

## **Support Material Agenda Item No. 18**

### **Board of Directors Meeting**

**April 6, 2016**

**10:30 a.m.**

Location:

San Bernardino Associated Governments  
Santa Fe Depot- SANBAG Lobby 1<sup>st</sup> Floor  
1170 W. 3<sup>rd</sup> Street, San Bernardino, California 92410

### **Discussion Calendar**

#### **Administrative Matters**

#### **18. Execution of Agreements related to the Implementation of the Multi-Class Heavy-Duty Zero-Emission Truck Development Project for Intermodal and Warehouse Facilities**

A. Authorize the Executive Director, or his designee, to negotiate and execute when approved by the General Counsel, the final form of the Funding Agreement No.16-1001506 with the California Air Resources Board (CARB), for \$9,100,800, towards the project's electrification of yard tractors and service vehicles located in rail yards in the cities of Commerce, Fontana, and San Bernardino, for the period of April 6, 2016 to April 1, 2019, the current draft of which is attached to this Agenda Item.

B. Authorize the Executive Director, or his designee, to negotiate and execute when approved by the General Counsel the final forms of the following agreements needed to implement the project and administer and assure compliance with the grant terms and conditions:

i. Subrecipient Agreement No. 16-1001507, with BYD, for up to amount of \$7,554,000 of grant funds under the Funding Agreement, for purchase of battery electric yard trucks and service vehicles, proper charging equipment, and maintenance at three facility locations for this project, for the period of April 6, 2016, to April 1, 2019, and;

ii. Subrecipient Agreement No. 16-1001487, with BNSF and/or its subcontractors for a total not-to-exceed amount of \$1,141,800, for the demonstration of zero emission yard trucks and service vehicles at two of their facility locations in Commerce and San Bernardino for the period of April 6, 2016 to April 1, 2019, and;

iii. Subrecipient Agreement No. 16-1001508, with Daylight Transportation, for a contract total not-to-exceed amount of \$50,000, for the demonstration of zero emission yard trucks and service vehicles at their facility located in Fontana for the period of April 6, 2016 to April 1, 2019, and;

iv. Subrecipient Agreement No. 16-1001509, with CALSTART, for a contract total not-to-exceed amount of \$355,000, for data analysis and market commercialization of the zero emission trucks and vehicles for the period of April 6, 2016, to April 1, 2019, and;

C. Authorize the Executive Director, or his designee, to approve administrative changes to the above contracts' Scopes of Work, Work Program and/or budgets, as needed, that do not materially change the project's overall scope or funding. **Presenter: Duane Baker**

*The following reports are being provided separately from the agenda:*

- *2014-2015 Grant Solicitation*
- *Multi-Source Facility Demonstration Project Application*

## **2014-2015 GRANT SOLICITATION**

# **Air Quality Improvement Program and Low Carbon Transportation Greenhouse Gas Reduction Fund (GGRF) Investments**

### **Advanced Technology Freight Demonstrations: Multi-Source Facility Demonstration Project**

Mobile Source Control Division  
California Air Resources Board  
June 23, 2015



California Environmental Protection Agency

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 **Air Resources Board**

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California Air Resources Board  
Air Quality Improvement Program and Low Carbon Transportation  
Greenhouse Gas Reduction Fund Investments

**Multi-Source Facility Demonstration Project**

June 23, 2015

**Table of Contents**

I.	SUMMARY .....	1
II.	BACKGROUND .....	1
III.	NEED FOR EMISSION REDUCTIONS FROM THIS CATEGORY.....	3
IV.	CURRENT TECHNOLOGY .....	4
V.	AVAILABLE FUNDING .....	5
VI.	REQUIRED MATCHING FUNDS.....	5
VII.	ELIGIBLE GRANTEES .....	6
VIII.	RESPONSIBILITIES OF GRANTEE AND TECHNOLOGY DEMONSTRATOR.....	7
IX.	ELIGIBLE PROJECTS.....	9
X.	SCOPE OF WORK .....	10
XI.	PROPRIETARY INFORMATION AND INTELLECTUAL PROPERTY.....	14
XII.	APPLICATION REQUIREMENTS .....	15
XIII.	APPLICATION INSTRUCTIONS .....	16
XIV.	APPLICANT TELECONFERENCE.....	17
XV.	EVALUATION, SCORING, AND PRELIMINARY SELECTION .....	17
XVI.	GRANTEE SELECTION .....	26
XVII.	IMPLEMENTATION PROCESS .....	27

APPLICATION	Appendix A
MULTI-SOURCE FACILITY DEMONSTRATION PROJECT SAMPLE GRANT AGREEMENT	Appendix B
HYDROGEN REFUELING STATION REQUIREMENTS	Appendix C
METHODOLOGY FOR DETERMINING EMISSION REDUCTIONS AND COST-EFFECTIVENESS	Appendix D
CALIFORNIA ENVIRONMENTAL QUALITY ACT COMPLIANCE AND PERMITTING REQUIREMENTS	Appendix E

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## I. SUMMARY

The California Air Resources Board (ARB or Board) is soliciting one or more Grantee(s) to implement and administer the Multi-Source Facility Demonstration Project under the Air Quality Improvement Program (AQIP) and Low Carbon Transportation Greenhouse Gas Reduction Fund (GGRF) Investments, as identified in the Fiscal Year 2014-15 Funding Plan approved by the Board in June 2014.<sup>1</sup> This project, along with the Zero-Emission Drayage Truck Demonstration Project, is part of a \$50 million allocation for advanced technology freight demonstrations and complements a separate project to deploy early commercial zero-emission trucks and buses. It is anticipated that up to \$23,658,500 will be available under this Solicitation for the Multi-Source Facility Demonstration Project, and several independent projects may be selected. This project is intended to demonstrate multiple types of equipment and vehicles employing zero and near zero-emission technologies at one freight facility located within, or with the project directly benefitting, disadvantaged communities.<sup>2</sup> Examples of multi-source facilities include distribution centers, warehouses, ports, intermodal rail yards, or other similar freight support facilities. The project(s) will reduce greenhouse gas (GHG) emissions and provide economic, environmental, and public health co-benefits to disadvantaged communities, while synergistically demonstrating the practicality and economic viability of wide-spread adoption of advanced freight technologies for various sources at a single facility. All work must be completed by April 15, 2019. Specific tasks are outlined within this solicitation. Applications are due to ARB no later than **5:00 p.m., September 24, 2015.**

This Solicitation is issued under the Assembly Bill 118 (AB 118) AQIP Advanced Technology Demonstration Projects and the Low Carbon Transportation Investments, with all project funds coming from the Greenhouse Gas Reduction Fund. The project is intended to fund technologies on the cusp of commercialization that further the purposes of AB 32 (Nunez, Chapter 488, Statutes of 2006). This competitive Solicitation is open to local air districts or other California-based public agencies, as well as California-based non-profit organizations that demonstrate the requisite administrative and technical expertise.

## II. BACKGROUND

In 2007, the *California Alternative and Renewable Fuel, Vehicle Technology, Clean Air, and Carbon Reduction Act of 2007* (AB 118, Statutes of 2007, Chapter 750) was signed into law. AB 118 created AQIP, a voluntary incentive program administered by ARB, to fund clean vehicle and equipment projects, air quality research, and workforce training.

As required in Health and Safety Code (HSC) Section 44274(a), the Board adopted regulatory guidelines in 2009 for AQIP. The Guidelines for the AB 118 Air Quality

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<sup>1</sup> The approved Fiscal Year 2014-15 Funding Plan for AQIP and Low Carbon Transportation GGRF Investments is available at <http://www.arb.ca.gov/msprog/aqip/fundplan/fundplan.htm>.

<sup>2</sup> The Disadvantaged Communities, as identified by the California Environmental Protection Agency, are available at [www.calepa.ca.gov/EnvJustice/GHGInvest/](http://www.calepa.ca.gov/EnvJustice/GHGInvest/).

Improvement Program (Guidelines)<sup>3</sup> define the overall administrative requirements and policies and procedures for program implementation based on the framework established in statute. Central to the Guidelines is the requirement for a Board-approved annual funding plan developed with public input. The funding plan is each year's blueprint for expending AQIP funds appropriated to ARB in the annual State Budget. The funding plan focuses AQIP on supporting development and deployment of the advanced technologies needed to meet California's longer-term, post-2020 air quality goals.

In 2012, the Legislature passed, and Governor Brown signed into law, three bills – AB 1532 (Pérez, Chapter 807), SB 535 (De León, Chapter 830), and SB 1018 (Budget and Fiscal Review Committee, Chapter 39) that established GGRF to receive Cap-and-Trade auction proceeds and to provide the framework for how the auction proceeds will be administered in furtherance of the purposes of AB 32, including supporting long-term, transformative efforts to improve public health and develop a clean energy economy. The suite of implementing legislation offers strong direction for investing a portion of the auction proceeds to benefit disadvantaged communities, including specific allocation requirements in SB 535.

In 2014, the Legislature appropriated nearly \$200 million dollars in GGRF monies to establish a Low Carbon Transportation GGRF program that ARB is implementing in coordination with the AQIP AB 118 programs. Projects funded by the Low Carbon Transportation GGRF program must reduce GHG emissions and further the purposes of AB 32, with a strong emphasis on benefiting disadvantaged communities.

