics such as tank size, vapor space, and vapor generation are well-defined. Evaporative emissions impacts ozone as NOx, hydrocarbons and sunlight create ozone.

Emission Monitoring Technologies: NOx Sensors

EPA discusses identified applications where the agency believes the use of advanced sensors could enhance and potentially streamline existing EPA programs.[29] Robust sensor monitoring technology offers significant opportunities for verification that advanced technologies are providing the real-time benefits throughout a vehicle's actual life. MEMA agrees all capable sensor technology should be considered and should not solely focus on NOx detection but also other emissions such as particulate matter (PM). However, expectations should be realistic and appropriate (e.g. in viewpoints of sensor accuracy, operability) as to not drive cost of ownership beyond the value of vehicle's owner and operator. For example, emissions measurement may not be possible during all vehicle operating conditions. Even with technology improvements, sensors will have a limitation of accuracy and repeatability. Therefore, as emission concentrations get lower, the present sensor technology is not able to measure emissions with the desired accuracy expected from laboratory grade equipment. MEMA urges EPA to consider these existing limitations and – when future improved sensor technology becomes available – EPA should consider tightening the sensor threshold; as long as other factors are considered; including cost implications and economic impacts of the threshold reductions.

[25] 85 Fed Reg 3317
[26] 85 Fed Reg 3318
[27] *Ibid.*
[28] *Ibid.*
[29] *Ibid.*

Hybrid, Battery-Electric, and Fuel Cell Vehicles:

EPA asks how the agency should address barriers to market adoption of hybrid HD vehicles and appropriate incentives for these advanced technologies considering the potential for substantial tailpipe emissions reductions from HD hybrids.[30] Suppliers and vehicle manufacturers have made significant investments in these advanced technologies like the HD hybrid. Additionally, suppliers have made significant investments in aftertreatment technologies for the HD diesel and gasoline engines. As a result, MEMA would prefer that the technology adoption for meeting the EPA's new low HD NOx standards is kept on a level playing field.

MEMA does, however, support an update to the powertrain test procedures for HD hybrids, previously developed as part of the EPA's HD Phase 2 regulation so that it can be applied to criteria pollutant certification.[31] When HD hybrid vehicles have the diesel engine shut off for a significant amount of time there would be a contribution to reduced emissions. This reduction of emissions must be considered so that the HD hybrid technology is not penalized. Further, hybrid technology can also impact load shifting. Testing should be able to account for these benefits. Because the current engine dynamometer test ignores the advantages HD hybrids can provide, test procedures need to be updated to accurately measure the benefits from these advanced technologies.

Alternative Fuels:

EPA requests comment on how LPG, DME and natural gas fuels should be treated in the CTI.[32] MEMA recommends that EPA considers hydrogen and e-fuels (a carbon fuel not produced from fossil or biomass), or power-fuels. These should be considered as other zero GHG emissions options. Such technology enables ongoing use of significant infrastructure investments and can be applied in today's products with less disruption, bringing potentially more immediate benefits. While MEMA does not support incentivizing one alternative fuel over another, general encouragement of alternative fuels is welcomed. Moreover, we recommend EPA ensure there is a level playing field for these alternative fuels by encouraging investments that provide adequate infrastructure to support market access for these fuels.

MEMA Supports New Standards and Test Cycles

As EPA acknowledges in the ANPR, CARB has conducted research the last few years on its Low NOx Demonstration Program to investigate the feasibility of a 90 percent reduction of NOx emissions from HD vehicles. EPA and industry stakeholders have been engaged in the various stages of research conducted by SwRI. While EPA does not include specific values for the HD NOx standards being considered by the agency, the agency encourages comments and data assisting in developing appropriate standards and test cycles.[33]

A CTI comprehensive framework that encourages implementation of innovative technologies through improved standards, new test cycles and in-use emission standards is important to the supplier industry. MEMA supports new HD NOx emissions standards and additional test cycles that will drive additional NOx emissions reductions on the road and encourages best-in-class technologies. These standards should be performance-based and technology-neutral and the test-cycles should reflect real use of vehicles. Both the standards and test cycles should enable multiple technology paths to achieve compliance.

