

## CALIFORNIA AIR RESOURCES BOARD

### Low Carbon Transportation Investments

#### Fiscal Year 2017-18 Zero- and Near Zero-Emission Freight Facilities Project Solicitation

#### List of Applications Received and Project Summaries



Page	Project Applicant	Project Title	Location	Located in a Disadvantaged Community	Funding Amount Request
1	Center for Transportation and the Environment	Class 8 Fuel Cell Truck with Hydrogen Production and Fueling Station at Anheuser-Busch Van Nuys, CA Brewery	Van Nuys	Yes	\$13,998,610
2	Center for Transportation and the Environment	Fuel Cell Hybrid Electric Delivery Van Deployment	Ontario	Yes	\$4,302,896
3	Center for Transportation and the Environment	Next Generation Fuel Cell Delivery Van Deployment	Ontario	Yes	\$5,831,866
4	Center for Transportation and the Environment	Zero-Emission Beverage Handling and Distribution at Scale	Carson, Riverside, Sylmar, Pomona	Yes	\$5,530,303
5	City of Benicia/Solano Transportation Authority	North Bay Electric Logistic Center	Benicia	No	\$1,434,312
6	City of San Francisco	Zero Emission from Farm to Table: Reducing Pollution Emissions and Health Risks from the Movement of Produce along Two Adjacent Trade Corridors in California	San Francisco, Sacramento, Fresno	Yes	\$4,562,862
7	Gas Technology Institute	Zero Emissions for California Ports	Port of Los Angeles	Yes	\$ 5,788,335
8	Port of Long Beach	Sustainable Terminals Accelerating Regional Transformation	Ports of Long Beach, Stockton and Oakland	Yes	\$50,000,000

Page	Project Applicant	Project Title	Location	Located in a Disadvantaged Community	Funding Amount Request
9	Port of Los Angeles	Zero-Emission Freight "Shore to Store" Project	Port of Long Beach Gardena, Long Beach, Ontario, Wilmington, Rancho Dominguez, Terminal Island and Port of Huenuume	Yes	\$41,122,260
10	Project Clean Air	Net-Zero Farming and Freight Facility Demonstration Project	Reedley	Yes	\$3,283,735
11	South Coast Air Quality Management District	Volvo Low Impact Green Heavy Transportation Solutions	Ontario, Chino, Fontana, Placentia	Yes	\$44,839,686
12	San Joaquin Valley Air Pollution Control District	Flexible Solutions for Freight Facilities - San Joaquin Valley Zero and Near-Zero Emission Enabling Freight Project	Stockton, Barstow and San Bernardino	Yes	\$22,616,647
13	San Joaquin Valley Air Pollution Control District	Frito Lay Transformative Zero and Near Zero Emission Freight Facility Project	Modesto	Yes	\$15,382,243

Solicitation materials are available at: [www.arb.ca.gov/msprog/aqip/solicitations.htm](http://www.arb.ca.gov/msprog/aqip/solicitations.htm).

Application scoring criteria are described in the Zero- and Near-Zero Emission Freight Facilities Project Grant Solicitation at [https://www.arb.ca.gov/msprog/mailouts/msc1810/zanzeff\\_solicitation.pdf](https://www.arb.ca.gov/msprog/mailouts/msc1810/zanzeff_solicitation.pdf).

**Project Applicant:** Center for Transportation and the Environment

**Project Title:** Class 8 Fuel Cell Truck with Hydrogen Production and Fueling Station at Anheuser-Busch Van Nuys, CA Brewery

#### Project Summary for Public Posting

**Project Title:** Class 8 Fuel Cell Trucks with Hydrogen Production & Fueling Station at Anheuser-Busch Van Nuys, CA Brewery  
**Name of Applicant:** Center for Transportation and the Environment (CTE)  
**End User:** Anheuser-Busch  
**Project Partners:** Nikola Motor Company – Class 8 Fuel Cell Trucks  
Nel Hydrogen – Electrolyzer and hydrogen fueling station  
Zen Clean Energy Solutions: Data Collection and Analysis  
**Requested Funds:** \$13,998,610

CTE, Anheuser-Busch, Nikola Motor, NEL Hydrogen and Zen Clean Energy Solutions plan to deploy a fleet of ten zero-emission Class 8 hydrogen trucks with supporting hydrogen production and fueling infrastructure at Anheuser-Busch's brewery in Van Nuys, California. This trailblazing project will be the first of its kind to demonstrate a fleet of zero emission long range class 8 vehicles in normal commercial operation and will provide a path for others to follow in adopting zero-emission truck technologies and fuel production.

