Written Testimony for the Record of

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Before the
Subcommittee on Energy
Committee on Energy & Commerce
United States House of Representatives

Hearing on "Charging Forward: Securing American Manufacturing and Our EV Future"

March 8, 2022

Chair Rush, Ranking Member Upton, and distinguished members of the Subcommittee, thank you for this opportunity to share our views for the record on the topics of climate change, transportation and clean air, and American jobs.

I am John Boesel, President and Chief Executive Officer of CALSTART.[1] I would like to share information about the technical and product revolution underway in zero-emission technologies for vehicles – including trucks and buses – and how these vehicles can play a major role in reducing the harmful effects of climate change.[2] But I also want to emphasize the co-benefits of the zero-emission vehicle sector to our nation that go beyond the climate crisis. These vehicles are critical to American technical leadership and competitiveness. They provide a growing source of good-paying jobs, from assembly to supply chain to infrastructure installation, that are in many cases hyper-local. And importantly, these same technologies can cut to zero the pollution load born disproportionately by communities of color. We want to commend the good work this Committee and Congress have put in motion; but we also hope to make clear what still is left to be done.

We are seeing a historic increase in the adoption of zero-emission vehicles across the light-, medium- and heavy-duty categories. To grow the uptake of these vehicles in a meaningful and sustainable way, we need to grow our U.S. battery manufacturing industry. Globally, the vehicle market is in a period of disruptive change, as established manufacturers, start-ups, and others are making billion-dollar investments in the transition away from internal combustion engines to electric powertrains. The global market for electric vehicle (EV) batteries will likely exceed $5 trillion by the end of this decade. U.S. companies led the global development and production of internal combustion engines in the 1900's. Will the U.S. win the global EV battery market? Consistent with President Biden's goal of a 100% clean electric grid in 2035 and his American Jobs Plan, electrifying the U.S. transportation sector can address the climate crisis and create new manufacturing jobs. However, new policies are required to establish a domestic supply chain for EV batteries that results in job creation and economic development. A domestic, competitive battery manufacturing supply chain reduces U.S. economic vulnerabilities with importing materials and offers

[1] See www.calstart.org
[2] https://globaldrivetozero.org/site/wp-content/uploads/2021/05/How-Zero-Emission-Heavy-Duty-Trucks-Can-Be-Part-of-the-Climate-Solution.pdf

new prospects for economic growth and national security by supplying EV battery materials and components to global markets.

Background. CALSTART is the nation's largest and oldest clean transportation technologies industry consortium. Nearly 300 companies and organizations are members of the CALSTART industry network,[3] ranging in size and role from major established car, truck and bus makers, innovative new electric manufacturers, leading companies in the automotive and truck component supply chain, where the bulk of the industry's jobs reside, the world's leading fleets, and a broad base of hundreds of small to mid-size technology companies who represent America's powerful emerging supply chain for advanced, clean and zero-emission vehicles.

CALSTART's non-profit mission since its founding nearly 30 years ago has been to support and grow this clean transportation technology industry. Our mission and goals are even more resonant today than when we launched: to ensure we have both a heathy environment and a healthy economy. Jobs and clean air and climate action must go hand-in-hand. Our thirty years of experience show they can. By manufacturing and using the world's cleanest vehicles, communities most impacted by transportation pollution can breathe free, while also working in good-paying jobs. Clean air for all citizens, high-quality jobs and economic opportunity, maintaining American technology leadership and competitiveness, cutting climate impacts today – this is what our industry is dedicated to.

With offices in New York, Washington, DC, Florida, Michigan, Colorado and headquarters in California, we support this industry's success and growth in four key ways:

- Developing and managing world-leading technology demonstration and validation programs, to keep America's pipeline of innovation on the cutting-edge;
- Supporting faster adoption of early production clean vehicles with fleet assistance and incentive programs. One key example is the Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), a zero-emission commercial vehicle purchase incentive program CALSTART has helped administer with the California Air Resources Board (CARB) for the last decade since the program's inception;
- Working with industry to develop and secure supportive policies that invest in America's technologies and products; and
- Providing our member companies, fleets and organizations with market, technical, funding opportunity and networking assistance to grow their development and production.

U.S. Battery Supply Chain Global Leadership. CALSTART is leading the U.S. Battery Leadership Initiative, involving several key OEM and battery supply chain members focused on advancing incentives and workforce development programs to support domestic manufacturing supply chain for electric vehicle batteries – from upstream technologies for the sustainable, domestic processing of minerals, to downstream battery cell and pack innovations, to battery recycling manufacturing processes. As part of this effort, we are organizing key EV industry voices to support Congress's efforts to invest in manufacturing investment tax credits, grants, and loans to retool, equip, and incentivize battery cell, pack, and material manufacturers of all sizes; invest in innovation to bolster the domestic ZEV battery supply chain competitiveness; and train and bolster the U.S. battery supply chain manufacturing and assembly workforce.