In order to identify the priority investments that facilitate GHG emission reductions, the legislature directed the development of the Cap-and-Trade Auction Proceeds Investment Plan (Investment Plan).<sup>4</sup> The 3-year Investment Plan, which was released in May 2013, calls for projects that support the large-scale deployment of alternative technologies, such as zero and near zero-emission vehicles, to help achieve the State's near-term and longer-term GHG emission reduction goals. In addition, SB 535 directs at least 25 percent of funding from GGRF to be allocated toward projects that benefit disadvantaged communities and at least 10 percent to be allocated toward projects located within disadvantaged communities, as identified by the California Environmental Protection Agency (Cal/EPA).<sup>5</sup>

Because the Governor's goals for the investment of GGRF monies are consistent with the established objectives of AQIP, and because of the past success of AQIP structure, staff has combined the two funding sources (AQIP and Low Carbon Transportation GGRF Investments) into one funding plan. The Funding Plan for AQIP and Low Carbon

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<sup>3</sup> The Guidelines for the AB 118 Air Quality Improvement Program are available at [www.arb.ca.gov/msprog/aqip/aqip.htm](http://www.arb.ca.gov/msprog/aqip/aqip.htm).

<sup>4</sup> The Cap-and-Trade Auction Proceeds Investment Plan is available at <http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/auctionproceeds.htm>.

<sup>5</sup> The identified Disadvantaged Communities census tracts are available at <http://www.calepa.ca.gov/EnvJustice/GHGInvest/>.



Transportation GGRF Investments is designed to support development and commercialization of advanced technologies that are necessary to meet California's long-term air quality and climate goals. The Funding Plan identifies projects that provide both immediate emission reductions from the vehicles directly funded and, more importantly, set the stage for greater, indirect reductions in the future by accelerating large-scale market penetration and technology transfer to other sectors. Funding is provided for projects that support evolution through three phases of technology advancement: demonstration, commercialization, and transition to widespread deployment. For the demonstration phase, the Fiscal Year 2014-15 Funding Plan allocated up to \$50 million combined for the Multi-Source Facility and Zero-Emission Drayage Truck Demonstration Projects. To incentivize the deployment of early commercial technologies, and as a complementary investment, the Funding Plan also allocated up to \$25 million for a Zero-Emission Truck and Bus Pilot Project. Solicitations for each Fiscal Year 2014-15 demonstration and pilot project will be released separately.

### **III. NEED FOR EMISSION REDUCTIONS FROM THIS CATEGORY**

Heavy-duty on-road trucks and off-road vehicles and equipment are a significant source of GHG, diesel particulate matter (PM), and oxides of nitrogen (NOx) emissions that lead to ozone and secondary PM. Statewide, they are responsible for a majority of the total PM and NOx emissions from mobile sources.<sup>6</sup> Their emissions result in increased health risks and mortality rates, as well as contributing to the challenge of meeting federal clean air standards. Disadvantaged communities are disproportionately affected by multiple types of pollution and have vulnerable populations. Heavy-duty on-road and off-road vehicles and equipment play a major role in freight transport, and both are commonly used in freight support facilities, such as distribution centers, warehouses, ports, and intermodal rail yards. In freight operations, trucks typically handle the on-road transport while off-road vehicles and equipment, such as forklifts, transport refrigeration units (TRUs), yard tractors, trains, and marine vessels handle the freight cargo off the roads or within the facility.

While recent regulations aim to reduce the emissions impacts from on- and off-road heavy-duty vehicles and equipment, the continued development and demonstration of advanced technologies is necessary to reach California's long-term GHG emission reduction goals, protect public health, and reach attainment with increasingly more stringent federal air quality standards. Projects selected under this Solicitation to demonstrate advanced technologies should be able to provide a significant reduction in GHG emissions and improve air quality for many affected areas within the State when fully integrated into the marketplace.

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<sup>6</sup> The distribution of PM and NOx emissions from mobile source on-road and off-road applications (including agriculture, trains, and marine sources) are available at <http://www.arb.ca.gov/regact/2014/truckbus14/tb14isor.pdf>.

#### IV. CURRENT TECHNOLOGY

There are a variety of zero- or near zero-emission technologies applicable to heavy-duty on-road and off-road vehicles and equipment that will meet the objectives of this Solicitation, from those that are currently commercially available for some equipment types but have yet to be commercialized into new applications, to those that have surpassed the research and development phases but have not yet reached full commercialization. As discussed below, there is significant opportunity to showcase pre-commercial technologies with commercial viability and suitability for the California marketplace.

One example of an existing technology that is already used in one equipment type that could benefit from demonstration of additional applications is in the lift truck and small ground support equipment category. Battery electric lift trucks with a 6,000-pound lift capacity can commonly be found in warehouse and distribution center environments where charging infrastructure has already been introduced. However, commercially available electric forklifts are currently limited to about a 20,000-pound lift capacity.<sup>7</sup> Expanding battery electric technology to larger lift-capacity forklifts (up to 40,000-pounds) that are traditionally powered by diesel fuel due to their higher lift capacity is a promising next step, and Low Carbon Transportation Investments can further reduce emissions locally and regionally.

Industry has also made significant progress in developing zero-emission transport refrigeration units (TRUs) using fuel-cell, battery systems, and cold plate technology to replace conventional diesel-fueled TRUs for use in regional food distribution. Zero-emission transport refrigeration systems can significantly reduce GHG, criteria pollutant, and toxic air contaminant emissions not only near warehouses and distribution centers, but also regionally, since many diesel TRUs currently keep perishables cool while in transport. Combining these TRUs with additional equipment types, such as other off-road vehicles utilizing fuel-cell or battery systems, in the same facility could provide a synergistic and practical approach to supporting a zero or near zero-emission freight hub.

Cargo handling equipment, particularly yard trucks, have seen a strong push toward zero-emission technology driven both by economics and regulatory goals. For example, using grid power to recharge equipment batteries for propulsion can lower operational costs and reduce GHG, criteria pollutant, and toxic air contaminant emissions. Replacing manually-operated diesel-fueled cargo handling equipment with automatically controlled electric or fuel-cell electric hybrid vehicles using sophisticated software designed to more efficiently move goods within a facility is another promising technology that warrants consideration.

In addition to zero-emission technologies for off-road vehicles and equipment that support freight movement, recent advancements have been made in the electrification of vehicles used in on-road freight transport. Further demonstration of these

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<sup>7</sup> A comparison of forklift propulsion systems is available at [www.transportation.anl.gov/pdfs/TA/537.pdf](http://www.transportation.anl.gov/pdfs/TA/537.pdf).

technologies now, particularly when paired with other equipment types that share a supportive infrastructure, can accelerate advanced technology into the marketplace, show economic advantages of zero-emission technologies in a commercial environment, and provide emission benefits for disadvantaged communities and regions that are out of compliance with federal and state ambient ozone and PM standards.

## **V. AVAILABLE FUNDING**

In June 2014, ARB approved the Fiscal Year 2014-15 Funding Plan, allocating up to \$50 million in advanced technology demonstrations, including funding for multi-source facility demonstration projects that focus on the freight sector and benefit disadvantaged communities. The anticipated total ARB funding available through this Solicitation is up to \$23,658,500. If additional funds become available, and valid applications remain unfunded, those projects may be funded without reissuing a solicitation. The total amount of funding available includes a \$1 million reduction for data analysis. This money will be used for data collection and analysis on awarded demonstration projects in this category.

This Solicitation may fund such activities as construction and deployment of prototypes, infrastructure, emissions testing, and practical demonstrations of technologies with a high potential to be commercialized. It may not be used to fund basic research, design-only projects, or commercial production. Field applications as demonstrations of practical utility are required.

Funding is to be broken down as follows:

- Equipment, technology, and infrastructure production and installation.
- Demonstration of the deployed equipment, technology, and infrastructure and data collection (data analysis will be accomplished through an independent third-party entity contracted by ARB).
- Administrative costs (administrative costs shall not exceed 5 percent of the project amount funded by ARB).

In the event additional funding is provided from Low Carbon Transportation GGRF Investments for the Multi-Source Facility Demonstration Project, these funds may be administered under this Solicitation at ARB's sole discretion.

## **VI. REQUIRED MATCHING FUNDS**

The Grantee is required to match a minimum of 25 percent of the total project cost. Match funding must be provided in the following manner:

- A minimum of 10 percent of the total project cost must be in the form of cash committed by the Grantee and/or technology demonstrator (exclusive of providing in-kind contributions). Cash includes labor and capital outlays during the term of the Grant Agreement.

- 15 percent or more of the total project cost may be through some combination of in-kind contributions, such as labor, equipment, materials, equipment transportation, private financing, and federal or non-AB 118 and non-GGRF sourced state funds. While other publicly funded projects may work in tandem or as part of a project funded under this program, none of those funds or anything funded by those projects may be included in fulfilling any of the 25 percent match requirement; however, assets from publically funded projects can be counted toward the match if the contract requirements are complete at the time of the application. For example, electric charging or fueling infrastructure funded under another State project may be leveraged to support a Multi-Source Facility Demonstration Project but may only be used to meet part of the Grantee match requirements if the contract requirements with the State for that fueling infrastructure are no longer in effect. Project facilities, laboratories, or property will not be considered as part of a proposed in-kind match whether owned or leased by the Grantee or technology demonstrator.

If a third party, (i.e., a party other than the Grantee or technology demonstrator) proposes to provide any part of the required match, the Grantee must include a letter from each third party stating that it is committed to providing a specific dollar value of cost sharing and the source of such funds. A Grantee and its partners must demonstrate technical and fiscal resources sufficient to meet their cost share commitment and complete the proposed project.