Nikola Motor will supply ten *Nikola Two*™ fuel cell-powered Class 8 trucks, the world's first commercial, zero-emission hydrogen fuel cell electric truck for mass production, which has the same fast fueling, long driving range, and power performance as conventional diesel trucks. These new, zero-pollutant and low-noise emission trucks will be used by Anheuser-Busch to replace Class 8 diesel trucks in their current fleet and represents Nikola's first multi-vehicle deployment in the US.

NEL Hydrogen will provide the 1000 kg/day alkaline electrolyzer and 700 bar hydrogen fueling station, which will be highly integrated into the facility. A new 3MW rooftop solar installation will provide at least 33% renewable energy to the electrolyzer and recycled, byproduct waste-water from the brewery will be used as the primary water source for hydrogen production.

The proposed Project is located at Anheuser-Busch's Van Nuys warehouse, within a designated Disadvantaged Community area that experiences heavy trucking activities. The ten trucks and hydrogen fueling station will be operated by Anheuser-Busch for at least one year. The trucks will deliver beverages from the brewery, which produces over two dozen brands and supplies 28% of all beer sold in the state of California. The Project will improve local air quality through criteria emissions reduction of 1.141 tons/year, and will result in GHG emissions reduction of 1,174 metric tons of CO<sub>2</sub>e/year.

The total Project duration is 29 months with a total budget of \$46,823,185. CTE is requesting \$13,998,610 from CARB, 30% of the total project budget. Project partners will contribute the remaining \$32,824,575 in match funds. Project partners are committed to developing an industry and community outreach plan to make this site a flagship example for zero emission trucking.



**Project Applicant:** Center for Transportation and the Environment

**Project Title:** Fuel Cell Hybrid Electric Delivery Van Deployment Project

***Project Summary for Public Posting***

**Project Name:** Fuel Cell Hybrid Electric Delivery Van Deployment Project

**Name of Applicant:** Center for Transportation and the Environment

**Project Partners:** Unique Electric Solutions LLC (UES), Hydrogenics USA, University of Texas – Center for Electromechanics (CEM), StratosFuel, UPS

**Brief description of proposed project including location:**

Center for Transportation and the Environment (CTE), Unique Electric Solutions LLC (UES), University of Texas – Center for Electromechanics (CEM), Hydrogenics, and UPS are currently building a fuel cell hybrid electric delivery van that will be demonstrated in delivery service in West Sacramento, CA in Fall 2018. DOE, CEC, and SCAQMD fund this existing program and will help fund additional vehicles if the West Sacramento demonstration is successful. CTE is seeking additional funding to leverage existing funding and build 15 additional vehicles based on the initial fuel cell hybrid electric delivery van design.

The proposed delivery vans will be built in Riverside, CA. Fifteen existing diesel-powered delivery vans will be refurbished with fuel cell hybrid electric propulsion system kits. UPS will operate the 15 fuel cell hybrid electric vans in parcel delivery service out of its Customer Center in Ontario, CA. The existing StratosFuel hydrogen station in Ontario will be utilized during the deployment. Additional hydrogen sources may be utilized depending on local availability and market conditions at the time of deployment.

The deployment location supports the state's focus on providing emission benefits to disadvantaged communities. The project team has strategically planned to deploy these vehicles on routes that maximize the hours of service to and through these communities.

Data collection and commercialization assessments are critical components of the proposed vehicle deployment. Real-world performance data will be collected and provided to project stakeholders.

**Amount of funding requested:** \$4,302,896

**Total cost of project including requested funding amount and match amounts that are proposed:** \$9,491,238

**Expected emission reductions in criteria, toxic and GHG:**

Annual GHG Emission Reductions:  $285 \frac{\text{tonnes CO}_2\text{e}}{\text{year}}$

Annual Criteria Pollutant Emission Reductions:  $WER = 0.28 \frac{\text{tonne}}{\text{year}}$

**Whether the project is expected to be located within or provide benefits to a disadvantaged community:** The project has the potential to domicile vehicles within disadvantaged communities. UPS will deploy and operate the vehicles in typical parcel delivery applications out of its Customer Center located at Jurupa Street in Ontario, CA, which will support the state's focus on providing emission benefits to disadvantaged communities. The project team has strategically planned to deploy these vehicles at facilities near hydrogen stations with adequate fueling capacity and on routes that maximize the hours of service to and through these communities.

**Project Applicant:** Center for Transportation and the Environment

**Project Title:** Next Generation Fuel Cell Delivery Van Deployment Project

***Project Summary for Public Posting***

**Project Name:** Next Generation Fuel Cell Delivery Van Deployment Project

**Name of Applicant:** Center for Transportation and the Environment

**Project Partners:** Linamar, Ballard Power Systems, StratosFuel, and UPS

**Brief description of proposed project including location:**

Center for Transportation and the Environment (CTE), Linamar, Ballard Power Systems, StratosFuel, and UPS are assembling as a team of highly qualified organizations to develop, validate, and deploy four fuel cell hybrid electric delivery vans with an eye towards commercialization of the technology. The team has significant experience and a successful model for the development, build, and demonstration of fuel cell hybrid vehicles using off-the-shelf components and is seeking funding through the CARB Zero- and Near Zero-Emission Freight Facilities Project.