[3] See https://calstart.org/members/

The U.S. EV industry employed approximately 130,000 people in 2019.[4] The Blue Green Alliance and American Council for an Energy Efficient Economy estimated that up to 570,000 new net EV-related jobs could be created by 2030 with higher U.S. fuel economy standards at 54 miles per gallon.[5] With the President's American Jobs Plan and the CALSTART-led advocacy for new national initiatives, this number is expected to grow even more as the U.S. deploys more electric vehicles.

This is an economy and national security issue: other nations have prioritized EV battery manufacturing as a strategic priority and the U.S. is already importing these batteries. China's national and state governments have made enormous investments and provided financing for its large EV battery manufacturing sector much like they did with photovoltaics. EV battery companies in South Korea and Japan are also doing well in the international market as their governments have also targeted this technology. In the past five or so years, countries in the European Union, particularly Germany, have taken action to accelerate EV battery manufacturing. Compared to these other nations, the U.S. has done comparatively little in recent years to ensure that this nation is not only able to produce enough batteries to meet its own needs, but also be competitive on a global basis.

Given this outlook, we must put in place a multi-prong, comprehensive federal policy approach to make sure that we are not dependent on other nations for EV batteries and that we maximize job creation here at home. Growing the EV battery industry means the U.S. should examine the materials supply chain and, wherever possible, find domestic sources for the raw materials and ensure they are produced in ways that are environmentally and socially responsible. We do not want to be dependent on other nations for key materials where the environmental and labor protections are beneath acceptable standards.

Rapid Industry Change. We are seeing a rapid pace of change in advanced, zero-emission technologies, and this quick deployment is extremely important.

The light-duty EV market is growing rapidly worldwide, especially in China and significantly in Europe, too. For the U.S. to realize the significant economic benefits of growth in this domestic industry, and to be a climate leader, the federal government should set strong standards. The Biden Administration's Executive Order targeting 50% of new sales being ZEVs by 2030 is a strong start. The federal government should strongly consider working toward one national 2035 standard that aligns with the target established by California and a bipartisan group of 11 other states: 100% of new vehicles sales are zero-emission vehicles by 2035.[6]

To support early market growth, the U.S. should restructure its current light-duty EV incentive policy by lifting the cap per automaker and consider a sunset date based on a new EV sale threshold of, e.g., 50%.

While commercial vehicles – medium- and heavy-duty trucks and equipment – represent just a fraction or about four percent of total vehicles on the road worldwide, they represent an outsized contribution to climate and air pollution emissions. Commercial vehicles account for nearly thirty percent of on-road greenhouse gas emissions, and, just as importantly, more than 60 percent of nitrogen oxides (NOx), a

[4] Environmental Defense Fund EV Market Report, September 2020 Update, Dana Lowell and Alissa Huntington, M.J. Bradley & Associates, p. 13.
[5] Creating the Clean Energy Economy, Analysis of the Electric Vehicle Industry, International Economic Development Council, Jennifer Todd lead author, 2013, p.13.
[6] https://www.npr.org/2021/04/21/989463166/governors-urge-biden-to-order-100-zero-emission-car-sales-by-2035

major component of what causes air pollution.[7] In some U.S. cities, the contribution of NOx is as high as nearly 70 percent.[8] Few vehicles; big impact. That's why trucks are a prime segment for targeted, cost-effective emissions reduction.

Importantly, trucks are also undergoing a revolution in the availability of low-carbon, low-emissions technologies that means they can deliver out-sized reductions sooner than many have anticipated. Today, every major North American and European truck maker has zero-emission trucks in early production or final stages before production. Volvo, Kenworth, Peterbilt, Navistar, Mack and Freightliner all are producing at least one, and in some cases several, zero-emission trucks. These are not just small delivery size vans. They include heavy Class 6 "box" trucks used to carry goods around cities and towns and full Class 8 "big rig" tractors, used to haul trailers around larger regions, such as from warehouses to stores or ports and railyards to distribution facilities.[9]

"Beachhead" Strategy to Drive Change. CALSTART has developed a fast-track strategy for accelerating the successful deployment of zero-emission trucks by first focusing on those applications that are best suited for success immediately, and outlining the subsequent, rapid phases into heavier and longer-range segments achievable as advanced truck technology advances and production costs drop. It was developed in partnership with CARB to help identify investment strategies to speed zero- and near-zero vehicles to market. Called the "beachhead" strategy, it identifies a first market success, or beachhead, and expands from there by transferring technology and reducing cost by building higher supply chain volumes.[10]

America's first beachhead segment is electric transit buses, now representing a meaningful percentage of new bus purchases in the United States.[11] The underlying powertrain – electric motors, power electronics and battery packs or fuel cell systems – are highly transferrable to other medium- and heavy-duty applications, such as delivery, distribution and regional heavy freight trucks. This technology transfer helps unlock these next beachheads, allowing new market segments to take hold faster than ever before.