## **VII. ELIGIBLE GRANTEES**

This competitive Solicitation is open to local air districts, other California-based public entities, or California-based non-profit organizations acting as the Grantee (applicant) for the application. The Grantee must demonstrate its expertise implementing demonstration projects and providing administration and oversight for the demonstration project. Private sector parties, i.e., technology demonstrators and end-users interested in demonstrating a strategy, must partner with an air district, other California-based public entity, or California-based non-profit organization in submitting a demonstration project proposal. Only projects from eligible Grantees will be scored.

Eligible applicants must meet all applicable requirements of State law and regulations, the AQIP Guidelines and FY 2014-15 Funding Plan, and this Solicitation. Specific requirements for the Grantee are further described in this Solicitation. To be considered for the grant award, applicants must fully complete the AQIP Application (Appendix A) and demonstrate that they meet the Application Requirements (see Section XII of this Solicitation). ARB may request clarification regarding application responses during the application review process.

An eligible Grantee can request demonstration project funds without an identified technology demonstrator(s), with a commitment to solicit for the project partners once funds are secured from ARB via this competitive Solicitation process. However, projects that already have all the needed participants, such as identified end user of the

proposed equipment, technology demonstrator(s), and eligible Grantee will score higher than those that do not have team members identified in advance (see criteria 2 in Section XV, Evaluation, Scoring, and Preliminary Selection).

The public agency or non-profit organization will be required to submit a resolution of its governing board prior to execution of the Grant Agreement that commits the agency/organization:

- To comply with the requirements of advanced technology demonstration projects;
- To accept the Grant funds from ARB; and
- To allocate any funding that the Grantee has committed to be part of a project application.

It is recommended that the resolution allow for grant amendments without governing board approval, if possible. If the public agency or non-profit organization does not have a governing board, then a binding written commitment from an official of the agency that has authority to enter into contractual obligations will be required to fulfill the above commitments.

If the public agency or non-profit organization that is submitting the project proposal contributes a match to the project, the governing board resolution shall authorize the Air Pollution Control Officer or other legally authorized official to supply sufficient funding to meet the stated match commitment. Signed Grant Agreements and approved governing board resolutions need to be in place on or before the deadline listed in the Solicitation Timeline on page 17. Sub-agreements between the technology demonstrator(s) and the Grantee need to be in place before work can begin.

### **VIII. RESPONSIBILITIES OF GRANTEE AND TECHNOLOGY DEMONSTRATOR**

The Grantee will be responsible for administration of the demonstration project, and major responsibilities will include:

- Submission of demonstration project proposal (application) to ARB;
- Administration of the project;
- Oversight of technology demonstrator(s);
- Maintaining oversight of the project budget and the amount of funds that are being used for the project's match requirement;
- Reporting to ARB on project status and Grant performance;
- Submission of periodic reports and Grant disbursement requests to ARB;
- Ensuring purchase, installation, and maintenance of data logging or other data collection equipment as deemed necessary by ARB;
- Submission of data, as requested by ARB and/or ARB's selected independent, third-party data analysis provider; and
- Coordinating periodic project status update meetings.

The technology demonstrator's major responsibilities in the demonstration project will include:

- Teaming with an air district, other public agency, or non-profit organization to develop the demonstration project application;
- Providing the technical expertise in performance of the demonstration;
- Timely achievement of stated demonstration project goals;
- Installation and maintenance of data collection equipment and data collection as required by ARB; and
- On-time reporting to the Grantee on project status and Grant performance.

Progress reports from the technology demonstrator(s) shall be submitted to the Grantee at a minimum of three-month intervals. The Grantee is responsible for forwarding all progress reports, unaltered, to ARB within seven business days of receipt from the technology demonstrator(s) (see Reporting and Monitoring Requirements in Section XVII, Implementation Process). Additionally, every Grant disbursement request shall be accompanied by a progress report that documents the time interval and the completion of specific project milestones, including any specific deliverables as defined for that milestone (see Project Funding Procedure in Section XVII, Implementation Process).

In order to ensure consistent data analysis across all heavy-duty demonstration projects, data analysis will be accomplished through an independent third party selected through a separate process. To avoid conflict of interest, a grantee selected for the Multi-Source Facility Demonstration Project must be separate and unique from the third-party data analysis provider and will not be eligible to compete for the data analysis work. However, other project team participants are eligible to apply for the data analysis work, provided they are not the demonstration project Grantee and are not involved in data gathering or analysis for the demonstration project.

Data collection will be required throughout the demonstration project, and the data gathered will be required to be submitted to ARB and/or the third-party data analysis provider periodically and as part of project milestones. The Grantee must agree to purchase and install data logging or other equipment as deemed necessary by ARB in order to facilitate data collection. For each demonstration vehicle or equipment (and each baseline vehicle or equipment, if applicable), the Grantee must include \$2,000 in their submitted budget for the purchase of data collection equipment. The type of data to be collected includes, but is not limited to, fuel/electricity consumption, fueling/charging times, state of charge information for battery and fuel cell electric vehicles, odometer readings, maintenance information, relevant telematics and GPS data, operating costs, hours of operation, idle times, temperatures, and user experience. Data collection and emission testing will also be required for baseline vehicles where appropriate. The Grantee will be required to work with the third-party data analysis provider to select and provide access to representative baseline vehicles or equipment with comparable duty cycles. Final determination of data to be collected and emission testing protocols will be made by ARB, at its sole discretion.

A final report must be submitted to ARB from the Grantee and technology demonstrator(s) at the conclusion of the demonstration project. The demonstration project will not be complete until the final report has been accepted by ARB. The final report will include, but will not be limited to, a summary of the progress reports, any deliverables that were committed to in the project, the results from any emission testing performed, and any other information required by ARB. The Draft final report is due to ARB no later than April 1, 2019 (see Sample Grant Agreement, Appendix B). ARB retains the right to withhold up to 10 percent of the total award amount until delivery of the final report.

Additional reporting requirements are detailed in the Reporting and Monitoring Requirements section of this Solicitation.

## **IX. ELIGIBLE PROJECTS**

The projects covered by this Solicitation require the use of zero- or near zero-emission advanced technologies that achieve significant reductions in GHG and co-pollutant emissions, directly benefitting disadvantaged communities. To determine whether a project qualifies as benefiting a disadvantaged community, applicants must use the criteria in ARB's Interim SB 535 Guidance.<sup>8</sup> Preference will be given to projects that meet the criteria for being located within a disadvantaged community census tract, but projects that meet the criteria for providing a benefit to a disadvantaged community are also eligible for consideration for funding.<sup>9</sup> The technologies for the projects funded under this Solicitation must not yet be commercially available (i.e., not yet produced for sale) but projected to be within three years of commercialization. The demonstration project's goal is to support development of full zero-emission and near zero-emission technologies for multiple types of equipment supporting freight transportation and operating at the same facility. Fueling and charging infrastructure to facilitate the successful demonstration of technologies and logistics/operations efficiency improvements may also be included. Two project types will be considered under this Solicitation:

- Zero-emission: technologies that produce no tailpipe greenhouse gas, criteria pollutant, or toxic air contaminant emissions during the equipment's entire duty cycle, whether stationary or operating, as well as infrastructure that supports such technologies; and
- Near zero-emission: technologies that utilize zero-emission technologies, provide a pathway to zero-emission operations, or incorporate other technologies that significantly reduce criteria pollutants, toxic air contaminants, and

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<sup>8</sup> ARB's Interim SB 535 Guidance, Appendix A, contains the criteria for determining whether a project is located within a disadvantaged community or provides a benefit to a disadvantaged community. This Guidance is available at: <http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/final535-interim-guidance-11-3-2014.pdf>.

<sup>9</sup> The identified Disadvantaged Communities census tracts are available at <http://www.calepa.ca.gov/EnvJustice/GHGInvest/>.

greenhouse gas emissions, as well as infrastructure that supports such technologies.

For the purpose of this Solicitation, vehicles and equipment used in a multi-source facility that support freight transportation can include, but are not limited to:

- On-road heavy-duty trucks (gross vehicle weight rating >14,000 pounds);
- Yard trucks;
- Light-duty and heavy-duty off-road vehicles (such as forklifts and boom lifts);
- TRUs;
- Marine vessels;
- Locomotives;
- Cargo handling equipment;
- Ground support equipment;
- Hydrogen refueling stations; and
- Electric vehicle supply equipment (EVSE, or electric vehicle charging stations).

This competitive Solicitation is expected to accelerate zero-emission freight technology into the marketplace. Projects that can utilize full zero-emission technology may score higher than those technologies that only partially eliminate emissions (near zero-emission). In addition, projects that can build on synergies generated from established infrastructure investments and experience with existing zero-emission technologies are also encouraged to apply. With such a diverse range of potential applications, projects selected under this Solicitation to demonstrate advanced technologies should be able to provide a significant improvement in air quality for many affected areas within the state when fully integrated into the marketplace.

## **X. SCOPE OF WORK**

This section provides information on the project's scope of work. Any requirements identified below are minimum requirements and are not comprehensive. In addition to the information below, the scope of work includes reporting and monitoring requirements as detailed in the Reporting and Monitoring Requirements section of this Solicitation.

Data collection will be a required element of all funded projects. Data analysis, which is an important part of each project, will be accomplished by an independent third party that ARB selects, and all types of data to be collected will be determined at ARB's sole discretion, in consultation with the project's technology demonstrator(s) and project Grantee. All project team participants must work cooperatively with the third-party data analysis provider and supply data as requested in a timely manner. The sharing of data collected from vehicles, infrastructure, and other relevant equipment with ARB's third-party data analysis team is required.