The proposed delivery vans will be built in Michigan. Fuel cell hybrid electric propulsion kits will be designed, built, and integrated with four Ford F-59 chassis. UPS will operate the four fuel cell hybrid electric vans in parcel delivery service out of its Customer Center in Ontario, CA. The existing StratosFuel hydrogen station in Ontario will be utilized during the deployment. Additional hydrogen sources may be utilized depending on local availability and market conditions at the time of deployment.

The deployment location supports the state's focus on providing emission benefits to disadvantaged communities. The project team has strategically planned to deploy these vehicles on routes that maximize the hours of service to and through these communities.

Data collection and commercialization assessments are critical components of the proposed vehicle deployment. Real-world performance data will be collected and provided to project stakeholders.

**Amount of funding requested:** \$5,831,866

**Total cost of project including requested funding amount and match amounts that are proposed:** \$11,670,102

**Expected emission reductions in criteria, toxic and GHG:**

Annual GHG Emission Reductions:  $76 \frac{\text{tonnes CO}_2\text{e}}{\text{year}}$

Annual Criteria Pollutant Emission Reductions:  $WER = 0.075 \frac{\text{tons}}{\text{year}}$

**Whether the project is expected to be located within or provide benefits to a disadvantaged community:** The project will domicile vehicles within disadvantaged communities. UPS will deploy and operate the vehicles in typical parcel delivery applications out of its Customer Center located at Jurupa Street in Ontario, CA, which will support the state's focus on providing emission benefits to disadvantaged communities. The project team has strategically planned to deploy these vehicles at facilities near hydrogen stations with adequate fueling capacity and on routes that maximize the hours of service to and through these communities.



**Project Applicant:** Center for Transportation and the Environment

**Project Title:** Zero Emission Beverage Handling and Distribution at Scale

#### **Project Summary for Public Posting**

**Project Name:** Zero Emission Beverage Handling and Distribution at Scale  
**Applicant:** Center for Transportation and the Environment  
**Project Partners:** BYD Motors LLC, ENGIE Services U.S., Inc., Anheuser-Busch

**Project Description:** The project proposes to deploy BYD's Class 8 Day Cab (8TT). The 8TT vehicle is the result of significant development efforts at BYD, and leverages feedback from BYD's fleet customers. Based on input received from real-world operations BYD has made enormous improvements to the range, acceleration, suspension, and ergonomics of the truck. The project also includes installation of charging infrastructure to support the vehicles, as well as installment and commission of solar generation at one facility.

Across a diverse range of activities at Anheuser-Busch Distribution Facilities, this project demonstrates how to boldly pursue a zero-emission freight system. With successful deployment of these Class 8 Day Cabs, construction of rooftop solar, and reduction in energy consumption, Anheuser-Busch will be well-suited with data and performance confidence to expand this electrification initiative across their entire national distribution fleet. The project establishes a transformative vision: utilizing on-site renewable energy production to fuel a fleet of zero-emission freight vehicles. To magnify their impact as a technology leader, Anheuser-Busch will use this project as a showcase of sustainability innovation that can be replicated by hundreds of its distribution partners across the country.

The project will be implemented at four Anheuser-Busch facilities: Beach Cities (Carson) Riverside, Sylmar, and Pomona, all of which are located in Disadvantaged Communities.

**Total project cost:** \$11,326,169 **Requested funding:** \$5,530,303 **Proposed match:** \$5,795,866

**Expected emission reductions:** 910 metric tonsCO<sub>2</sub>e/yr ; 0.28 tons WER/yr

**Project Applicant:** City of Benicia/Solano Transportation Authority

**Project Title:** North Bay Electric Logistics Center

The project will be known as the **North Bay electric logistics center**. Applicants are Yandell Truckaway, Inc./Santa Clara Warehouses and the City Benicia. Partners in preparing and administering the grant are the Solano Transportation Authority and the Solano Economic Development Corporation. The project is supported by the Bay Area Air Quality Management District.

Project location: 363 Industrial Way, Benicia, CA. Upgrade on-site, replace in-building propane forklifts with all electric vehicles, and convert 1/4 (10 of 41) heavy diesel truck delivery fleet to Tesla electric trucks.

The proposed project would result in annual reductions of approximately 1,540 MT CO<sub>2</sub>e and 2.64 tons of weighted surplus emissions reductions for the duration of the project. Over a two-year timeline the project would also provide cost effective reductions of \$1,013 per MT CO<sub>2</sub>e and \$591,078 per ton of weighted surplus emissions reductions. Over a ten-year lifespan of the project components, approximately 15,404 MT CO<sub>2</sub>e and 26.39 tons of WER will be reduced.

