

SCAQMD Zero Emission Cargo Transport (ZECT) II Demonstration

Technology Manufacturer

Center for Transportation and the Environment (w/ BAE Systems), Gas Technology Institute, Hydrogenics USA, Inc., Transportation Power, Inc., US Hybrid

Co-Participants

South Coast Air Quality Management District, Port of Long Beach, Port of Los Angeles, US Department of Energy, California Energy Commission, LA Department of Water and Power, Southern California Gas Company

Project Objective

The I-710 and CA-60 highways are major transportation corridors in the Southern California region, which are used daily by heavy-duty drayage trucks that transport cargo from the Ports to the inland transportation terminals. These terminals, which include stores/warehouses, inland-railways, are anywhere from five to 50 miles in distance from the Ports. The operation of these drayage vehicles have a significant impact on the air quality in this region and impacts the quality of life in the communities near these corridors and the Ports. The Zero Emission Cargo Transport II Project follows the South Coast Air Quality Management District's (SCAQMD's) original ZECT project (ZECT I). ZECT II encompasses the development of seven drayage trucks by five different contractors via two main components:

- Development and demonstration of zero-emission fuel cell range extended electric drayage trucks; and
- Development and demonstration of hybrid-electric drayage trucks for goods movement operations between the Ports near dock rail yards and warehouses.

The objective of this project is to accelerate deployment of zero and near-zero emission cargo transport technologies to reduce harmful diesel emissions, petroleum consumption and greenhouse gases in the surrounding communities along the goods movement corridors that are impacted by air pollution from heavy diesel traffic.

Technology Description

For this project, five electric drayage trucks will be demonstrated with a range of fuel cell sizes and battery capacities. In addition, plug-in hybrid technologies will be demonstrated on both a natural gas and diesel engine platform. The natural gas platform will also have the potential to connect to a catenary system via a pantograph-based technology developed by Siemens. These advanced technology trucks will operate along major drayage truck corridors including the Terminal Island Freeway, a primary corridor for port cargo travelling between Port of Los Angeles and Port of Long Beach terminals and the Intermodal Container Transfer Facility, a near-dock rail facility. The following is a short description of each of the project vehicles and technologies:

Center for Transportation and the Environment (CTE) – CTE and BAE Systems will develop a battery electric truck with hydrogen range extender. The power output of the electric drive train

is comparable to that of a Class 8 truck engine. AC traction motors will be mounted one on each rear drive axle and the electric drive train in the architecture is set up to be fully redundant. The vehicle will operate primarily from the batteries, engaging the fuel cell system only when the batteries reach a specified state of charge. BAE anticipates that the 30 kilogram (kg) of hydrogen (25 kg usable) will provide approximately 112 miles of range between fuel fills.

Gas Technology Institute (GTI) – Under project management by GTI, contractor BAE Systems will develop one battery electric hybrid truck with CNG range extender and optional catenary capability. The truck will operate in a zero emissions (all-electric) mode and in a conventional hybrid electric mode using CNG.

Hydrogenics USA Inc. – Hydrogenics will produce the truck in the first year of the project. The fuel cell range-extended Class 8 truck will be demonstrated for 24 months in the Ports of Los Angeles and Long Beach.

Transportation Power, Inc. (TransPower) – TransPower will develop two battery electric trucks with hydrogen fuel cell range extenders. The preliminary technical concept for the proposed fuel cell range extender project is to use TransPower’s proven ElecTruck™ drive system as a foundation and add fuel cells provided by Hydrogenics, one of the world’s leading suppliers of hydrogen fuel cells. The proposed project will result in the manufacturing and deployment of two demonstration trucks, one with a 30 kW fuel cell and one with a 60 kW fuel cell, enabling a direct comparison of both variants.

US Hybrid - US Hybrid will develop two battery electric trucks, each with an onboard hydrogen fuel cell generator. The trucks will be powered by a lithium-ion battery with an 80 kW hydrogen fuel cell generator in charge sustaining mode, eliminating the need for charging.

Status

TransPower and US Hybrid have both made strides in the design and integration of the vehicle components. The CTE/Kenworth and GTI/BAE Systems vehicles have made considerable progress to provide a more advanced level of technology readiness in their designs although their development timelines are more extensive. All project demonstration vehicles are anticipated to begin in-service demonstration during 2017.

Benefits

The battery-electric trucks equipped with fuel cell range extenders will have zero emissions. The hybrid-electric trucks are expected to operate at near-zero emission levels. This project supports the Ports’ efforts in moving toward zero-emission technologies.

Project Costs

The Ports are contributing \$1,133,979 in co-funding to this project with a total project budget of \$19,984,820.

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