[30] 85 Fed Reg 3319
[31] 85 Fed Reg 3320
[32] *Ibid.*
[33] 85 Fed Reg 3320-3321

MEMA Supports New Stringent NOx Emission Standards for RMC and FTP

MEMA supports EPA starting the new HD NOx standards in MY2027 which aligns target dates with EPA's HD Phase 2[34] as outlined in the ANPR and is consistent with CARB's proposed timeline.[35] This timeline will provide adequate lead-time which is critical to suppliers making and continuing meaningful technology investments. The MY2027 HD NOx standards should be set at levels that encourage the adoption of best available HD emissions technologies that are currently available from suppliers and accelerate technologies under development that promote reliable, cost effective solutions.

In their September 2019 workshop on the HD NOx Omnibus Rulemaking, CARB proposed HD NOx exhaust emissions standards for the RMC and FTP for MYs 2024 and 2027.[36] Generally speaking, MEMA accepts these values. A standard of 0.05 g/bhp-hr being considered for MY2024 is certainly achievable. In fact, a 0.05 g/bhp-hr HD NOx emissions standard has been demonstrated to be achievable and cost-effective in the U.S. by using currently available technologies without significant hardware changes.[37]

More importantly, the HD NOx standards CARB is considering in the range of 0.015 to 0.030 g/bhp-hr for RMC and FTP in MY2027 is feasible.[38,39,40] This range has been proven feasible at current FUL, and work is ongoing, including EPA's own low NOx demonstration program. This research is evaluating strategies to optimize MY2027 architectures to enable them to maintain this level of performance at extended durability.[41] Modeling recently conducted by Manufacturers of Emissions Control Association (MECA) predicts that HD diesel engines are able to achieve a composite FTP NOx emission rate in this range with commercially available catalysts, improved urea dosing, and better engine-out NOx control and calibration. Although these results do not provide the normal compliance margins vehicle and engine manufacturers need, the modeling shows the potential of current emissions control technologies without making major changes to the current aftertreatment architecture. [42]

MECA's modeled results are comparable with preliminary engine test results from SwRI's Low-NOx Test Program.[43] Further, the SwRI preliminary results show HD NOx emissions in this range of 0.015 to 0.030 g/bhp-hr are feasible with no increase in fuel consumption.[44] According to research, this range of emissions over the FTP and RMC can be achieved for an additional cost of a MY2027 HD Class 8 vehicle – ranging approximately $1500 to $2050 – an increase of about 1 percent (with current durability and warranty requirements, in 2019 dollars).[45]

---

[34] 81 Fed Reg 73478
[35] 85 Fed Reg 3307
[36] https://ww3.arb.ca.gov/msprog/hdlownox/files/workgroup_20190926/staff/01_hde_standards.pdf?_ga=2.146686516.1486563206.1581620359-742817937.1557173849
[37] ICCT, "Future Heavy-duty Emission Standards: An Opportunity for International Harmonization," November 2019, p.5. available at https://theicct.org/publications/future-hdv-standards-harmonization
[38] ICCT, "Future Heavy-duty Emission Standards: An Opportunity for International Harmonization," November 2019, p.8. available at https://theicct.org/publications/future-hdv-standards-harmonization
[39] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, pp.19-20.
[40] C. Sharp, Update on Heavy-Duty Low NOx Demonstration Program at SwRI, September 2019.
[41] 85 Fed Reg 3315
[42] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, p. 19.
[43] C. Sharp, Update on Heavy-Duty Low NOx Demonstration Program at SwRI, September 2019. And MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, p. 20.
[44] C. Sharp, Update on Heavy-Duty Low NOx Demonstration Program at SwRI, September 2019.
[45] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, p. 3.

