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Ms. Mary Nichols, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

28 May 2020

RE: Proposed Amendments to the Proposed Advanced Clean Trucks Regulation

Dear Chair Nichols and Members of the Board,

Garrett appreciates the opportunity to comment on the proposed Advanced Clean Trucks (ACT) regulation by the California Air Resources Board and **welcomes California's leadership to reduce emissions of criteria and climate pollutants.** The state has identified the heavy-duty transportation sector as a major source of California's emissions inventory, and these emissions are forecast to increase in the future. We believe an important opportunity exists to continue to reduce greenhouse gas emissions from medium- and heavy-duty engines and vehicles through the application of innovative technologies, especially hydrogen fuel cell technology.

For over 60 years, **Garrett has developed and produced cutting-edge technology for the automotive industry.** We help vehicles be safer, more connected, more efficient and environmentally friendly. We are a leading producer of emissions-reducing turbochargers, and also make technologies for low-emission hybrids and zero emission hydrogen fuel cell electric vehicles (HFCEVs). We also develop software for connected and autonomous driving. Garrett employs 7,500 people worldwide, has production facilities in 13 countries and R&D centers in 5 countries. Garrett has been in California since its founding in 1936, first in the early days of the aerospace industry, and later as a technology leader in automotive. Our R&D Center in Torrance continues our tradition of developing innovative solutions for mobility.

Garrett supports efforts to advance zero emission mobility; in particular, hydrogen mobility. Hydrogen fuel cell electric vehicles (HFCEVs) will play a significant role alongside battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEV) in the pursuit of zero-emission vehicles (ZEVs) in the coming years. Neither BEVs nor FCEVs by themselves can provide for all zero-emissions transportation needs during the next several decades. FCEVs are well-suited to higher-power, heavier applications for both passenger and commercial vehicles and have additional advantages: long range and much shorter refuelling times. Manufacturing costs for FCEV components are also decreasing with each generation and with scale.

Making such a large technology shift real requires investment from many players. The **automotive industry has invested billions of dollars** to develop and advance technologies that support environmental goals and reduce air pollution. In many cases automotive suppliers like Garrett lead technology development and take on substantial risks by driving a wide array of technology advancements needed to support environmental goals and improve emissions reduction.

Garrett has been manufacturing electric compressors to move air through hydrogen fuel cells since 2016. Our design innovations for this technology, born at our R&D Center in Torrance, have helped reduce the size of hydrogen fuel cell stacks by 40 percent over predecessor systems, simultaneously generating significant gains in constant power ratings. Our Two-Stage compressor can operate up to 20kW continuously and supply air at over 4 bar, helping to increase stack power density, while reducing weight and noise.

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Hydrogen is a promising technology and should be supported as a ZEV tech pathway for compliance with the ACT standard. We believe a **clear and stable regulatory environment** for ZEV technologies and its required fuelling infrastructure is important to guide greater use of HD ZEVs. Aligned, long-term targets have provided the domestic supplier industry with significant economic and technology development opportunities.

California's goals of encouraging a market for technologies like hydrogen fuel cell vehicles can help **US manufacturing of ZEV technologies like HFCEVs be more competitive globally** – especially with Asia.

To realize the potential of ZEV technologies, California and other states should ensure that **adequate BEV charging and hydrogen refuelling station infrastructure** becomes a reality and is designed with heavy-duty trucks in mind. To do this, California should provide incentives and funding for both BEV recharging and hydrogen refuelling stations. In order to ensure that all ZEV technology pathways and use cases are supported in California, hydrogen mobility infrastructure should be encouraged as much as BEV recharging infrastructure.

COVID-19 has rapidly increased the investment gap necessary to finance the transition to a climate-neutral economy by 2045. To create a market environment to advance these new (and often costly) technologies – **California should provide market incentives**, especially for fleets, from state public procurement programs to support the development of this market, as well as vehicle purchase premiums.

California should support HD ZEV market development by offering **sufficient flexibility to the proposed credit system** to sell more HD ZEVs in one weight category and fewer in another. This flexibility or credit system would allow more diverse OEMs to participate in this market in a meaningful way. Not all OEMs will choose to invest in all weight classes at the same time – especially given the current negative market environment which may continue for a few years.

In conclusion, hydrogen fuel cell electric trucks offer a very promising solution for zero emission mobility. The automotive industry needs regulatory certainly, strong support for refuelling infrastructure and market uptake through incentives, and flexibility in the credit system to help manufacturers make the transition as rapidly as possible.

Sincerely,

Cody Taylor
Vice President
Government Relations