Reproducible emission testing for internal combustion engines to verify the emission benefits from the demonstration of technologies funded under this Solicitation will be



required to be performed. If NO<sub>x</sub> emissions are being measured, the result will be shown as NO<sub>x</sub> and nitric oxide (NO) plus nitrogen dioxide (NO<sub>2</sub>). The emission testing procedure used to verify emission reductions should be cited in the project's narrative (see Appendix A, Attachment 3). The final emission testing procedure will be subject to ARB approval.

A "well-to-wheel" analysis to quantify greenhouse gas emission reductions is required for all vehicles and equipment funded under this Solicitation. The applicant is required to determine the resulting emission reductions associated with their project (see Appendix D for the methodology). All calculations must be shown in their entirety and included in the application (Appendix A, Attachment 4). Incomplete illustration of the mathematical processes used will result in no points being allocated for scoring criteria 5 and reduced points allocated under scoring criteria 10 in Section XV, Evaluation, Scoring, and Preliminary Selection, as well as possible disqualification.

Data collected from emission testing as part of a selected demonstration project and included in the project's submitted work plan and scope of work can be applied toward ARB or U.S. EPA certification or verification. However, AQIP funds or GGRF Low Carbon Transportation investments cannot be used directly to fund formal ARB or U.S. EPA verification or certification processes.

If the project uses any engine, retrofit, or piece of equipment that has or will be funded in whole or part by other public incentive programs and is still under contractual obligations, its incentive program status must be identified in the project's narrative. Additionally, the project narrative must include a plan to ensure that emission reductions required by any incentive program's contract or grant are considered for the piece of equipment that is proposed to be used for the technology demonstration (see Appendix A, Attachment 3).

### **A. Vehicle Certification, Verification, and Permitting**

All vehicles in the proposed project that will be operated on California roadways must be compliant with all State requirements, including, but not limited to, ARB Experimental Vehicle Permitting, Department of Motor Vehicles licensing, California Highway Patrol requirements, and others. Further, the proposed on-road vehicles must be approved for use by the intended operators that will be using them in the demonstration, and confirmation should be indicated in their letter of support for the project. A clear explanation of what steps are required in the process for legal operations on California roadways, usage on port properties, rail yards, and other sites where the on-road vehicle will be operated, must be indicated. Instructions will not be provided as part of this Solicitation as to the pathway to certification or verification.

However, ARB will be holding separate workshops as part of a broader effort to facilitate ARB certification of the next generation of advanced truck and bus technologies California needs to meet its long-term air quality and climate goals (ARB Innovative Technologies Regulation workshops). To be notified of the date, time, and location of

the next ARB Innovative Technologies Regulation workshop, or for questions related to the proposed Innovative Technologies Regulation, please visit <http://www.arb.ca.gov/msprog/itr/itr.htm> or contact Mr. Joe Calavita at [joe.calavita@arb.ca.gov](mailto:joe.calavita@arb.ca.gov) or 916.445.4586.

As part of a viable commercialization plan, ARB verification or certification must be the ultimate goal of all vehicles and equipment that are not zero-emission and are funded under this Solicitation. Zero-emission vehicles need an ARB approval for legal operations. For any technology that will require ARB verification or certification or U.S. EPA certification or consideration, the applicant must explain in the project narrative the steps that will be followed to accomplish required government certification and verification protocols. Projects selected for funding will require all submittals of documents to non-ARB certifying authorities to be concurrently submitted to ARB for routine Project Update meetings as discussed in Section XVII, Implementation Process.

## **B. Repowers and Conversions**

Projects containing a repower or conversion component will be required to meet certain criteria. Repower means removing an existing internal combustion engine and replacing it with a near zero-emission hybrid system that includes a new internal combustion engine that meets a more stringent emissions standard, regardless of the beginning and ending fuel types (e.g., a 2005 model year diesel engine repowered with a 2014 model year natural gas engine). A conversion means removing the existing internal combustion engine and replacing it with a zero-emission system (e.g., a diesel-fueled vehicle converted to an electric vehicle or fuel cell vehicle). The following criteria apply to repowers and conversions:

- An on-road vehicle repowered with a hybrid system must achieve at least some zero-emission miles. Projects will be scored according to the daily amount of zero-emission miles (e.g., a repower with a hybrid-electric system that achieves 40 miles of all-electric operation per day will score higher than one that achieves 20 miles of all-electric operation per day).
- Conversions or repowers of existing vehicles are limited to vehicles that the applicant can demonstrate will have a remaining useful life of at least 10 years.

## **C. Infrastructure**

As stated in the previous section, infrastructure necessary for operating vehicles that are the subject of this Solicitation is an eligible cost. Proposed infrastructure should be capable of allowing a robust and significant field demonstration of the proposed technology. Projects that propose only infrastructure without accompanying vehicles will not be scored.

ARB will only process applications for infrastructure projects where the project is proposed to be sited where similar infrastructure already exists (e.g., installing electric vehicle supply equipment where electrical infrastructure already exists, or installing a

hydrogen refueling station at an existing fueling station or industrial facility). Proposed projects that can synergistically take advantage of existing fueling or charging infrastructure should show a cost-effective advantage to other proposed projects that will require stand-alone infrastructure to be installed as part of a project. Emission reductions that are associated with any infrastructure funded by this Solicitation are not allowed to be included as part of the emission reduction totals that will be considered during proposal scoring. In other words, emission reductions will only be assigned to the advanced technology vehicles and equipment funded under this Solicitation.

Proposed infrastructure costs must be substantiated by qualified entities with experience in the installation, permitting, and commission of the proposed infrastructure type. Any infrastructure proposal should indicate all the required steps including, but not limited to, siting, permitting, safety certifications, and other necessary certifications. Operation and maintenance of any proposed infrastructure must be addressed in the project application budget. The amount of funds proposed in the application for infrastructure that will be funded by the grant will be the total amount of funds that ARB will devote to infrastructure funding. **NOTE: If the actual infrastructure costs exceed the proposed amount of funds allocated in the application, the difference must be covered by the applicant.**

Projects that propose a dual use (public and private) charging/refueling station are encouraged. Charging/refueling stations that allow both the project vehicles and other advanced technology vehicles that are not being funded, such as zero-emission commercial medium duty trucks and buses or private light duty electric or fuel cell vehicles, may be scored higher.

## 1. Hydrogen Refueling Stations

Proposals containing a hydrogen refueling station installation must adhere to the minimum technical requirements and renewable hydrogen requirements specified in Appendix C and the California Environmental Quality Act (CEQA) and permitting requirements described in Appendix E. Additionally, the project must comply with all applicable federal, state, and local laws and requirements for acceptable installation and usage of hydrogen refueling stations. Each hydrogen refueling station must be designed to allow the hydrogen refueling station to accept delivery of hydrogen fuel from a mobile refueler or hydrogen tube trailer if on-site hydrogen production goes off-line or if hydrogen delivered via a pipeline is disrupted. Public or private access to refueling from proposed refueling stations is not required. However, infrastructure proposals that are designed to allow refueling to non-project entities during or following the completion of the demonstration project may score higher than those that do not allow refueling to non-project entities. As noted above, ARB will only process applications for infrastructure projects (including hydrogen refueling stations) where the project is proposed to be sited where similar infrastructure already exists (e.g., installing a hydrogen refueling station at an existing fueling station or industrial facility).

## 2. Electric Vehicle Supply Equipment

Proposals containing electric vehicle charging infrastructure installation must adhere to the CEQA and permitting requirements described in Appendix E, and the project must comply with all applicable federal, state, and local laws and requirements for acceptable installation and usage of EVSE. Any proprietary protocol may additionally be superimposed on the system, provided the site owner is able to revert to the open standard protocol. The proposal must include a maintenance plan for continued reliable operation and unforeseen breakdowns of the EVSE. Public access to charging from proposed EVSE is not required. However, projects that are designed to allow charging to non-project entities during or following the completion of the demonstration project may score higher than those that do not allow charging to non-project entities. As noted above, ARB will only process applications for infrastructure projects (including EVSE installations) where the project is proposed to be sited where similar infrastructure already exists (e.g., installing electric vehicle supply equipment where electrical infrastructure already exists).

### XI. PROPRIETARY INFORMATION AND INTELLECTUAL PROPERTY

ARB will not make any claims as to ownership of equipment funded by this grant. However, all information and data generated under the Grant Agreement is the property of ARB. Additionally, the technology demonstrator(s) and Grantee will make available any information and data needed to satisfy the requirements discussed in the Reporting and Monitoring Requirements section of this Solicitation.

Data gathered on actual emissions to the air as part of this demonstration project cannot be protected from disclosure. Any information determined to be a trade secret or otherwise exempt from disclosure under the California Public Records Act or other provisions of law must be labeled “confidential.” Review Appendix A, Attachment 7 for Procedures for Handling Confidential Information. If you wish to include confidential information, you must:

- Complete the Confidentiality Provision (Appendix A, Attachment 7) and attach it to your project proposal;
- Separate confidential pages from the other elements of the project proposal (do not include any confidential information in the main project proposal); and
- Clearly label every confidential page as “CONFIDENTIAL”.