HD NOx standards set in the range of 0.015 – 0.03 g/bhp-hr will drive technology adoption and provide investment payoff for motor vehicle suppliers that have made significant investments in these important technologies. Moreover, if EPA sets HD NOx standards in this range for MY2027, it could provide generally aligned targets for a national program and provide emission reductions needed to reduce adverse health impacts and help states attain their National Ambient Air Quality Standards (NAAQS).[46]

Summary of CARB Proposal (Sept 2019): HD NOx Emissions Standards Proposed:

	FTP/RMC (g/bhp-hr)	Low-load Cycle (g/bhp-hr)	Idling (g/hr)
2024-2026	0.05	.20	10
2027 and Subsequent	0.015 – 0.030	(1-3) x FTP	Equal or less than 10

MEMA Supports New Emission Test Cycles and Standards for Low-load and Idle

EPA is considering a new certification cycle to represent real-world in-use conditions for HD vehicles that have varied vocations and duty cycles. There is clear evidence that low-load and low speed operation are needed to control HD NOx emissions as current certification cycles are not matching real-world testing. EPA outlines test data that indicates that low-load operation accounts for as much as half of the NOx emissions from a vehicle over a given shift-day.[47] CARB also estimates that by 2030, low-speed, low-load emissions will represent half of all NOx emissions of the HDV fleet.[48]

EPA requests comment on the appropriateness of CARB's candidate number 7 low-load cycle.[49] MEMA encourages EPA to adopt CARB's candidate number 7 low-load cycle as this low-load cycle is appropriate to accurately capture real-world in-use emissions. A low-load cycle would also create a push for adoption of technologies that provide active thermal management of emission control systems. In the ANPR, EPA discusses the appropriateness of setting a federal idle standard for diesel engines.[50] MEMA supports EPA requiring an idle cycle for all powertrains with accountability for hybridized systems. An idle certification cycle should encourage available technologies like Start-Stop.

New certification cycles should accurately quantify and reward contributions of technologies to fuel efficiency improvements and NOx emissions reductions. As a result, MEMA supports EPA adopting a new low-load certification cycle and an idling certification cycle for evaluating the emissions performance of HD powertrains. Both certification cycles better represent real-world use and will encourage best-in-class technology adoption while effectively providing lower NOx emissions requirement.

MEMA Supports Real-World, In-Use Emissions Standards

While HD vehicles currently meet NOx standards of 0.2 g/bhp-hr, engines have challenges maintaining this standard during low engine load conditions. Several studies have found significant discrepancies between "Not-to-Exceed" (NTE) test results and actual emissions.[51] This is primarily due to the current federal in-use compliance requirements that exclude emissions data at lower vehicle

[46] https://www.epa.gov/aboutepa/petition-epa-rulemaking-adopt-revised-nox-exhaust-emission-standards-highway-heavy-duty
[47] 85 Fed Reg 3321
[48] California Air Resources Board, "CARB Staff Current Assessment of the Technical Feasibility of Lower NOx Standards and Associated Test Procedures for 2022 and Subsequent Model Year- HDDEs."
[49] 85 Fed Reg 3321
[50] *Ibid.*
[51] *Ibid.*

speeds, lower engine loads and lower aftertreatment temperatures. EPA explains that it is considering switching from the currently used NTE testing procedure to a MAW HD in-use testing (HDIUT) approach consisting of time-based windows.[52] MEMA agrees with EPA's recognition that a better in-use emissions testing is needed to reflect real-world use. Further, EPA proposed MAW HDIUT updates are a method that stakeholders are familiar with as it includes elements similar to Europe's Euro VI Step E In Service Conformity (ISC) testing.

MEMA supports updates to test procedures that accurately quantify and reward the contributions of emissions reducing technologies. EPA adoption of the MAW in-use emissions standards would provide as close to real-world emissions measurements as possible. As discussed in the ANPR, CARB has also proposed a MAW approach in their September 2019 workshop for their HD NOx omnibus rulemaking.[53] MEMA supports EPA and CARB having the most realistic in-use emissions standards while both agencies providing a consistent approach and minimizing variation between CARB and EPA's cycles. Harmonizing HDIUT would provide optimal streamlining for vehicle and engine manufacturers.

MEMA Supports Remanufacturing Practices

In the ANPR, EPA uses the subtitle "Improving Engine Rebuilding Practices" in the section requesting feedback on potential new provisions for remanufacturing.[54] Instead of using the term "Improving," MEMA recommends using the word "Broadening," or a similar term. "Broadening Engine Remanufacturing Practices" would be more appropriate given that the section focuses on aftertreatment, and aftertreatment systems are not included in the engine remanufacturing process. As currently written, the term "improving" is misapplied.

