COMMENTS OF MECA CLEAN MOBILITY ON THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION'S SCOPE OF CONSIDERATIONS TO BE ADDRESSED IN THE ENVIRONMENTAL IMPACT STATEMENT FOR FUEL EFFICIENCY STANDARDS FOR MY 2030 AND BEYOND MEDIUM- AND HEAVY-DUTY TRUCKS

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MECA Clean Mobility would like to provide comments in support of the National Highway Traffic Safety Administration's (NHTSA) scoping plan for preparing an environmental impact statement (EIS) to analyze the potential environmental impacts of new fuel efficiency (FE) standards for model years (MY) 2030 and beyond medium- and heavy-duty on-highway vehicles. Suppliers continue to innovate and introduce new technologies to improve the efficiency of combustion and expand the power electronics, motors, battery and fuel cell offerings for hybrids, PHEVs and full battery and fuel cell electric vehicles. We believe an important opportunity exists to continue to improve fuel efficiency while reducing greenhouse gas and criteria emissions from medium- and heavy-duty engines and vehicles through the application of innovative technologies and fuels. We appreciate NHTSA beginning the regulatory process for MY 2030 and later HD trucks and ask that the agency consider all pathways that reduce lifecycle emissions as you work towards finalizing standards with as much lead time as possible. Our members depend on long term regulatory certainty to justify their investments that will allow the U.S. to meet its national climate objectives and ensure that U.S. technology suppliers remain internationally competitive.

MECA is an industry trade association of the world's leading manufacturers of clean mobility technology. Our members have nearly 50 years of experience and a proven track record in developing and commercializing emission control, efficiency and electric technology for a wide variety of on-road and off-road vehicles and equipment in all world markets. Our members provide the technologies that enable heavy-duty on-road vehicles to meet the most stringent criteria emission standards as well as electrification and all-electric technologies that reduce emissions of all pollutants, criteria and climate, and allow vehicles to be the cleanest and most fuel efficient possible. Our industry has played an important role in the environmental success story associated with light- and heavy-duty vehicles in the United States and has continually supported efforts to develop innovative, technology-advancing, regulatory programs to improve fuel efficiency and deal with air quality and climate challenges.

Over the past 50 years, mobile source emission reduction and fuel efficiency policies have not only delivered important health, environment and energy conservation benefits but have also helped create an industry with a significant number of well-paying highly skilled jobs and a global economic reach. MECA companies represent over 70,000 of the nearly 300,000 North American jobs, many of which are members of unions, building the technologies that improve the fuel economy and reduce emissions of today's vehicles. This employment figure does not include the tens of thousands of additional jobs in automobile, truck, and off-road equipment assembly.

There is a long track record of meeting environmental goals through the implementation of performance-based standards and competing technology solutions. We encourage NHTSA to continue this performance-based model used in Heavy-Duty Phase 1 and 2 regulations. While technology mandates have been used to provide certainty in specific markets, they can result in premature barriers to investment and innovation in promising parallel pathways to achieving the same environmental goals. This has the unintended effect of destabilizing other markets for cost effective technologies, which can constrain the technology solution options to meet air quality and climate goals.

Several sources of propulsion energy are being explored to help reduce the carbon footprint of heavy-duty vehicle operation. The main low carbon energy sources gaining traction and forecast to become a more significant fraction of the on-road heavy-duty vehicle fleet in 2030 and beyond include electricity, hydrogen and renewable diesel. These energy sources are paired with battery electric vehicles, fuel cell vehicles and internal combustion engine vehicles, demonstrating that technology and fuel neutral combinations can achieve the goals of fuel efficiency as well as GHG and criteria emission reductions. However, current emission regulations are primarily focused on the vehicle operation and tailpipe rather than the lifecycle emission benefits of the energy sources.

In the development of environmental impact statements, regulatory impact analyses, and regulatory target decision-making, MECA urges NHTSA to work with EPA to fully integrate full lifecycle assessment for all vehicle powertrains and advanced vehicle fuels/energy sources. With the growing emphasis on rapid real world emission reductions, it becomes increasingly important to consider all impacts to the environment, including upstream emissions and energy consumption related to fuels, vehicle production supply chains and supporting fueling infrastructures in a consistent, accurate and equitable manner. Historically, NHTSA's process has considered a balanced and equitable treatment of fuels and technologies to arrive at cost effective regulations, and we support a continuation of this methodology. Numerous studies have shown that in many parts of the country, the benefits of transportation strategies are not uniform with regards to lifecycle energy consumption. In order to make sound incentive and investment decisions, there is a vital need to consider full lifecycle factors to ensure the most equitable regulations that support the attainment of long-term national objectives.

MECA members are engaged in developing a large portfolio of electrification and efficiency technologies that will directly or indirectly impact GHG emissions. Technologies that can improve internal combustion engine vehicles include the most advanced versions of cylinder deactivation, turbochargers, fuel injection, ignition systems, and waste heat recovery. Furthermore, emission control components on today's trucks, such as exhaust gas recirculation (EGR), diesel particulate filters (DPF), and selective catalytic reduction (SCR) systems, have been improved over time and optimized to reduce both criteria pollutants and CO_2. MECA member companies are making significant investments in technologies being applied to electric and fuel cell vehicles, including battery and fuel cell components, electronic controls, motors, transmissions and thermal management systems. Additional technology development will be furthered by sufficiently stringent standards considered in your preferred alternative.