Project proposals will be reviewed by ARB staff and may include reviewers outside of ARB associated with public universities in California and other State government agencies as needed. In the project proposal, at the point where the information would appear if it were not confidential, please indicate its existence under the separate cover. Please provide the name, address, and telephone number of the individual to be contacted if ARB receives a request for disclosure of the information claimed as confidential. ARB may share confidential information related to a demonstration project

(such as certification/verification data) with multiple units and sections within ARB or other relevant State agencies.

## **XII. APPLICATION REQUIREMENTS**

Eligible Grantees must meet all applicable requirements of State law and regulations, AQIP Guidelines, Funding Plan, and this Solicitation. To be considered for the grant award, Grantees must complete the application and demonstrate that they meet the required Solicitation elements. ARB may request clarification regarding application responses during the application review process. Only applications that contain all of the required elements as described in the Required Application Elements section and Appendix A of this Solicitation will be scored.

Please enclose with your project proposal any documents (or pertinent excerpts) that you cite in support of performance claims in your project. However, do not include materials that are not needed to supply the information requested in these instructions. ARB will not review patent documents, engineering drawings and specifications, or promotional materials. Include in your application package letters of support from project partners that describe the nature of their contribution to the project.

The submitted application package must include four (4) copies in addition to the signed original and one (1) compact disc (CD). The CD must contain the application package, including all required documents, as a single electronic file in either Microsoft Word or Portable Document Format (PDF). Applications that do not meet the above requirements may not be scored and may be disqualified.

### **Required Application Elements**

ARB requires applications to be accurate, and applicants are strongly encouraged to ensure their applications are brief and clear. Applications will be initially screened for completeness; incomplete applications will not be scored. The application is included as Appendix A of this Solicitation and includes the following required elements:

Appendix A: AQIP Application (Application must be signed and dated)

- Attachment 1: Applicant Qualifications
- Attachment 2: Project Executive Summary
- Attachment 3: Project Narrative and Work Plan
- Attachment 4: Emission Reduction and Cost-Effectiveness Calculations
- Attachment 5: Proposed Budget and Project Milestone and Disbursement Schedule
- Attachment 6: Disadvantaged Communities Eligibility Determination
- Attachment 7: Procedures for Handling Confidential Information
- Attachment 8: Letters of Commitment
- Attachment 9: California Environmental Quality Act Worksheet (if applicable)
- Attachment 10: Conflict of Interest Declaration
- Attachment 11: STD. 204 Payee Data Record (**required even if applicant is a public entity**)

### **XIII. APPLICATION INSTRUCTIONS**

Appendix A contains the forms and information necessary for submittal of a complete application. ARB will select a Grantee based upon the scoring criteria identified in this Solicitation. All information and data submitted as a response to this Solicitation are the property of ARB and will become a public record once a Grantee(s) is selected and a Grant Agreement is signed. If no qualified proposal is submitted, ARB will not award a grant and will re-evaluate this Solicitation to re-solicit for project proposals or other options at ARB's sole discretion.

If you need this document in an alternate format or language, please contact Lisa Williams at (916) 324-7582 or [lisa.williams@arb.ca.gov](mailto:lisa.williams@arb.ca.gov). TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

One (1) signed original, four (4) copies, and one (1) CD of the application, including all of the required documents, must be received at the Air Resources Board headquarters at 1001 I Street, Sacramento, California 95814. The CD must contain the application and other required documents, all in a single Word or PDF file.

Applications submitted via U.S. Postal Service, United Parcel Service (UPS), Express Mail, Federal Express, or another delivery service provider must be dispatched with enough time so that they are received by ARB no later than **5:00 p.m. (Pacific Time) on September 24, 2015** (delivery service provider tracking number may be used to verify date of receipt). Applications received after September 24, 2015 may be rejected and not scored.

Applications must be mailed to the following address:

Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, California 95812-2815

Applications submitted in person may be delivered to the following address:

Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
1001 I Street  
Sacramento, California 95814

Once the application has been mailed or delivered in person, please send an email to Lisa Williams at [lisa.williams@arb.ca.gov](mailto:lisa.williams@arb.ca.gov) indicating that you have submitted an application. Sending this email secures one of the five points provided for Application Completeness and lets ARB staff know that your formal application is on the way. ARB

will send a confirmation email to the applicant once the hard-copy of the application has been received. **No applications may be submitted by fax or email.**

### Solicitation Timeline\*

Key Actions	Dates	Time (Pacific)
Public Release of Solicitation	June 23, 2015	--
Applicant Question Deadline	July 17, 2015	5:00 pm
Applicant Teleconference	July 21, 2015	10:00 am
<b>Application Submittal Deadline</b>	<b>September 24, 2015</b>	<b>5:00 pm</b>
Preliminary Grantee Selection	October 22, 2015	5:00 pm
Final CEQA Documentation Submittal Deadline**	December 1, 2015	5:00 pm
Execute Grant Agreement and Return to ARB***	December 31, 2015	5:00 pm

\* Timelines are subject to change at ARB's sole discretion.

\*\* This step only applies for projects containing infrastructure proposals where an agency other than ARB is the lead CEQA agency for the project.

\*\*\* Includes governing board resolution.

#### XIV. APPLICANT TELECONFERENCE

ARB will hold an Applicant Teleconference at which time staff will be available to answer questions potential applicants may have regarding eligibility, application completion, and other requirements. The Applicant Teleconference will take place on the following date and time:

Date: July 21, 2015  
 Time: 10:00 a.m. – 12:00 p.m. (Pacific Time)  
 Call-in Phone Number: 888-324-7812  
 Passcode: 5319314

The Applicant Teleconference will be open to all interested entities. The intent of the Applicant Teleconference is to provide potential project applicants with an opportunity to ask clarifying questions regarding the Solicitation package and project requirements. Written questions submitted prior to the Applicant Teleconference will be given priority. Questions may be emailed to Lisa Williams at [lisa.williams@arb.ca.gov](mailto:lisa.williams@arb.ca.gov). Questions may be submitted up to 5:00 p.m. (Pacific Time) two business days prior to the Applicant Teleconference. The questions and answers from the Applicant Teleconference and any questions received via email will be posted on the ARB website by **5:00 p.m. (Pacific Time) on August 11, 2015**; this date may be extended at ARB's sole discretion. ARB will not answer questions regarding this Solicitation after the Applicant Teleconference. Any verbal communication with an ARB employee concerning this Solicitation is not binding on the State and shall in no way alter a specification, term, or condition of the Solicitation.

#### XV. EVALUATION, SCORING, AND PRELIMINARY SELECTION

ARB will evaluate each application based on the criteria described below. The maximum score is 100 points. The qualified applicant(s) with the highest overall

score(s) will be preliminarily selected as Grantee(s). The preliminary selection of a project does not in any way commit ARB to approving the grant. The selected applicant will be required to sign a Grant Agreement with ARB to fulfill the duties of Grantee (see Appendix B). The Grant Agreement may not be executed unless and until any required CEQA review has been completed. For a project where an agency other than ARB is serving as lead CEQA agency, the applicant must submit any required final CEQA documents by December 1, 2015 (prior to execution of the Grant Agreement). If an applicant fails to meet this requirement, ARB may deny the grant application. ARB will independently review any CEQA documentation provided by the applicant. ARB may modify any Grant Agreement based upon information produced from the CEQA environmental review process. If ARB in its sole discretion finds a project's CEQA documentation inadequate, ARB retains absolute sole discretion to either (1) modify the grant agreement as necessary to comply with CEQA, (2) select other feasible alternatives to avoid significant environmental impacts, or (3) deny the grant application. No legal obligations will exist unless and until the parties have executed and delivered a Grant Agreement, as informed by information produced from the CEQA environmental review process (to the extent applicable). ARB, in its sole discretion, may cancel the proposed grant and make a selection to the next highest scoring project, and so on, until an agreement is reached, or exercise its right, in its sole discretion, throughout this process to not award a grant. ARB reserves the right, in its sole discretion, to cancel this Solicitation, re-solicit for a Grantee, or direct funding to another project in the Funding Plan. In addition, in the event funding has been awarded to the highest scoring project(s), and the remaining available funds are less than the amount requested in the next highest scoring application, ARB, in its sole discretion, may offer funding to the next highest scoring project(s), carry the remaining funds forward to the next fiscal year, or shift the funds to another project category.

It is anticipated that up to \$23,658,500 for all selected projects will be available under this Solicitation. An independent third-party data analysis provider will be retained by ARB. The total amount of funding available includes a \$1 million reduction for funding third-party data analysis, which will be accomplished under a complementary solicitation process. If additional funds become available, and valid applications remain unfunded, those projects may be funded without reissuing a solicitation at ARB's sole discretion.

ARB will score projects based on the funding amount and budget requested. If two or more applications are submitted for the same project by different applicants, those applications will be scored separately, and the highest scoring project will then compete against applications submitted for different projects.

Only eligible projects will be scored, and only eligible vehicles and equipment will be scored and considered for funding. To be eligible, applicants must demonstrate in the Project Narrative (Attachment 3 of the Project Application) that the proposed project provides benefits to disadvantaged communities, as outlined in Section IX, Eligible Projects. Other elements are also required to be included in each application as indicated in this Solicitation (see the Required Application Elements area of this



section). Further information on determining benefits to disadvantaged communities can be found in Appendix A, Attachment 6.