Remanufacturing is a standardized industrial process by which previously sold, worn, or non-functional products are returned to same-as-new, or better condition and performance.[55] In the ANPR, EPA continuously uses the term "rebuilding" rather than "remanufacturing." In the document, EPA notes, "As used here, the term 'rebuilding' generally includes practices known commercially as 'remanufacturing.'" In addition, EPA notes, "Under 40 CFR part 1068[56] rebuilding refers to practices that fall short of producing a 'new' engine."[57] MEMA strongly requests the EPA adjust its definitions of "remanufacturing" and "rebuilding" to align with the definitions published by the U.S. FTC and the U.S. ITC.

In 2014, the FTC revised its report: "Guides for the Rebuilt, Reconditioned and Other Used Automobile Parts Industry."[58] In this most recent revision, the FTC updated its definition, and subsequent positioning, of the term "remanufacturing." Today, the FTC guidelines prohibit the use of the term "remanufactured" to describe automotive parts not produced in a factory setting. The FTC notes in paragraph 20.3(b), "It is unfair or deceptive to represent an industry product as 'Remanufactured' or 'Factory Rebuilt' unless the product was rebuilt as described in paragraph (a) of

[52] 85 Fed Reg 3322

[53] https://ww3.arb.ca.gov/msprog/hdlownox/files/workgroup_20190926/staff/02_hdiut.pdf?_ga=2.34107169.1663699168.1580771662-742817937.1557173849

[54] 85 Fed Reg 3327

[55] Remanufacturing Associations Agree on International Industry Definition, European Association of Automotive Suppliers (CLEPA), Motor & Equipment Remanufacturers Association (MERA), Automotive Parts Remanufacturers Association (APRA), Automotive Parts Remanufacturers National Association (ANRAP), European Organization for the Engine Remanufacture (FIRM) and Remanufacture Committee of China Association of Automobile Manufacturers (CPRA), September 2016.

[56] 40 CFR part 1068 – General Compliance Provisions for Highway, Stationary and Nonroad.

[57] 85 Fed Reg 3307

[58] "Guides for the Rebuilt, Reconditioned and Other Used Automobile Parts Industry," 16 CFR Part 20: Guides for the Rebuilt, Reconditioned and Other Used Auto Parts Industry; Final Revisions to the Guides, Federal Trade Commission, July 2014.

this section at a factory generally engaged in the rebuilding of such products." With these revised definitions, the FTC acknowledges that remanufacturing and rebuilding are not synonymous. Further, the ITC defines "remanufacturing" as an "industrial process that restores end-of-life goods to **original working condition or better**. Firms that provide remanufacturing services to restore end-of-life goods to original working condition are considered producers of remanufactured goods."[59] [*emphasis added*]

While we understand 40 CFR 1068.120(b) uses the term "rebuilding," MERA and its members have worked for years to advance this distinction in the narrative on remanufacturing. As such, MEMA and MERA urge the EPA to adjust its terms to reflect the contemporary FTC and ITC definitions and 1) begin incorporating the root term "remanufacture" in rulemaking documents and recognize its distinction relative to "rebuild," and 2) acknowledge that remanufacturing practices do restore goods to "original working condition or better."

In the ANPR, EPA explains the consideration of a program where a remanufacturer would be required to collect information documenting certain OBD codes from the owner to determine whether the aftertreatment systems are functioning prior to sending the engine out for remanufacturing. EPA requests feedback on the feasibility and challenges of such a requirement, including suggestions of relevant OBD parameters, report format, and how to collect the information.[60]

MEMA and MERA strongly support engine remanufacturing practice that maintains emissions compliance. However, such a program of requiring remanufacturers to collect OBD codes from the owner would be extremely burdensome. Further, it is unclear how this requirement would advance compliance. First, many engines are replaced using an exchange program, i.e., where the original engine is not reinstalled in the same vehicle. With exchange programs, many vehicles are already back on the road with fully-functioning remanufactured replacement engines before their original engines are returned – via a reverse logistics channel – for remanufacturing. Second, the overall performance of aftertreatment components on vehicles receiving replacement engines – whether new or remanufactured engines – is a system dependent and tied directly to the vehicles themselves. If engine remanufacturers are required to collect these reports, this would be a non-value added activity that would be difficult and burdensome. Vehicle inspection practices, post-engine replacement, may deliver the results sought by the EPA.