Hybrid electric vehicles can offer significant emission reductions as battery electric and fuel-cell vehicles gain traction and the infrastructure is readied for a significant number of these vehicles. A review of hybrid passenger vehicles currently available for sale shows that fuel economy in city driving is 50-100% higher for the hybrid model compared to its gasoline counterpart. This type of savings, if incentivized through technology for vocational trucks that spend most of their time on city streets, would result in much greater benefits than current Phase 2 GHG limits. For those truck segments that are less amenable to full electric powertrains, broad application of hybridization delivers sustainable electrification and magnitudes greater emission reductions than a limited number of all-electric trucks.

Conventional engines will continue to be built for years to come and, if operated on low carbon fuel, these will also offer parallel criteria and GHG reductions. Beginning with MY 2027, it is expected that heavy-duty vehicles will be required to meet tighter NOx emission limits of 0.02 g/hp-hr over the FTP based on EPA's proposed rule set to be finalized in December 2022. As noted above, lifecycle analysis will play an important role in assessing total emission benefits of vehicle and fuel pairs. Based on projected electricity grid generation mixes across the U.S. included in Argonne National Laboratory's GREET model, upstream NOx emissions for electricity generation to power heavy-duty electric trucks are likely equal to or greater than tailpipe emissions from engine-powered trucks, through the 2030-2035 time frame.

MECA supports NHTSA's consideration of alternative fuels in heavy-duty fuel economy standards, including both battery electric and fuel cell electric vehicles (FCEV). In addition to hydrogen FCEV, there is broad industry support for internal combustion engines fueled with clean hydrogen, and most engine manufacturers are conducting significant development work worldwide to meet this technology need. Similar to FCEVs, hydrogen-fueled internal combustion engines (H2ICE) are attractive options in commercial trucking where challenges remain in applying current BEV technology to several vocations. One of the main benefits of H2ICE in the commercial vehicle sector is the opportunity to leverage existing investments in manufacturing capacity in engines and aftertreatment while growing the market for on-board hydrogen storage technology and infrastructure. For more challenging vehicle use-cases, this technology can be commercialized sooner than FCEVs and at a lower TCO, in-turn delivering carbon reductions earlier.

H2ICE vehicles share many characteristics with vehicles on the road today, including the base engine, installation parts, powertrain components and aftertreatment system architectures. Furthermore, H2ICE can borrow technology from currently available engines, such as cylinder heads, ignition systems, fuel injection, turbochargers, cooled exhaust gas recirculation (EGR), and engine control unit/software, among others. Nearly all on-road and off-road engine OEMs, along with their suppliers, are developing H2ICE for commercial introduction in the MY 2025-2027 timeframe.

These commonalities provide engine makers and fleet end users an alternate hydrogen technology to support the transportation transition by utilizing existing powertrain components and maintenance experience to reduce capital costs and total ownership costs for low-carbon vehicle options with near-term commercial availability. Fleets have the ability to begin to transition their vehicles to zero CO_2 at competitive initial capital costs while maintaining current workforce and familiar maintenance practices. In addition, this would allow fleets to buildout their hydrogen fueling needs and transition seamlessly to FCEV trucks as they become available. Suppliers can build manufacturing capacity for hydrogen storage tanks, which will also be used by FCEVs once technology and cost challenges are overcome.

On the hydrogen fueling side, pathways that incentivize fleet penetration of H2ICE will create demand for current and future hydrogen fuel infrastructure that will be needed for higher penetration of FCEVs. Infrastructure investments can be justified as utilization increases and provides returns on the capital-intensive expenditures of hydrogen fueling stations. With respect to GHGs, H2ICE utilizes the exact same hydrogen as FCEVs and therefore emits nearly zero CO_2 from the tailpipe. Furthermore, lifecycle emissions will be zero if renewable hydrogen is sourced as a fuel. It should be noted that European heavy-duty CO_2 regulations will assess H2ICE as having zero tailpipe CO_2, on par with FCEVs, within the VECTO model that is used for compliance with European heavy-duty vehicle GHG regulations.

As the battery electric and fuel cell electric truck markets mature, we support NHTSA's consideration of maximum feasible efficiency standards for these vehicles. We believe this will result in continued technology innovation toward higher efficiency and lower emitting vehicles that will complement improvements in grid resiliency and further the goal of energy security. In addition, this will lead to improved consumer protections as well as confidence for those with limited BEV and FCEV experience. Currently, the California Air Resources Board (CARB) has adopted Zero Emission Powertrain (ZEP) requirements to establish performance standards for the batteries and components on electric heavy-duty vehicles. We consider that as a good starting point that could be enhanced to drive continued innovation in electric truck component development. CARB's Advanced Clean Cars II light-duty vehicle regulation was finalized with assurance measures to ensure battery and fuel cell durability and vehicle range requirements. Technologies that increase efficiency, durability and range of BEVs and FCEVs include improved battery and fuel cell materials and architectures; advanced motors, as well as motor control management software; efficient wiring harnesses; fuel cell electric compressors; and thermal management technologies and strategies. We have witnessed over the history of transportation regulations and incentive programs, that performance standards lead to continued progress in the development of cost-effective robust technologies to ensure the cleanest and most efficient vehicles and equipment.

In conclusion, MECA commends NHTSA's leadership to improve fuel economy and reduce GHG emissions from on-highway vehicles. There are significant pathways to continue to improve fuel efficiency and reduce criteria and greenhouse gas emissions from medium- and heavy-duty engines and vehicles through the application of innovative technologies and fuels, including battery-electric and fuel-cell trucks. Lifecycle analysis will be a necessary tool in order to accurately assess the complete emissions reduction potential of all available pathways. We believe an important opportunity exists to continue to reduce greenhouse gas emissions and improve fuel economy from medium- and heavy-duty engines and vehicles by applying the fundamental regulatory structure that has been effective under the first two phases of the medium and heavy-duty standards.

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