### **Optional Minimal Project Proposal**

In addition to their project proposal, the applicant may include an optional proposal for a minimal project that is a smaller scale and scope of the original proposal's elements to be considered, at ARB's sole discretion, should there be remaining funding available after the highest scoring project(s) has/have been selected. The optional minimal project proposal must be sent together with the main project application but must be a separate, stand-alone application in a separate sealed envelope labeled "Optional Minimal Project Application". The optional minimal project application must include an associated work plan, budget, emission reductions and cost-effectiveness calculations, and all other required elements listed in Section XII (incomplete applications will not be considered for scoring). One (1) signed original, four (4) copies, and one (1) CD of the application and all of the required documents must also be submitted. Scoring for the optional minimal projects will only occur in the event the remaining funds are not enough to be awarded to the next highest scored project. Scoring for optional minimal project proposals will be accomplished in the same manner as for all other applications, and only applications submitted for optional minimal projects that have budgets at or below the remaining level of funding will compete. An applicant's minimal project proposal will only be eligible for consideration if the main project was not selected for funding.

### **Summary of Scoring Criteria for Demonstration Projects**

	<b>Scoring Criteria</b>	<b>Points</b>
1	Applicant Qualifications	10
2	Project Team Capabilities and Degree of Industry Collaboration	10
3	Project Objectives and Work Plan	15
4	Budget, Match Funding, and Financial Capabilities	10
5	Potential Emission Reduction Benefits	10
6	Cost-Effectiveness	5
7	Benefits to Disadvantaged Communities	5
8	Technology and Innovation	10
9	Potential for Market Penetration and Commercialization of the Technology	15
10	Application Completeness	5
11	Timeline for Project Completion	5
	<b>TOTAL</b>	<b>100</b>

### **Scoring Scale**

Using the scoring scale below, the evaluation team will score each eligible application for each scoring criteria described within this Solicitation.

Possible Points	Interpretation	Explanation for Percentage Points
0%	Not Responsive	Response does not include or fails to address the requirements being scored. The omission(s), flaw(s), or defect(s) are significant and unacceptable.
10-30%	Minimally Responsive	Response minimally addresses the requirements being scored. The omission(s), flaw(s), or defect(s) are significant and unacceptable.
40-60%	Inadequate	Response addresses the requirements being scored, but there are one or more omissions, flaws, or defects or the requirements are addressed in such a limited way that it results in a low degree of confidence in the proposed solution.
70%	Adequate	Response adequately addresses the requirements being scored. Any omission(s), flaw(s), or defect(s) are inconsequential and acceptable.
80%	Good	Response fully addresses the requirements being scored with a good degree of confidence in the Applicant's response or proposed solution. No identified omission(s), flaw(s), or defect(s). Any identified weaknesses are minimal, inconsequential, and acceptable.
90%	Excellent	Response fully addresses the requirements being scored with a high degree of confidence in the Applicant's response or proposed solution. Applicant offers one or more enhancing features, methods, or approaches exceeding basic expectations.
100%	Exceptional	All requirements are addressed with the highest degree of confidence in the Applicant's response or proposed solution. The response exceeds the requirements in providing multiple enhancing features, a creative approach, or an exceptional solution.

The **PROJECT NARRATIVE** must separately address each of the scoring criteria listed below, see instructions for the Project Narrative in Appendix A, Attachment 3.

**1. Applicant Qualifications (Appendix A, Attachment 1) – Maximum 10 points**

- Describe the experience and expertise the proposed Grantee has in implementing large-scale air quality incentive projects or programs and working with on-road or off-road vehicle and equipment manufacturers, technology providers, and other key project stakeholders. Scoring will be based on the applicant's ability to successfully act as Grantee according to their demonstrable staffing, infrastructure, funding, and other available resources.

**2. Project Team Capabilities and Degree of Industry Collaboration – Maximum 10 points**

- Proposals that identify the end user of the vehicles and equipment to be used in the project, the technology demonstrator(s), and the Grantee will score higher than those that do not have all the needed participants identified in advance.
- Describe the roles and the work to be performed by each of the project's key participants, including project administration, project planning, field demonstration, and data collection and reporting.
- Describe the administrative and technical qualifications and capabilities of key personnel, such as education and training, research and professional experience, publications (patents, copyrights, and software systems may be provided in addition to or substituted for publications), and ability to administer similar air quality programs.
- Describe the project team's relationship and degree of collaboration with vehicle and charging/refueling infrastructure builders and technology demonstrator(s) on the proposed project. Describe what business alliances and partnerships will be involved in commercialization.
- Performance of the Grantee, technology demonstrator(s), and third-party contractors with previous AQIP projects will also be considered.

**3. Project Objectives and Work Plan (for Work Plan, see Appendix A, Attachment 3) – Maximum 15 points**

- Provide a concise statement of how the project meets ARB's goals under the Multi-Source Facility Demonstration Project Solicitation and the FY 2014-15 Funding Plan.
- In a logical sequence, describe the tasks necessary to prepare for and conduct a practical demonstration of the innovative technology(ies). Tasks should be divided into the phases of the project, as appropriate, and described in enough detail for reviewers to understand the scope of the work. Identify what entity (Grantee or industry partner) will perform each task.
- Identify the extent to which renewable sources of energy will be used to support the zero- or near zero-emission technologies to be demonstrated. Projects employing a higher percentage of renewable energy will score higher than those employing a lower percentage or no renewable energy.
- Provide quantitative milestones for each budget period of the project, and identify them with a number, title, and planned completion date. The general

duration for each task must be specified. Identify at which milestones disbursement requests will be made and at what amounts.

- Identify the entities that will be using the vehicles and equipment included in the project and how the Grantee will ensure data will be reported as required to ARB or the ARB-designated third-party data analysis provider.
- Identify the resources (e.g., equipment, machine and electronic shops, field and laboratory facilities, materials, etc.) to be used at each performance site listed. Describe only those resources that are directly applicable to the proposed work. List important items of equipment already available for this project. If proposing an equipment acquisition, describe comparable equipment, if any, already at your organization and explain why it cannot be used.
- Identify any fueling, charging, or other related infrastructure already in place that will be utilized during the proposed demonstration project and the agreements that are planned or already in place to utilize the existing infrastructure.
- Specify if any mobile refueling will be included in the project, and agreements that are planned or already in place to provide mobile refueling to funded vehicles and equipment.
- Identify any infrastructure, including charging and refueling infrastructure, that will need to be installed to allow proper use of the vehicles and equipment identified in the project and a brief description of the process for planning and installation. Identify the entities that will be doing the infrastructure installation and at what cost. Describe plans, if any, for future use of charging and refueling stations following the demonstration project.
- For proposals that include installation of a hydrogen refueling station to be funded as part of the project, provide a description of how all of the components of the Hydrogen Refueling Station Requirements (Appendix C) will be met. The proposal must include overall station performance parameters including, but not limited to, fuel quality, metering accuracy, fueling protocol, pressures, storage, compression, daily throughput, hourly peak throughput, and a plan to maintain and verify the same.
- For projects that include electric vehicle supply equipment (e.g., charging stations), identify the analysis that has been accomplished, if any, to identify and/or address grid impacts during peak electricity demand hours.
- For proposals that include fueling or charging infrastructure installation to be funded as part of the project, include information showing the infrastructure is designed and engineered to match the specific minimum fueling/charging needs of the proposed fleet. The proposal must include a template illustrating

station parameters that must be met, in addition to a “space or area” where parameters that must be supplied or provided by the applicant will be placed appropriate to the vehicles or equipment being served. Details must be provided explaining the existing similar infrastructure where the funded infrastructure is proposed to be sited (e.g., existing electrical infrastructure where proposed EVSE is to be sited, or existing fueling station or industrial facility where a proposed hydrogen refueling station is to be sited). In cases where the applicant would make the funded infrastructure available to non-project fleets, the proposal must include information showing how the applicant will plan for capacity adjustments to handle the additional demand.

Applicants will be evaluated based on the project’s goals relative to this Solicitation, the completeness of their plan for implementing the project, and the ability to complete the work in a timely manner. The Project Narrative and Work Plan must address how the applicant will implement all of the tasks in the proposed scope of work.

#### **4. Budget, Match Funding, and Financial Capabilities – Maximum 10 points**

- Provide a clear and concise project budget that lists all expenditures and source of those funds in a logical sequence that leads to on-time completion of the project (see sample budget in Appendix A, Attachment 5). Administrative fees may not exceed 5 percent of the total amount awarded by ARB.
- Indicate the source of funding for each task, the amount of funds for each task, and the amount of the funds that are being used as match for the project.
- Demonstrate that the Grantee and/or technology demonstrator(s) will be financially capable of providing the minimum 25 percent match requirement of the total project budget (including the 10 percent cash requirement exclusive of in-kind contributions). Higher match pledges will be scored higher. In-kind contributions refer to goods or services contributed by the Grantee, technology provider, end-user, or third party, but not charged to the project amount. Cash contributions refer to monetary funds contributed by the Grantee, technology provider, end user, or other third party to fund the project.
- Describe each financial contribution to the project (match funding or other leveraged funding), in addition to describing other current and pending funding sources for the required cost share match. Identify if all or a portion of the match funding is dependent upon successful grant award under any other solicitation.
- For each demonstration vehicle or equipment (and each baseline vehicle or equipment, if applicable), include \$2,000 in the budget for the purchase of data collection equipment.

- Attach Letter(s) of Commitment from each third party (i.e., a party other than the organization submitting the application) stating that it is committed to providing a specific minimum dollar amount of cost sharing as part of the match funding requirement or as other leveraged funding. Letters must be signed by the person authorized by the entity to commit the expenditure of funds.