The total project cost will be \$ 3,096,896, broken into 4 major categories: warehouse electrical upgrades, acquisition of electric forklifts, acquisition of Tesla trucks and administration and monitoring. Yandell trucking is requesting \$1,434,312 in grant funds. All non-grant funding will come from Yandell trucking, with in-kind support from STA and Solano EDC.

The project is not located in a state-designated disadvantaged community.



**Project Applicant:** City of San Francisco

**Project Title:** Zero Emission from Farm to Table: Reducing Pollution Emissions and Health Risks from the Movement of Produce along Two Adjacent Trade Corridors in California

#### **Project Summary for Public Posting**

**“Zero Emission Farm to Table: Reducing air pollution emissions and health risks from the movement of produce along two adjacent trade corridors in California”**

Led by the City and County of San Francisco’s Department of the Environment (SF Environment), and in partnership with the cities of Sacramento and Fresno, this project will coordinate demonstration of electric medium- and heavy-duty vehicles engaged in the movement of goods along two adjacent California trade corridors: San Francisco Bay Area and Central Valley. Specifically, this project will electrify medium (23) - and heavy-duty (9) trucks that deliver produce from and within the Central Valley, Sacramento Valley, and coastal urban hubs. The project will also deploy Level 2 and Direct Current Fast Chargers to support demonstration fleets in San Francisco and Sacramento. At one of the two participating produce distribution markets in San Francisco’s Demonstration District, a 240-kilowatt solar photovoltaic array will also be installed.

The project’s goal is to ensure electric medium- and heavy-duty trucks are feasible for the transport of produce in multiple geographic market areas. The project will identify the most effective technical solutions for advancing use of electric vehicles (EV), collect and analyze data throughout the performance period to create a business case for fleet managers, and quantify the benefit of EVs to residents along the trade corridors, and in communities where project demonstration fleets operate. Each of the demonstration sites is either located in a CalEnviroScreen 3.0 designated Disadvantaged Community (DAC), or in a zip code that includes at least one DAC.

The total project cost is \$9,114,799 and the project team is requesting CARB funding in the amount of \$4,562,862. The project team is providing a total match of \$4,551,937 which equals \$3,522/metric tons CO<sub>2</sub>e reduced and \$5,564,682/tons criteria pollutants reduced.

Like many nonprofit organizations, and small and medium size businesses, project partners that operate delivery fleets do not have the experience, capacity or capital to complete a project of this scope. Through CARB support, and leveraging private sector investment, this project will enable technology deployment, technical engineering, consulting services and data analysis that results in the successful demonstration of electric trucks on the streets of San Francisco, Sacramento and beyond.

The project also aims to provide education and technical assistance (e.g., EV concierge) to fleet managers to make vehicle electrification simple and cost effective. The project will share demonstration fleet data, summarize project findings and lessons learned, and testimonials from early adopters in a final report that will be shared broadly with other cities to encourage replication and advance market transformation for medium-and heavy-duty EVs.

In addition to the project cities, additional major project participants include CALSTART, Ryder Systems, Thor Trucks, eMotorWerks, the San Francisco Wholesale Produce Market, Earl’s Organics, Veritable Vegetable, Ozark Trucking, Inc., Produce Express, Luminalt, Black & Veatch and DNV-GL.



**Project Applicant:** Gas Technology Institute

**Project Title:** Zero Emissions for California Ports (ZECAP)

Project Summary for Public Posting – 500 words or less

**Project Name:**

Zero Emissions for California Ports (ZECAP)

**Project Applicant:** Gas Technology Institute (GTI)

**Project Partners:** Ballard Power System, REV Group, Inc, Capacity, a Division of REV Group, Hydrogen Technology Energy Corporation (HTEC), BAE Systems Inc., ZEN Energy, and Frontier Energy.

**Project Description:**

GTI and its technology partners, will deploy two fuel cell – electric hybrid yard trucks at the Port of Los Angeles, operated by TraPac for 12 months. There will be an extensive technology showcasing effort in order to maximize the impact of the demonstration. Yard trucks are the single largest source of emissions in all classifications of cargo handling equipment, but are difficult to convert to zero-emissions due to the unique duty cycle and operating environment. The project is intended to demonstrate to port terminal operators that fuel cell powered, zero-emissions yard trucks is a safe, reliable, and operationally preferable solution to meet the port's clean air action plan.

The trucks will be supported by HTEC's hydrogen fueling system, which provides fuel in a similar manner as diesel is currently provided. Frontier Energy will coordinate data collection and reporting and will lead community outreach and technology showcase activities.