Extended Regulatory Full Useful Life Could Pose Challenges

EPA explains that it will consider extending significantly the regulation for useful life of trucks Classes 4-8.[61] HD suppliers are capable of emissions technology durability improvements. However, there are several mistaken assumptions regarding the relationship of commercial diesel engine remanufacture and emissions control and aftermarket systems component durability and life expectancy. It may be difficult to address these issues before actual failure modes are completely understood. If EPA does extend full useful life for Classes 4-8, it will be important that a phased-in approach is used to allow necessary data and time for suppliers to improve durability as these technologies are adopted.

Suppliers face various challenges in meeting a significantly extended useful life. A phased-in approach, allowing suppliers more time, will be beneficial for the same reasons a phased-in approach is helpful in any emissions warranty extension. In November 2019, CARB, in response to stakeholder feedback, proposed a phased-in approach with an increase in FUL starting in 2027 then another increase in 2031 for the FUL element of their HD low NOx omnibus rulemaking. If EPA extends HD regulatory useful life, MEMA supports EPA and CARB coordination as much as possible.

[59] ITC report: "Remanufactured Goods: An Overview of the U.S. and Global Industries, Markets, and Trade." 2012, p. xvi
[60] 85 Fed Reg 3327
[61] 85 Fed Reg 3323

MEMA agrees with EPA, as discussed in the ANPR, that proper maintenance is of paramount importance for durability. Below, we discuss two points MEMA supports if both FUL and emissions warranty is extended: 1) EPA should provide an update of the minimum replacement maintenance intervals and 2) serviceability improvements are needed, including diagnostics, tools, and training.

Extended Emissions Technology Warranty Could Pose Significant Challenges

The agency explains it intends to propose longer emissions warranty periods in order to incentivize improved durability of HD emissions technology. EPA requests comment on an appropriate length of emissions warranty period for engine and aftertreatment components that would not result in unreasonable costs.[62] An extension to emissions warranty could significantly impact HD vehicle suppliers and could pose numerous challenges. Suppliers would take on the resources and costs related to conducting research, development and reengineering in order to extend the durability of emissions parts capable of meeting the extended warranty. Additionally, suppliers or OEMs currently do not have access to the necessary data to understand the failure modes and if improvements are possible. MEMA outlines in detail challenges that would face suppliers with an extended warranty period and provides recommendations.

A substantial increase in the warranty emissions will be difficult for suppliers. First, they currently do not have the data necessary to make durability improvements. Second, there will be significant cost implications to suppliers early in the learning period. Given that the current HD emissions warranty is 100,000 miles and 5 years, the feasibility of an emissions warranty mileage extension of up to six-fold is unknown.

If EPA proposes a significantly lengthened emissions warranty, it is critical that a phased-in approach is used, and industry is provided adequate lead-time to develop robust systems at the lower emission levels. Inspection and maintenance programs and serviceability improvements will help control repair costs for vehicle manufacturers, vehicle owners and suppliers. MEMA communicated these concerns to California in 2017 and 2018 on CARB's "Step 1" update to California's emission control system warranty regulation slated to start in model year MY2022[63] and provided more feedback on the extension slated to start in MY2027. MEMA and other stakeholders proposed that, at a minimum, if a significantly lengthened warranty is implemented, a phased-in approach should be used.

Suppliers Do Not Currently Have Access to Necessary Data for a Substantially Extended Warranty Period

The feasibility of meeting an extended warranty of six times the miles of the current emissions warranty is unknown because of the current lack of field data available to suppliers. Suppliers do not receive information from the vehicle manufacturers after the warranty period is over, which is currently set at 100,000 miles. In some instances, suppliers do not receive warranty information even under the warranty period and certainly not beyond the warranty period. Often, suppliers do not receive any diagnostic information from the dealers when they replace a part. As a result, suppliers currently do not have the necessary data or knowledge on the costs and failures needed to ensure improvement of emissions parts capable of meeting the extended warranties out to six times the miles of current emissions warranties.