Learnings from Real-World Applications. To support this work, CALSTART has developed multiple practical tools to support adoption and track progress, including tools to assess the business case (commonly referred to as Total Cost of Ownership),[12] to plan for infrastructure needs,[13] and a matrix of successful policy instruments.[14] To help fleets and policy makers assess vehicle availability, we developed the Zero Emission Technology Inventory (ZETI), which tracks zero-emission commercial vehicles (ZECVs) in production or coming to market three years out.[15] ZETI Analytics projects that the number of ZECV models will grow globally by 30 percent by 2023; and the number of heavy-duty models will grow by a staggering 80 percent.[16]

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[7] https://globaldrivetozero.org/site/wp-content/uploads/2021/05/How-Zero-Emission-Heavy-Duty-Trucks-Can-Be-Part-of-the-Climate-Solution.pdf; page 2

[8] http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/presentation-2022-aqmp-mobile-sources-printer-friendly.pdf?sfvrsn=12

[9] https://californiahvip.org/vehicles/

[10] https://globaldrivetozero.org/publication/the-beachhead-model/

[11] https://calstart.org/zeroing-in-on-zebs-2020-edition/

[12] https://californiahvip.org/tco/

[13] https://californiahvip.org/purchasers/#infrastructure

[14] http://toolkit.globaldrivetozero.org/

[15] https://globaldrivetozero.org/tools/zero-emission-technology-inventory/

[16] https://globaldrivetozero.org/tools/zeti-analytics/

Global Alignment and Competition. However, the beachhead strategy is not unique to the United States. Indeed, as global market demand and zero-emission commercial vehicle market opportunities grow, we have had visibility to the significant investments in this technology and jobs being created in Asia and Europe. These regions have also been able to apply this theory of change. To support of industry partners, CALSTART developed a worldwide program, the Global Commercial Vehicle Drive to Zero (Drive to Zero) program,[17] that has to date organized 15 nations and more than 100 international industry, fleet, utility and government partners around the common goal of creating the supporting conditions for faster ZECV adoption. This policy ecosystem includes purchase incentives for the early market; investments in charging and refueling infrastructure installation; expanding technology development and demonstration programs to assist industry; and smart regulations.

Drive to Zero nations agreed to develop a Global Memorandum of Understanding (Global MOU) to achieve specific zero-emission deployment targets for commercial vehicles to keep pace with climate change emissions. The Global MOU, modeled on a 15-State MOU in the United States,[18] establishes a goal of 30 percent ZECV sales by 2030 and 100 percent by 2040, with specific actions to meet those goals. At the international climate summit in November 2020 (Conference of the Parties, or COP26) 15 nations announced their commitments to these goals.[19]

The policy ecosystems we are helping other nations to establish, and which we are strongly recommending at the federal level for the United States, derive directly from our experience working with industry and fleets to understand which policies best support faster production and purchase of zero-emission trucks and buses – and with them, job creation and cleaner air in our most impacted communities.

As one example, both manufacturers and fleet operators have consistently told us that traditional tax incentives do not influence commercial vehicle purchase decisions; fleets need the vehicle cost reduced at the time of sale. Potentially reduced taxes later in the year do not overwhelmingly influence vehicle choice. But incentives directly reducing vehicle cost work.[20] Validated through ten years of real-world results at the state level in Illinois, New York, and California where we administer significant point-of-sale purchase incentive programs, we have put thousands of clean and zero-emission trucks and buses on U.S. roads. Earlier this month, the largest such program we help administer, HVIP in California, was fully subscribed in a period of just three hours with requests for over a thousand zero-emission trucks. Thirty percent of the requests were for heavy-duty Class 8 electric tractors for use in drayage, goods movement and regional distribution.[21] Successful public policy that can drive decarbonization of commercial vehicles resonates globally, as we have seen with Drive to Zero. It also demonstrates both where the United States can lead our partner nations by its example and where we have an opportunity to maintain a domestic competitive advantage.