**Cost:**

<b>Total project cost:</b>	<b>12,055,413</b>
<b>Requested funding amount:</b>	<b>5,788,335</b>
<b>Match amounts proposed:</b>	<b>6,267,078</b>

**Expected emission reductions in criteria, toxic, and greenhouse gas emissions:**

The overall lifecycle greenhouse gas emissions reductions from this project are **44 metric tons CO2e/year**.

The weighted emissions reductions for this project are **0.277 metric tons criteria pollutants reduced/year**.

**Disadvantaged Community:**

The proposed project serves disadvantaged communities in the Port of Los Angeles area.

**Project Applicant:** Port of Long Beach

**Project Title:** Sustainable Terminals Accelerating Regional Transformation

### Project Summary for Public Posting

The City of Long Beach Harbor Department (Applicant)—in collaboration with technology demonstrators SSA Marine, Shippers Transport Express, Matson Navigation Company, Harley Marine Services, and the Ports of Oakland and Stockton—seeks \$50,000,000 for the \$102,907,585 Sustainable Terminals Accelerating Regional Transformation (START) Phase 1 project. The Project Partners will provide \$52,907,585 in match share. Other participants include OEMs (DINA, Taylor, ZPMC, Peterbilt, Wiggins, and Nordco), shipyards (Nichols Brothers Boat Builders and General Dynamics NASSCO), technology vendors (TransPower, BYD, Cavotec, Thor, and Shuttlewagon), universities (University of California, Riverside's College of Engineering Center for Environmental Research and Technology), community colleges (Long Beach City College, Peralta Community College, and Delta Community College), school districts (Long Beach Unified School District, Oakland Unified School District, and Stockton Unified School District), and consultants (Tetra Tech, Gladstein Neandross & Associates, and Grant Farm). The proposed end users will demonstrate 102 zero- and near-zero-emission vehicles, vessels, and units of cargo handling equipment across an intermodal freight network spanning three California seaports and three Air Districts. Specific project objectives include demonstration of 84 units of zero-emission terminal equipment, 15 zero-emission trucks, the first two Tier 3 Low NOx ocean-going vessels (OGV) on the West Coast, and a near-zero-emission tugboat to service these vessels.

Port of Oakland	Port of Long Beach	Port of Stockton
5 Yard Tractors 1 Top Handler 10 400-HP Class 8 Trucks	33 Yard Tractors 1 Top Handler 9 Electric RTGs 5 500-HP Class 8 trucks 1 Tier 4 Electric Drive Tug	18 36,000-lb forklifts 16 8,000-lb forklifts 1 rail car mover
2 Tier 3 Low NOx OGVs		

START Phase 1 will strengthen statewide workforce education and development efforts to support a zero-emission technology future and collect project data to support commercialization. Key benefits and outcomes include: 1) direct reduction of 93.6 tons per year (t/y) NOx, 2.7 t/y ROG, 0.4 t/y of toxic PM<sub>10</sub> emissions, and 12,821.7 MT CO<sub>2</sub>e/yr GHG emissions reduction; and 2) average GHG cost-effectiveness of \$4,061 per MT CO<sub>2</sub>e reduced over a two-year period (\$847/MT CO<sub>2</sub>e over a 10-year period) and an average weighted emissions reduction cost-effectiveness of \$505,581 ton of criteria pollutant emissions reduced per a two-year period (\$105,495/ton over a 10-year period). All deployments will be located in disadvantaged communities, improving air quality in areas heavily burdened by freight-related emissions.

		
TransPower Yard Tractor	TransPower Class 8 Truck	Nordco Shuttlewagon
		
BYD Top Handler	Cavotec RTG	Wiggins 8,000lb (L), 36,000-lb (R) Forklift
		
Matson Kanaloa Class Tier 3 OGV Rendering	Harley Marine Tugboat Rendering	



**Project Applicant:** Port of Los Angeles

**Project Title:** Zero-Emission Freight “Shore to Store” Project

**Project Summary for Public Posting**

The City of Los Angeles Harbor Department (Harbor Department, POLA), Equilon Enterprises LLC (d/b/a Shell Oil Products US) (Shell), Toyota Motor North America (Toyota) and Kenworth Truck Company (Kenworth) are partnering with the Port of Hueneme (POH), United Parcel Services (UPS), Total Transportation Services Inc. (TTSI), Southern Counties Express (SCE), Toyota Logistics Services (TLS), Air Liquide, National Renewable Energy Laboratory, Coalition For A Safe Environment, and the South Coast Air Quality Management District (SCAQMD) to implement the first phase of a long-term industry collaboration to scale a zero emission (ZE) freight market in southern California. This initial phase focuses on the introduction of hydrogen fuel into the southern California market by demonstrating near-commercial heavy-duty H2 fuel cell electric trucks (FCETs) at and between freight facilities throughout the region, while continuing to lay the groundwork for battery electric operations. The proposed “Shore-to-Store Project” (S2S) builds on project team experience to help realize our vision of ZE freight operations in the future. In support of this visionary project, the Harbor Department and its team are requesting \$41,122,260 in grant funding. The total project cost for this initial phase is \$82,568,872, with partners providing 50.2%, or \$41,446,612 in match funding.