Furthermore, suppliers also do not have data on the life characteristics of parts that successfully reach end -of-life, which is extremely important for suppliers when designing durability. All this information is critical for suppliers to be able to successfully develop new parts capable of meeting the proposed extended warranties. Currently, only the vehicle manufacturer has access to this data. The extension of the emissions warranty to six times the miles of the current warranty is an area where

[62] 85 Fed Reg 3325

[63] California Air Resources Board. "Heavy-Duty OBD Regulations and Rulemaking." Available online: *https://heavy-duty-obd-regulatins-and-rulemaking.*

even many vehicle manufacturers may not have durability data. This is because any necessary repairs may be done in maintenance facilities outside of their dealer network, or parts that successfully reach end-of-life are scrapped without OEM or suppliers being able to learn from them.

A phased-in approach will provide more time for suppliers to gather data and learn. However, there are other ways the agency can assist industry in making significant jumps in FUL and warranty. MEMA would be interested in exploring ways to build into the HD NOx program assistance with data gathering, provided that the data is shareable. Examples include assistance with:

- Gathering data from the vehicle manufacturers via research funded through EPA that can help with getting suppliers information on failed parts.
- Providing data to suppliers on the second and third owners of these trucks. Over the life of a longer warranty, the vehicle may change hands and the second/third owners may operate very differently. Extensive use profiles for second/third owners are generally not available to provide design input.

Because suppliers will be taking on the R&D and re-engineering of these emissions systems, it is critical that suppliers have this type of information on how the component or system needs to be modified to develop and improve product durability.

Cost Implications of the Extended Emissions Warranty

If there is an extension for emission warranties on HD vehicles, the responsibility of warranty coverage would be placed on to the OEM, engine manufacturer, and component/system suppliers for all engines and emission devices. While historically the vehicle manufacturer is responsible for the warranty, this cost almost always trickles down to the vehicle owners. This is because of the cost increases to cover additional and lengthened product durability assessment would add to development costs from the engine manufacturers and suppliers that need to be recovered.

A significantly extended emissions warranty will add costs to suppliers related to developing new parts capable of meeting the extended warranty period. This will be needed for all components in the emissions control system resulting in a significant increase in costs. If a supplier incorrectly estimates the program costs to cover the expanded warranty program, they could be disadvantaged. Because of suppliers lack of adequate data, suppliers will likely bear more of the burden and increased risks and costs. If EPA adopts extended emissions warranty, MEMA strongly recommends implementing an extended emissions warranty with a long lead-time and a phased-in approach in order to reduce risks and costs to suppliers.

EPA should take into consideration the costs associated with extended warranty periods through higher vehicle costs. MECA estimates that for a Class 8 (12-13 liter engine) truck, increased durability and warranty requirements of 800,000 miles[64] would add approximately $2000 to $2750 to the cost of emission controls and engine efficiency technologies.[65] MEMA urges EPA to fully evaluate and consider the economic impact of expanding such warranties on various stakeholders, including the end-user (i.e. consumers and fleets). Again, an extended emissions warranty that allows a long lead-time and a phased-in approach is preferred to a significant increase at once in order to provide suppliers time to gather data and learn. Allowing more lead time to fully understand, estimate costs related to, and plan for the extended warranty will help alleviate risks and costs for suppliers.

[64] Proposed by CARB January 23, 2019.
https://ww3.arb.ca.gov/msprog/hdlownox/files/workgroup_20190926/staff/04_hd_ul_step_2_warranty.pdf?_ga=2.245697028.1486563206.1581620359-742817937.1557173849

[65] MECA, "Technology Feasibility for Heavy-Duty Diesel Trucks in Achieving 90% Lower NOx Standards in 2027," February 2020, p. 25.