The Need for Federal Leadership. Individual state actions creating varying supportive policies is not enough: our industry needs a consistent national program so all regions can take part. Shaped directly with our industry partners and proven in the laboratory of the states, CALSTART leads four major national

[17] See www.globaldrivetozero.org
[18] https://www.trucks.com/2020/07/20/bipartisan-clean-trucks-agreement/
[19] https://globaldrivetozero.org/2021/11/09/landmark-commitment-at-cop26-countries-subnational-governments-vehicle-manufacturers-and-fleets-target-100-zero-emission-new-truck-and-bus-sales-by-2040/
[20] https://calstart.org/wp-content/uploads/2020/09/CALSTART_VIP_White_Paper.pdf
[21] *"Funders Forum Update 061621",* PowerPoint briefing to Funders Forum meeting

industry coalitions that are making specific federal policy recommendations to advance zero-emission vehicle deployment and infrastructure: the National Zero-Emission Truck (ZET) Coalition; the Zero-Emission Bus & Innovative Mobility Coalition; the Clean Corridors Coalition; and the US EV Battery Leadership Initiative.

These groups' policy recommendations show a broad base of support in industry for advancing clean transportation technologies and good-paying jobs. To summarize a few:

- New purchase incentives, such as voucher programs or manufacturer tax credits, for zero-emission heavy-duty vehicles. We are now seeing this idea gain some traction at the federal level, as discussed below.
- Historic opportunity and responsibility to invest in projects in deindustrialized and under-invested communities, including low-income communities and communities of color. This recommendation is particularly apt for a discussion of how to decarbonize goods movement since frontline communities often bear the brunt of the air quality impacts of heavier vehicle movement.
- New grants to states and local and tribal governments to facilitate installation of electric vehicle charging stations and hydrogen fueling infrastructure along designated corridors along the National Highway System. The Bipartisan Infrastructure Law enacted last year is a significant down-payment on this investment, and CALSTART is working across states and with the federal government to support deployment of that money as efficiently and effectively as possible.
- Prioritizing Low-No Grant Program funding to projects in environmental justice communities; as well as expanding public transit access.
- Supporting the role of the U.S. Department of Energy (DOE) in advancing research, development, demonstration, and deployment (RDD&D) to make high-efficiency, zero-emission, long-range trucks commercially viable, including through robust demonstration and pilot deployment of components, vehicles and infrastructure; and to help states through the DOE State Energy Program include transportation electrification planning and guidance in their state energy transportation plans.
- Doubling-down on the zero-emission vehicle supply chain, from battery cell and pack technological innovations, to investment in upstream process innovations to provide a sustainable, domestic source of materials and components for battery electric vehicles in particular. The Bipartisan Infrastructure Law included $6 billion in manufacturing grants from DOE, but this is far from enough to establish the US as a global leader in battery supply chain and manufacturing. The U.S. needs additional manufacturing incentives, increased RDD&D, and a highly skilled workforce if it is to win the EV global market. We need new Federal efforts, in partnership with State and local programs, to train and upskill workers for building new grid infrastructure, charging stations, advanced batteries and material supply chains.

What is Still Left to Do. We thank the Congress for its work to date, but the work is not yet done. There are several critical elements for industry, such as the point-of-sale incentive for trucks and manufacturing incentive for EV batteries, that have yet to move forward. To further support the growth of the ZEV industry across the board, from cars to big rigs, the U.S. should revise and update the Renewable Fuel Standard so that it includes and incentivizes lower carbon transportation fuels such as electricity and green hydrogen in a technology-neutral, performance-based manner. The California Low-Carbon Fuel Standard is an excellent example of good policy that can be built upon for a national approach.

We strongly encourage the Committee to continue to highlight the need to support and invest in American technology competitiveness; to support and create U.S. jobs by encouraging the production and purchase of these technologies with incentives that match market needs; to ensure America leads the world in building the new infrastructure these zero-emission vehicles need; and to prioritize deploying zero-emissions vehicles in under-invested communities and communities of color, who have born the bulk of the burden of air pollution.

We are at a unique period of inflection for our nation and the world in how we address our climate imperative, and whether we do so in a way that will keep American industry competitive, provide U.S. workers future-proof jobs and clean the air in communities too long left behind. America has invented many of the technologies now being manufactured elsewhere but has often not supported or spurred our own manufacturers to make and our fleets to buy these best-in-class technologies. Asia and Europe are investing deeply in zero-emission technology and the critical component manufacturing leadership it brings. We have the unparalleled opportunity and the national capacity to lead this next phase of transportation. Zero-emission commercial vehicles are a powerful and focused segment that enables targeted policies and investments to make outsized impacts in our nation and world. Our world requires it; our workers deserve it; and equity demands it. Let us not lose this chance to change transportation for good.

We appreciate the opportunity you have given us to provide this information and recommendations. We remain committed to being an asset to the Committee and its staff at any time.