Ten Kenworth ZE Class 8 FCETs, integrated with Toyota’s fuel cell drive technology, will be operated by UPS, TTSI, SCE, and TLS in revenue service. The demonstration fleet will be fueled at the proposed hydrogen fueling stations that will be built in Ontario, CA and Wilmington, CA, as well as at a station at the Port of Long Beach that is supported by the California Energy Commission (CEC) and SCAQMD. This fleet will transport cargo between POLA terminals, the Inland Empire warehouses, and POH. Also, POH will demonstrate two electric yard tractors, and TLS will demonstrate two zero-emission forklifts at their facility showcasing elements of the entire supply chain operating on ZE. These TLS and POH projects complement the extensive ZE and near zero-emission (NZE) equipment that will be operated by Everport Terminal Services under two recent CEC grants. When taken together as the first phase of an ongoing collaborative project, this project will showcase a clear snapshot of the zero-emissions supply chain of the future, and will provide a model by which freight facilities can support ZE and NZE operations.

The S2S project will:

- Demonstrate the technical feasibility of zero-emission hydrogen fueled Class 8 heavy-duty trucks and electric cargo handling equipment in rigorous goods movement operation throughout the southern California region.
- Create direct localized emission reductions in designated disadvantaged communities, including those in zip codes 90220, 90247, 90248, 90731, 90744, 90802, 91761.
- Achieve actual<sup>1</sup> emission reductions (tons) for the proposed project are estimated to be: 0.39 NO<sub>x</sub>, 0.04 ROG, 0.015 PM<sub>10</sub> and 465 metric tonnes per year of CO<sub>2</sub>e (between 50% and 81% GHG reduction, depending on type).



**Project Applicant:** Project Clean Air

**Project Title:** Net-Zero Farming and Freight Facility Demonstration Project

**Project Summary**  
**Net-Zero Farming and Freight Facility Demonstration Project**

**Project Name:** Net-Zero Farming and Freight Facility Demonstration Project

**Applicant:** Project Clean Air, Inc.

**Project Partners:** HummingbirdEV  
Moonlight Companies  
California Transport Refrigeration, Inc.  
Thermo King  
TechTruth Consulting

**Project Description:** In partnership with Project Clean Air, HummingbirdEV will develop, design and deploy five all-electric class 7 trucks and five all-electric Transport Refrigeration Units (eTRUs). HummingbirdEV will deliver the first eTRU to Moonlight Companies in March 2020 (presuming project start date is April 2019), with the remaining three delivered in December 2020. Moonlight has 28 different site operations (farms, warehouses and cold storage facilities) that will be used to demonstrate the eTRUs. All sites are located within a disadvantaged community. Data collection will occur over a twelve month period for the first pair of tractors and six months for the second pair. TechTruth Consulting will provide the third party data collection and analysis. A key component of this analysis will include the pairing of an electric TRU with an existing diesel TRU – the two will perform identical tasks to show true GHG and criteria pollutant emission reductions. These vehicles have tremendous potential for replacing over-the-road diesel trucks, especially between fields and packing sheds or production facilities, and between production facilities and cold storage facilities.

Agriculture pollution has been a hot topic over the past two decades for U.S. EPA, ARB, and the San Joaquin Valley Air Pollution Control District (SJVAPCD); so much so that grants have been created to replace old, high-polluting, medium- and heavy-duty diesel trucks. These efforts have had a high level of success, through the Truck Voucher Program provided by the SJVAPCD. While this has allowed the SJVAPCD to meet their goal of ten-ton emissions reductions per day, the San Joaquin Valley is the last non-attainment for PM<sub>2.5</sub> and 2015 Ozone standard district within the state. Freight movement through the Valley remains a top priority for the SJVAPCD in pursuing strategies to attain the latest federal PM<sub>2.5</sub> standards.

The goals of the project include:

Goal 1: Customize, manufacture, and deploy five all-electric class 7, single vehicle, trucks and all-electric transport refrigeration units (eTRUs)

Goal 2: Demonstrate the functionality and GHG Emissions Reductions of the electric fleet (specifically in Disadvantaged Communities)

Goal 3: Create a market for all-electric heavy-duty TRUs in the agriculture and freight industries by improving existing technology.