MEMA Encourages EPA and CARB Coordination for HD Warranty Emissions and Useful Life Extension

While MEMA has significant concerns with a significant extension of useful life and emissions warranty, we encourage EPA and CARB to work together to coordinate useful life and warranty requirements as much as possible without adding unnecessary burden. This coordination should be in collaboration with input from industry stakeholders. If emission warranty requirements are uncoordinated, even briefly, it would be burdensome for industry. Uncoordinated emission warranties would add unnecessary complexities and would be costly and overly burdensome to OEMs and their suppliers through increased design, production, and compliance costs.

MEMA Encourages EPA Adjusting the Minimum Replacement/Repair Intervals

If EPA does propose to extend the service life and emissions warranty, the agency should revisit the current list of minimum replacement and scheduled maintenance interval. Similar to CARB adjusting the maintenance intervals when it extended emissions warranty in 2018, EPA should also provide an update of serviceable items and periods. Testing and validation to meet the minimum replacement intervals for emissions components will need to be developed with motor vehicle suppliers.

MEMA Supports Freezing the OBD Threshold

MEMA supports EPA freezing the OBD monitoring thresholds. In CARB's September 2019 HD NOx Omnibus workshop, CARB proposed to freeze the PM and NOx monitoring thresholds for 2024 and subsequent model years at current levels for HD diesel.[66] MEMA supports EPA continuing to work with CARB to review OBD thresholds as they have in the past. The OBD threshold staying constant is an important element for any significantly extended warranty emissions extension. However, development is on-going with software, specifically on vehicle health management. Therefore, if future improved OBD technology becomes available, EPA should consider tightening the OBD threshold as long as EPA considers cost implications and economic impacts of the OBD extension.

MEMA Does Not Support Heavy-Duty Hybrids Being Included in the Warranty Emissions Extension

HD hybrids should not be included with the warranty emissions extension. Since there are currently very limited amounts of HD hybrids in the market, it would be difficult and impractical to have data assessing the feasibility of the extended FUL and warranty requirements under this proposal for HD hybrids. As more HD hybrids come into the market and the supplier industry accumulates more data on these HD hybrids, EPA should consider a future introduction of warranty extension for HD hybrids.

Negative Impact on Medium and Heavy-Duty Aftermarket Emissions Parts

If EPA significantly extends medium and HD emissions control system warranties, there may be long-term unintended negative impact on the medium-duty/HD aftermarket emissions technology industry because it could reduce aftermarket product demand. Longer warranties will have an implied restriction to use only OE service parts (due to the risk of voided warranties). This may result in a near total monopoly for OE service components limiting consumer choice and price point options. Eventually this reduced demand will affect the availability of quality emissions related components – equally equivalent in form, fit and function – for repairs during or after a warranty period.

Many vehicle owners typically will have warranty repairs and non-warranty repairs performed by the OEM service provider in order to reduce critical downtime. Reducing free and open competition would affect aftermarket service and parts suppliers across the U.S.

---

[66] https://ww3.arb.ca.gov/msprog/hdlownox/files/workgroup_20190926/staff/06_obd_ddp_abt.pdf?_ga=2.80976215.1537503598.1580504935-742817937.1557173849, California Code of Regulations for Heavy-Duty On-Board Diagnostics, sections 1971.1, 1971.5 and 1968.2, title 13. Available here.

Consequently, EPA should ensure aftermarket service providers have a pathway to perform emission control system warranty repairs just like any OEM service provider. In order to facilitate this and minimize the potential negative impact to the aftermarket businesses, MEMA requests that EPA consider regulatory language that ensures aftermarket service providers have equal access to the necessary tooling (e.g. scan tools, etc.), repair and diagnostic information as an OEM service provider. Allowing access to the tooling, repair and diagnostic information would help maintain aftermarket competition and would help ensure that consumers and fleet owners continue to have market choice.

MEMA Supports Serviceability Improvements

The EPA requests feedback on recommendations "to improve maintenance practices and the repair experience for owners."[67] If emissions warranties are extended, it will be critical to suppliers that dealer and independent service providers concurrently improve diagnostic routines, tools and training. These improvements are important to better control repair costs.

Inadequate or incomplete service diagnostic routines can incorrectly identify faults in these emissions components. It is a common diagnostic technique in service repair shops to continually swap out emissions components until the problem goes away. This often results in an assumption that one of the emissions components was faulty when it was in fact not the faulty component. Improving service dealership education on this topic must be a priority.