## 5. Potential Emission Reduction Benefits – Maximum 10 Points

- Describe in Appendix A, Attachment 4 the estimated reductions of GHG, criteria pollutant, and toxic air contaminant emissions (PM) as determined by using the methodology in Appendix D. Combined weighted criteria pollutant and PM emission reductions are to be based on exhaust emissions (tank to wheel) and calculated in tons reduced per year. The GHG emission reductions are to be based on life cycle analysis (well to wheel) and calculated in tons of CO<sub>2</sub> equivalent<sup>10</sup> reduced per year.
- **Show all math used in calculations.** Cite all sources and explain all variables used in the calculations that are not included in Appendix D.
- Describe the utility of the innovative technology to help California achieve its climate change and air quality goals by reducing GHG, criteria pollutant, and toxic air contaminant emissions, particularly in disadvantaged communities.

## 6. Cost-Effectiveness – Maximum 5 points

- Describe in Appendix A, Attachment 4 the estimated cost-effectiveness of the project in dollars per ton of combined criteria pollutant and weighted PM emissions reduced, and per ton of GHG emissions (in CO<sub>2</sub> equivalent) reduced for the two scenarios below, using the methodology in Appendix D:
  - during the actual proposed project over a 2-year demonstration; and
  - once deployed into the marketplace, one year post proposed demonstration.

## 7. Benefits to Disadvantaged Communities – Maximum 5 points

- Describe the location of the multi-source facility, including the physical address with zip code.
- Describe how the project will benefit a disadvantaged community. All projects must meet at least one of the criteria in ARB's Interim SB 535 Guidance for being located within, or providing benefit to, a disadvantaged community.<sup>11</sup>

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<sup>10</sup> "CO<sub>2</sub> equivalent" means the number of metric tons of CO<sub>2</sub> emissions with the same global warming potential as one metric ton of another greenhouse gas.

<sup>11</sup> Use the criteria contained in ARB's Interim SB 535 Guidance, Appendix A, to determine whether a project is located within a disadvantaged community or provides benefit to a disadvantaged community.

- Projects that meet the criteria for being located within a disadvantaged community census tract will be scored higher than those that meet the criteria for providing a benefit to a disadvantaged community, but are not located within the census tract. Projects that do not meet any of the criteria in ARB's Interim SB 535 Guidance<sup>12</sup> will not be considered for funding.

## **8. Technology and Innovation – Maximum 10 points**

- Identify and describe the technological innovation that is the basis for the project. If the proposed technology is a component of a device or process, also describe the device or process. Descriptions should be understandable to reviewers who are not experts in the field. Cite (but do not include) patents if needed. Describe exactly what part of the technology is innovative, how it is innovative, and how it works.
- Describe what safety measures are in place to ensure safe operation and maintenance of the vehicles and equipment: during operations, battery charging, refueling, equipment maintenance, and other operational parameters. Identify any specific issues that first responders, such as firefighters, police, etc., should be concerned with if an emergency is encountered, either due to internal or external forces, with the piece of equipment funded under this demonstration.
- Explain the technical advantages of the innovation, and document performance claims.
- Describe what type of emission testing has already been done on the proposed technology(ies), if applicable.

## **9. Potential for Market Penetration and Commercialization of the Technology – Maximum 15 points**

- Define target markets and explain why the targeted industries would buy the innovation after a successful demonstration project. Both markets within and outside of California should be considered.
- Describe the recent and expected growths or declines of the targeted industries.
- Identify the specific market niche for the proposed technology and describe its size and potential for growth.

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<sup>12</sup> This Guidance is available at: <http://www.arb.ca.gov/cc/capandtrade/auctionproceeds/final535-interim-guidance-11-3-2014.pdf>.

- Describe any specific barriers to entry or expansion.
- Describe the commercialization plan for the proposed technology(ies).
- Describe what steps will be followed to gain ARB certification or verification of the proposed technology(ies).
- Describe the economic benefits that a California business could expect if they operated zero- or near-zero emission vehicles or equipment that are part of this demonstration.
- Describe any special training that will be required for installation and maintenance personnel.

#### **10. Application Completeness – Maximum 5 points**

- Applications that are clear, concise, and include all of the requested information will be scored higher than those that are unclear or missing information. Do not make a declaration as to application completeness in your submittal.
- Provide a written affirmation in the Project Narrative that all parties participating in the demonstration have read the Sample Grant Agreement that is included in this Solicitation packet as Appendix B.

#### **11. Timeline for Project Completion – Maximum 5 points**

- Provide a project schedule including the milestones as described in the Project Narrative and Work Plan section of Appendix A (Attachment 3). Both a tabular and graphic display (such as a Gantt chart) of the project schedule is preferred, but at a minimum, a tabular display is required. Information must include task duration, start and completion dates, and expected time to secure materials and construction services, in addition to the milestones being clearly identified. The milestones and timelines must also include all infrastructure installation that is to be funded as part of the project.
- Demonstrate that all work will be accomplished by April 15, 2019.

### **XVI. GRANTEE SELECTION**

The successful Grantee will be required to sign a Grant Agreement with ARB to fulfill the administrative duties and technical duties associated with the project (see



Appendix B, Sample Grant Agreement).<sup>13</sup> Signed Grant Agreements and approved governing board resolutions must be returned to ARB no later than the deadline described in the Solicitation Timeline in Section XIII of this Solicitation. If project Grant Agreements and approved governing board resolutions are not returned by the deadline, ARB, in its sole discretion, may deny the grant application and can redirect funds to another submitted application to this Solicitation or to another project in the Funding Plan as needed. If, in ARB's sole discretion, no submitted project proposal meets the goals of this Solicitation, Funding Plan, or AQIP Guidelines, no selection of a Grantee or technology demonstrator will be required to be made, and funding can be directed to another project identified in the Funding Plan as needed.

ARB, in its sole discretion, may make minor changes to proposed milestones, work plan, or disbursement schedules in consultation with the applicant, for inclusion in the Grant Agreement.

## **XVII. IMPLEMENTATION PROCESS**

### **Meetings**

Before work begins, a kick-off meeting will be held in Sacramento between the Grantee, the technology demonstrator(s), third-party data analysis provider (if determined), and ARB project management staff (a separate kick-off meeting with the third-party data analysis provider may be required). The purpose of this meeting will be to discuss the work plan, details of task performance, the project schedule, any changes to the project team, and any issues that may need resolution before ARB-funded work begins. Project update meetings to discuss the project's progress will be held as often as needed, but typically monthly. These meetings can occur via telephone conference calls upon approval of the ARB Project Liaison. Project update meetings are the responsibility of the Grantee to schedule and prepare a meeting agenda. Project update meetings need to contain, but are not limited to:

- Agenda for the meeting with conference call information;
- Update of the status of the project;
- Discussion of any difficulties encountered since the last project update meeting;

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<sup>13</sup> As noted above, the Grant Agreement may not be executed unless and until any required CEQA review has been completed. For a project where an agency other than ARB is serving as lead CEQA agency, the applicant must submit any required final CEQA documents by December 1, 2015 (prior to execution of the Grant Agreement). If an applicant fails to meet this requirement, ARB may deny the grant application. ARB will independently review any CEQA documentation provided by the applicant. ARB may modify any Grant Agreement based upon information produced from the CEQA environmental review process. If ARB in its sole discretion finds a project's CEQA documentation inadequate, ARB retains absolute sole discretion to either (1) modify the grant agreement as necessary to comply with CEQA, (2) select other feasible alternatives to avoid significant environmental impacts, or (3) deny the grant application. No legal obligations will exist unless and until the parties have executed and delivered a mutually acceptable Grant Agreement, as informed by information produced from the CEQA environmental review process (to the extent applicable). See Appendix E for additional information.

- Discussion on any deliverables that are nearing a due date;
- Notification of any pending disbursement requests; and
- Schedule of the next project update meeting.

Site visits by ARB staff may be required at ARB's sole discretion. A final meeting, or conference call pending ARB Project Liaison approval, will be held at the conclusion of the project to review the results and discuss the status of commercialization plans.

### **Project Funding Procedure**

In order to receive a disbursement, the Grantee must submit a grant disbursement request to ARB. The Grant Disbursement Request Form (see Appendix B, Exhibit C) must be signed by the party authorized and designated in the Grant Agreement and must include all information to substantiate the eligibility of costs to be reimbursed. GGRF grant funds will only be issued for vehicles, equipment, and services that are identified in the Project Narrative and Work Plan included in the application package, memorialized in the signed Grant Agreement, memorialized in the signed Grant Agreement, and that have already been rendered. A detailed invoice will be required. A Progress Report on the status of the project to date, including the milestones for which the disbursement request is requesting reimbursement, is required with all disbursement requests. The advance of grant funds will not be allowed.

Disbursements will be made following the procedure described in the Reporting and Monitoring Requirements section of this Solicitation and the signed Grant Agreement.

### **Reporting and Monitoring Requirements**

The Grantee must submit numbered status reports accompanying grant disbursement requests to ARB at least every three months, but may submit on a monthly basis if necessary for more frequent invoicing with prior approval from ARB. These reports must be approved by ARB and must contain the following information, at a minimum, in either Microsoft Word or PDF, as a single electronic file:

- Project Status Report number, title of project, name of Grantee, date of submission, and project grant number;
- Summary of work completed since the last progress report, noting progress toward completion of tasks and milestones identified in the work plan;
- Statement of work expected to be completed by the next progress report;
- Notification of problems encountered and an assessment of their effects on the project's outcome;
- Data collected from vehicles and equipment since the last data reporting, as deemed necessary by ARB or its designated third-party data analysis provider;

- Itemized invoice showing all costs for which reimbursement is being requested; and
- Discussion of the project's adherence to the project timeline.