**Amount Requested:** \$3,283,735

**Total Project Cost:** \$6,567,471



**Project Applicant:** SCAQMD

**Project Title:** Volvo Low Impact Green Heavy Transportation Solutions

Volvo LIGHTS

*Project Summary for Posting*

The Volvo Low Impact Green Heavy Transport Solutions (LIGHTS) project will transform freight operations at the facilities of two of the nation's top trucking fleets and the west coast's largest truck and trailer dealership. The project will deploy eight multi-configuration, Class 8 battery electric demonstration units and an additional 15 precommercial and commercial Class 8 units throughout the South Coast Air Basin. The project will integrate 29 battery-electric pieces of equipment. A total of 58 non-proprietary chargers will support the vehicles and equipment, with solar energy production on-site at two of the locations. The scope of the project encompasses the development of demonstration units, the production of the commercial units, facility improvements, installation of charging infrastructure, public outreach, and data collection and reporting. The total cost of the project is \$90,694,994, of which the project team will provide \$44,839,686 or 50.56% in cost-share. The funding request for the Volvo LIGHTS project is \$44,839,686.

The project team consists of 16 members of the industry's leading organizations in manufacturing, emissions testing, goods movement and maintenance and training. SCAQMD is the lead applicant, and the technology partner in charge of developing the Class 8 electric vehicles is Volvo Group North America. The fleet partners are Dependable Highway Express (DHE), National Freight Inc. (NFI), and TEC Equipment (TEC). CALSTART will manage the procurement of off-road equipment (terminal tractors, forklifts, etc.). Greenlots, along with its sub-contractor Burns & McDonnell, will install the electric charging infrastructure at NFI's, DHE's, and TEC's facilities. Trillium (a Love's company) will install the charging infrastructure at a public location, which will be open to non-project fleets as well. Southern California Edison will assist with charger installation and complete a grid impact assessment. CE-CERT at the University of California, Riverside will collect and analyze vehicle data for reporting, and Rio Hondo and San Bernardino Valley Colleges will design technician training programs specific to heavy-duty electric truck maintenance. The community-based organization leading outreach and education is Reach Out. Lastly, the project includes infrastructure planning at the Port of Los Angeles and the Port of Long Beach to encourage early adoption of these technologies at ports.

The five project sites are in Ontario (DHE), Chino (NFI), La Mirada (TEC), Fontana (TEC), and Placentia (Trillium). Four out of five sites are located within the top 25% of disadvantaged communities, as determined by CalEnviroScreen 3.0, and every site benefits disadvantaged communities. Every site has a pollution burden of 90% or higher. Deploying zero-emission vehicles from these locations will provide immediate public health benefits for the local community, as well as along the routes the vehicles travel on a daily basis. Volvo LIGHTS will reduce 3.57 tons of criteria pollutants and 3,020 metric tons of greenhouse gases annually. Volvo has already received a significant number of customer interest inquiries for trucks, and full production will begin prior to the end of the project life to drive market penetration of zero-emission vehicles.

**Project Applicant:** San Joaquin Valley Air Pollution Control District

**Project Title:** Flexible Solutions for Freight Facilities - San Joaquin Valley Zero and Near-Zero Emission Enabling Freight Project

**Project Executive Summary for Public Posting**

**Project Title:** *Flexible Solutions for Freight Facilities* – San Joaquin Valley Zero and Near-Zero Emission Enabling Freight Project

**Name of applicant and project partners:** San Joaquin Valley Air Pollution Control District (applicant), BNSF Railway, BYD, GE Transportation, MiJack, SH&H Inc., ITS ConGlobal, Southwest Research Institute, and Café Coop (CBO)

**Brief description of project including location:** *Flexible Solutions for Freight Facilities* is a BNSF Railway led initiative to demonstrate zero and near-zero emission technologies in and around its yards. GE Transportation will design, manufacture and commission a single Battery Electric Locomotive (BEL) that will be deployed in a diesel consist (multiple locomotives that pull a train) running from Stockton to Barstow in commercial operations. The BEL will improve the fuel efficiency of the entire consist and thereby reduce operating costs while simultaneously reducing criteria pollutant and greenhouse gas emissions. The proposed project will also afford BNSF and GE the opportunity to evaluate several operational options for maximizing the utility of the BEL.

In addition, zero and near-zero equipment will be demonstrated at the company's intermodal yards in Stockton and San Bernardino. The Stockton and San Bernardino facilities will each demonstrate a Mi-Jack brand hybrid-electric rubber-tire gantry (RTG) crane that features an advanced battery system and achieves a 70% efficiency improvement. The San Bernardino facility will also deploy a full-electric side loader which is built in America by Taylor Machine Works, Inc. and distributed by Mi-Jack. The project is rounded out with an on-road zero-emission demonstration featuring BYD's Class 8 dray truck solution, which will be used for short-haul drayage operations in San Bernardino. The project also includes electrical upgrades and electric vehicle supply equipment (EVSE) to charge the series of zero and near-zero pieces of equipment and vehicles.

