

CALSTART

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Artisan Vehicle Systems

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Title: Zero Emission Drayage Truck Marketplace Jumpstart Program

Location: I-710 Corridor serving POLA and POLB drayage operators

Executive Summary: Artisan Vehicle Systems has applied their expertise in battery electric (BEV) mining vehicles to create BEV drayage trucks, using a CEC grant to design a truck with proven components. Artisan is using a manufacturing approach similar to factory OEM natural gas trucks – a major OEM dealer has agreed to install the Artisan drive system in glider chassis. The dealer will provide warranty and after-sale support. Artisan fully warrants its electric driveline. The project would deliver a fully zero-emission truck, from a major OEM, with full standard warranties, and over 100 miles of range per charge. The chargers (EVSE) are included with the truck, and are stand-alone units that can be easily placed and connected to grid power. To address the primary remaining hurdle to BEV dray truck adoption, the project would utilize state funding to cover the incremental cost between the zero-emission Artisan truck and a conventional diesel vehicle. The truck operator would buy the Artisan truck with their own funds, and therefore be invested in the project, but the ZE vehicle would cost no more than a new diesel vehicle. Artisan would manufacture the battery packs, motors, power electronics and other driveline components in Ventura County. Driveline integration by the OEM retailer would be done in Los Angeles County.

The project would deliver 100 trucks over a 2 year time frame, roughly 1 truck per week. This is not an R&D prototype project of one or two trucks, but rather a real production program demonstrating real world evidence of the market for ZE drayage. There would be job creation in both Ventura and Los Angeles counties. We plan to contact the Harbor Trucking Association and work with them to arrange the purchase and operation of these trucks by San Pedro region dray companies. We also expect interest from early-adopter fleets that no longer face the risks of a one-off demonstration program, or the high costs of ZE truck purchase. CALSTART would conduct data collection and analyses to validate the fuel and emissions savings. Over the 2 year period of deployment, we believe a ZE Drayage Ecosystem will begin to form, based on the trucks and chargers put into use by this project. The ecosystem will add more vehicles and chargers over time, as well as creating opportunities to capitalize

on avoided costs and improve the business case for ZE Drayage. For example, we could investigate the negotiation of PierPass exemptions for these ZE trucks. There are existing processes to exempt certain containers, but a ZE truck exemption will require conversations and negotiations with the PierPass non-profit, along with the Federal Maritime Commission, the Ports, MTOs, and other stakeholders. The impact on finances for PierPass would be minimal, and exemption from fees and time constraints could be evaluated as a potentially critical element for driving ZE truck adoption. We believe it is possible to find a short term arrangement for these 100 trucks, which already deliver on one of the core goals for PierPass – reduced emissions.

Detailed Description:

Advanced Technologies: The project trucks use application real world production battery packs, electric motors, and power electronics, all designed, developed, and assembled in Southern California.

Alternative Fuels: Electricity is a low-carbon alternative fuel in California.

Freight and Fuel Infrastructure: Artisan has a unique stand-alone charger design that simplifies the placement and installation of equipment. It is expected that coordination with SoCal Edison and/or LADWP, along with other stakeholders, will enable charger planning and deployment locations across the I-710 corridor, with important learning for the future regarding grid impacts, truck operations, and charging patterns.

Local Economic Development: Jobs will be created in LA and Ventura counties.

Improving Freight Efficiency: Particularly if the PierPass exemption is negotiated and implemented, this project will increase freight efficiency. The reduced maintenance of BEV trucks will improve up-time and lower costs for drayage operators. Fuel savings can be applied to lower costs to BCOs.

Transitioning to ZE: 100 trucks in two years is the largest ZE drayage deployment ever proposed. This project would significantly demonstrate the viability of BEV dray trucks, and test one business model for jump starting the marketplace transition.

Increasing competitiveness of CA: Demonstrating that California can reduce emissions while increasing freight efficiency will add to the competitiveness of our ports, and encourage greater adoption of these technologies. Fuel savings and a business model that supports ZE truck adoption will enable competitive pricing for goods movement through San Pedro ports, while decreasing pollution and noise in DACs, supporting environmental justice for the corridor residents.

Estimated Costs: A new diesel drayage day-cab conventional truck costs roughly \$125,000. The expected incremental cost for the BEV Artisan design is \$180,000. The total cost of the BEV Artisan Truck then is \$305,000, and funds would be requested to cover the incremental increase. For 100 trucks, funding of \$18,000,000 would be needed. But funding would only be distributed based on actual real world sales of trucks to end customers. Again, this is not a prototype R&D project of just 5 or even 25 trucks, but rather a real world production system, with 100 trucks that are fully warrantied and have quality on par with natural gas OEM vehicles.

Timeline: 2 years from program launch; one truck built and deployed per week. If approval received this year, by December 2017 there would be 100 fully ZE drayage trucks working in the I-710 corridor.

Means for measuring progress: The number of trucks purchased would be the key measure – while they can be built at the rate of one per week, sales may not follow the same pattern. Selling all the trucks, ideally before they are built, would be the progress measurement and goal.

Roles for interagency partners:

All partners can contribute funding, in varying amounts based on resources available. Other roles can include:

CA State Transportation – Assistance with outreach

CA EPA/Natural Resources – Assistance with outreach, expedited NEQA/CEQA as needed.

CARB – Certification exemptions as ZE vehicles

C-DOT – Consider exemptions for overweight, if batteries cause total vehicle weight to exceed current maximums by less than 20,000 pounds

CEC – Assistance in working with utilities and electricity generation; funding of analysis for charging station locations and usage; assistance with possible solar installations for power.

GoBiz – Assistance with expanding manufacturing capabilities as needed, working with quality control, improving local supply chain and technician training for manufacturing and for maintenance/repair, and training for drivers as needed.