Along those same lines, review and improvement of diagnostic tools and training is needed for dealer service and independent service providers. Moreover, these diagnostic tools and training must be fully utilized by both independent service providers as well as vehicle fleet and dealer technicians to improve maintenance and repair costs. Service repair technicians require increasingly sophisticated tools in order to correctly identify the root cause of emissions component failure. Technicians, without the correct tools and training to use those tools, will be left to make difficult and important decisions without complete information. These decisions without complete information can lead to incorrect repairs and needed follow-up repairs, which adds costs.

Software solutions exist on the market today that can improve trouble shooting and diagnostics. These software solutions are helpful for extremely complex diagnostic issues which will become increasingly complex with new emissions regulations requirements, new technologies, and vehicle electrification. As vehicle technicians face a skills gap challenge, these software solutions will help bridge these gaps by reducing repair costs and improving repair quality. In order to streamline and improve vehicle health management and serviceability, the industry, driven by SAE International, created JA6268, which standardizes the practice of component health indicators development. Similar language could be used to standardize diagnostic tools and training.

Workshop and repair shop cleanliness is an important aspect of improving serviceability. Some repair shops may replace a failed emissions technology component. If the repair environment was contaminated or there was a failure to properly clean components, that component may immediately fail.

MEMA also recommends greater evaluation and use of OBD and sensor technologies to understand root system failures for emissions technology systems. OBD technology has accelerated since 2010/2013 in the HD market and could be used as an effective tool to improve compliance. Additional OBD requirements and function should be defined to help protect emissions products and help prevent systematic failures.

[67] 85 Fed Reg 3327

MEMA Supports Incentives for Early Compliance

The EPA requests input on provisions that would provide regulatory incentive for reducing emissions earlier than required.[68] MEMA strongly supports EPA's CTI rulemaking principle stated in the ANPR that the regulation "should incentivize early compliance and innovation."[69] MEMA encourages a credit program that provides incentivization for early compliance with EPA's ultimate HD NOx MY2027 standard. Such a program would incentivize early adoption of supplier technologies, help provide earlier environmental benefits and help ease into a national program prior to 2027. While MEMA supports early reduction of emissions, it is important that incentives are tied to the MY2027 HD NOx standard and not simply reductions below the 2010 standard of 0.20 g/bhp-hr. If significant credits are tied to an interim standard, this could delay adoption of the best available emissions reducing technologies and the other associated benefits of the ultimate HD NOx standard in 2027.

Conclusion

The motor vehicle supplier industry is at a critical point with R&D and domestic investments in HD emissions-reducing technologies. The CTI presents an important opportunity for further reductions in NOx emissions from HD vehicles. MEMA recommends MY2027 HD NOx standards, certification cycles and in-use testing procedures that encourage adoption of best available emissions technologies that promote reliable, cost-effective solutions. Closely harmonized EPA and CARB HD NOx programs will provide a stable framework the industry needs for long-term planning and investment decisions that will strengthen the U.S. supplier manufacturing sector and grow the economy. Further, we encourage EPA and CARB to coordinate as much as possible on useful life and warranty requirements without creating unnecessary burden to suppliers and vehicle manufacturers.

At a minimum, MEMA supports:

- Stringent HD NOx emissions standards starting in MY2027;
- Adoption of low-load, idling certification cycles and MAW emissions in-use testing;
- A harmonized approach from EPA and CARB of unified test cycles and targets; and,
- A reasonable, carefully structured FUL and emissions warranty requirements that address needed improvements to serviceability and consideration of suppliers' need for a long lead-time and data challenges.

These elements are critical to the supplier industry's stability, continued job growth and preservation of important strategic investments and leadership in global innovation. Thank you for consideration of these comments. MEMA looks forward to providing EPA further feedback on the CTI Notice of Proposed Rulemaking. For more information, please do not hesitate to contact Laurie Holmes, MEMA senior director of environmental policy at 202-312-9247 or lholmes@mema.org.

# # #

[68] 85 Fed Reg 3329
[69] 85 Fed Reg 3307