SJVAPCD has a strong tradition of working with businesses to identify and implement cost-effective emission solutions. This partnership with BNSF is critical because as an experienced and technically savvy operator they are positioned to understand both the challenges and the opportunities with zero-emission technologies. *Flexible Solutions for Freight Facilities* is an industry-led initiative to identify cost-effective opportunities to improve efficiency and thereby improve environmental sustainability. Proving out the technical feasibility and TCO for the proposed zero and near-zero vehicles and equipment that are the subjects of this application will be a valuable step in efforts toward commercialization.

**Requested Funding Amount:** \$22,616,647

**Total Project Cost:** \$45,233,319

**Match Amount:** \$22,616,672 (50%)

**Emissions Reductions:** The annual greenhouse gas emission reductions are expected to be 1,362 MT CO<sub>2</sub>e / year for the entire project. The weighted annual surplus emission reductions are expected to be 16.14 tons / year with a tier 2 consist as base equipment, or 3.83 tons / year with a tier 4 consist as base equipment.

**Disadvantaged Communities:** The proposed project will be located in and benefit the disadvantaged communities of Stockton (95-100<sup>th</sup> percentile in CalEnviroScreen 3.0), Barstow (91-95<sup>th</sup> percentile in CalEnviroScreen 3.0), and San Bernardino (96-100<sup>th</sup> percentile in CalEnviroScreen 3.0).



**Project Applicant:** San Joaquin Valley Air Pollution Control District

**Project Title:** Frito Lay Transformative Zero and Near Zero Emission Freight Facility Project

**Project Executive Summary for Public Posting**

**Project Title:** Frito-Lay Zero and Near-Zero Emission Project

**Name of applicant and project partners:** San Joaquin Valley Air Pollution Control District (SJVAPCD) (applicant), Frito-Lay, Tesla, BYD, Peterbilt, ANG, CALSTART, UC Riverside CE-CERT, Project Clean Air, Café Coop, Meritor, PepsiCo, Gladstein, Neandross & Associates

**Brief description of project including location:** The San Joaquin Valley Air Pollution Control District (SJVAPCD) has partnered with Frito-Lay, a division of PepsiCo, to implement the "Frito-Lay Zero and Near-Zero Emission Project" in Modesto, California; a bold and transformative effort that will yield a world-renowned showcase for economically and environmentally sustainable manufacturing, warehousing and distribution.

This project aims to completely replace the use of all diesel-powered freight equipment within one of Frito-Lay's largest food production, warehouse and regional distribution facilities. This will be accomplished via the use of zero-emission (ZE) technology everywhere feasible, and near-zero emission (NZE) technology and renewable fuels everywhere else. The project will integrate an incredible array of commercially available and pre-commercial ZE and NZE technologies in a number of applications, including: 15 heavy-duty Tesla battery electric tractors; six (6) Peterbilt e220 battery electric trucks; three (3) battery electric BYD yard trucks; 12 Iron-Phosphate battery electric BYD forklifts; and 38 NZE Volvo tractors fueled with ultra-low carbon renewable natural gas.

In addition to the fleet assets, an on-site renewable energy generation (solar PV) and energy storage systems from Tesla will be installed to better serve the energy needs of the manufacturing facility, warehouses, material handling equipment, heavy-duty electric trucks and light-duty electric vehicles in a more cost-effective manner. This system will provide multiple benefits, including: increasing the resiliency of the overall operation; allowing for the self-consumption of renewable energy generated on-site; and reducing demand charges and utility costs for powering the facility and electric trucks. A new dedicated electric utility service will be provided to serve the needs of the electric trucks, and state-of-art ZE and NZE fueling facilities will be installed to dispense renewable energy via standardized receptacles to all fleet assets, as well as a public-access renewable natural gas fueling station.

The outcome of this plan will be to demonstrate how similar companies in the Central Valley, California, the United States, and the world can move freight within regional distribution networks to end-user consumers without the use of diesel, through the use of innovative ZE and NZE vehicles, equipment and renewable/low-carbon energy, thus resulting in significant Green House Gas (GHG) reductions and air quality improvement.

**Requested Funding Amount:** \$15,382,243

**Total Project Cost:** \$30,764,486

**Match Amount:** \$15,382,422 (50%)

**Emissions Reductions:** The annual greenhouse gas emission reductions are expected to be 6,349 MT CO<sub>2</sub>e / year for the entire project. The weighted annual surplus emission reductions are expected to be 9.26 tons / year.

**Disadvantaged Communities:** The proposed project will be located in and benefit the disadvantaged community of Modesto, CA (90-95<sup>th</sup> percentile for overall burden in CalEnviroScreen 3.0).