A final report is required at the end of the project and must include:

- A description of the project's goals and objectives, methods, results of the demonstration, and future application of the technology; and
- An update on the commercialization prospects.

Final reports will be made public and posted on ARB's AQIP website. Requests for additional information may be required by ARB, at its sole discretion, to evaluate reports and to determine if a monthly, quarterly, or final report is complete.

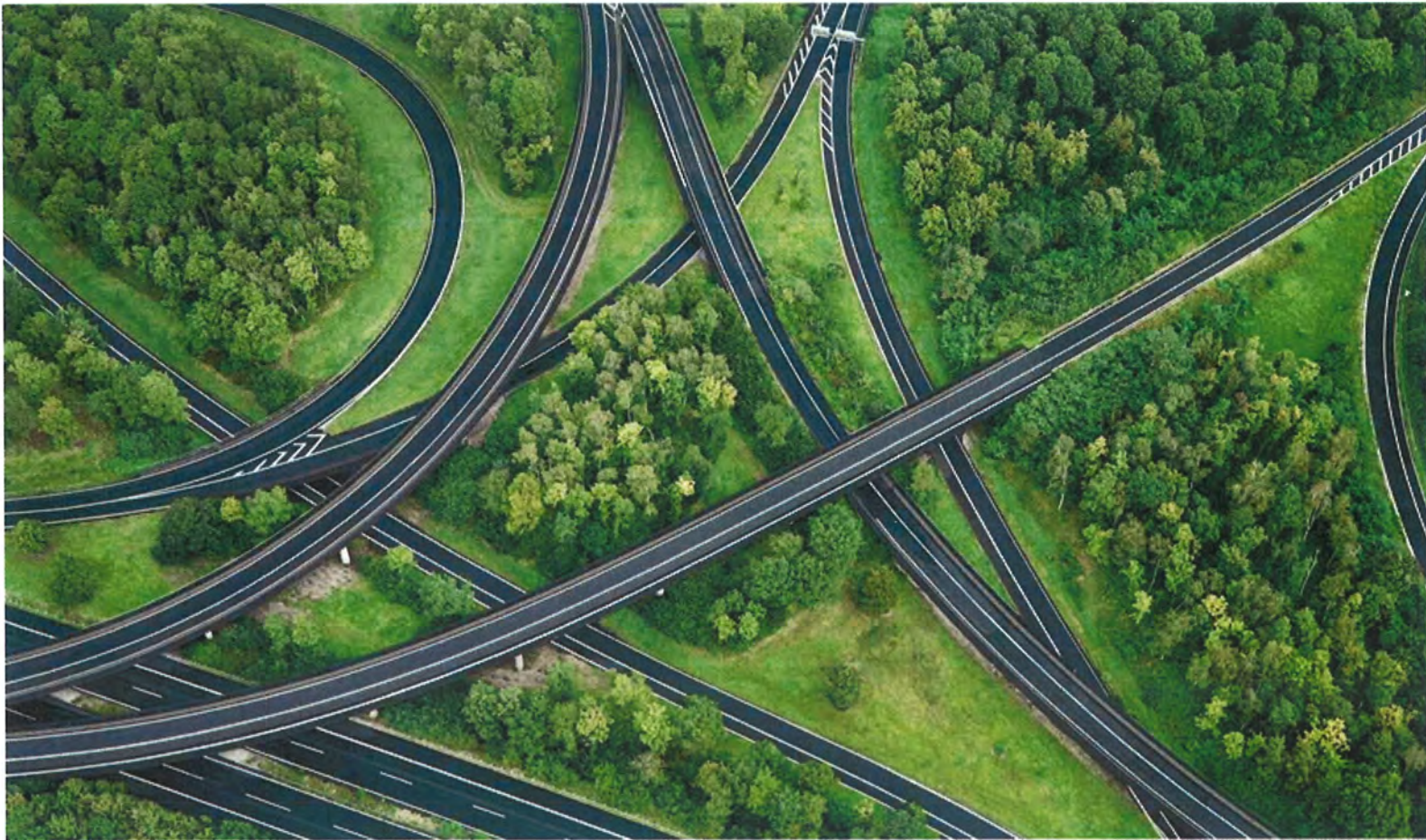
If the Grantee plans on pursuing official verification or certification of the emission reducing potential for its proposed technology, the Grantee must submit documentation in support of that verification or certification to ARB's Project Liaison. Any supporting documentation sent to ARB, U.S. EPA, or any other government agency granting certification or verification, must be concurrently submitted to the AQIP Project Liaison assigned to the project, as identified in the Grant Agreement (see Appendix B).

Any change in the project budget, re-definition of deliverables, or extension of the project schedule must be approved in advance and in writing by the ARB Project Liaison and may require an amendment. Once a grant is in place, minor changes to the work to be done or other project scope changes may be considered by ARB, in consultation with the Grantee or technology demonstrator(s). ARB reserves the right to terminate a grant if ARB determines, in its sole discretion, that the objectives cannot be reached or that the Grantee, technology demonstrator(s), or their subcontractors cannot or will not perform the required work in a timely manner, as specified in Section 6 of the Grant Agreement.

The Grantee and technology demonstrator(s) must allow ARB, the California Department of Finance, the California Bureau of State Audits, or any authorized designee access, during normal business hours, to conduct reviews and fiscal audits or other evaluations. Access includes, but is not limited to, reviewing project records, site visits, interviews, and other evaluations as needed. Project evaluations or site visits may occur unannounced as ARB staff or its designee deem necessary.

AIR QUALITY IMPROVEMENT  
PROGRAM (AQIP) AND LOW  
CARBON TRANSPORTATION  
GREENHOUSE GAS REDUCTION  
FUND (GGRF) INVESTMENTS

Multi-Source Facility  
Demonstration Project



September 22, 2015

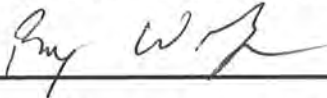
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## MULTI-SOURCE FACILITY DEMONSTRATION PROJECT APPLICATION

Please print clearly or type all information on this application.

1. AQIP Project: <b>MULTI-CLASS HEAVY-DUTY ZERO-EMISSION TRUCK DEVELOPMENT PROJECT FOR INTERMODAL AND WAREHOUSE FACILITIES</b>		
2. Company Name/Air District/Organization Name/Individual Name: <b>San Bernardino Associated Governments</b>		
3. Business Type: <b>Special District Government</b>		
4. Contact Name and Title: <b>Kelly Lynn, Chief of Air Quality/Mobility Programs</b>		
5. Person with Contract Signing Authority (if different from above)/Air Pollution Control Officer (APCO): <b>Raymond W. Wolfe, Ph.D. – SANBAG Executive Director</b>		
6. Mailing Address and Contact Information:		
Street: <b>1170 W. 3<sup>rd</sup> St. Floor 2</b>		
City: <b>San Bernardino</b>	State: <b>CA</b>	Zip Code: <b>92410</b>
Phone: <b>( 909 ) 884-8276</b>		Fax: <b>( 909 ) 885-4407</b>
Email: <a href="mailto:klynn@sanbag.ca.gov">klynn@sanbag.ca.gov</a> ; <a href="mailto:jherrera@sanbag.ca.gov">jherrera@sanbag.ca.gov</a>		
<input checked="" type="checkbox"/> I have read and understood the terms and conditions of the Sample Grant Agreement.		

I hereby certify under penalty of perjury that all information provided in this application and any attachments are true and correct.

Printed Name of Responsible Party or APCO: <b>Raymond W. Wolfe, Ph.D.</b>	Title: <b>Executive Director</b>
Signature of Responsible Party or APCO: 	Date: <b>9/21/15</b>

### Third Party Certification (if applicable)

I have completed the application, in whole or in part, on behalf of the applicant.

Printed Name of Third Party:	Title:
Signature of Third Party:	Date:
Amount Being Paid for Application Completion in Whole or Part:	Source of Funding to Third Party:

## Table of Contents

<b>Attachment 1 – Applicant Qualifications</b>	<b>iv</b>
<b>Qualifications Narrative</b>	<b>iv</b>
SANBAG’s Experience in Implementing Large Scale Air Quality Projects	iv
Interstate Clean Transportation Corridor	iv
Ryder Alternative Fuels Demonstration Project	iv
<b>Staff Information</b>	<b>v</b>
Resume for Kelly Lynn	vi
Resume for Jenny Herrera	viii
<b>Subcontractor and Partner Information</b>	<b>ix</b>
BYD	ix
Brendan Riley, Vice President	x
Andy Swanton, Director of Business Development for North America	x
Priyankar Balekai, Director of Product Development for North America	x
Brian Li, Project Manager	xi
Michael Conner, Technical Services	xi
I/O Controls	xi
BNSF	xi
Kevin Maggay, Senior Manager of Environmental Operations	xii
Mike Pagel, manager of intermodal equipment business unit operations	xiii
Brant Ring, AVP, Intermodal Hub Operations	xiii
Parsec – Subcontract to BNSF at Commerce Rail Yard	xiii
David H. Budig, VP and COO	xiii
Eagle – Subcontractor to BNSF at San Bernardino Rail Yard	xiii
Greg Olshavsky, President	xiv
Al Thompson, Regional Manager	xiv
Daylight Transport	xiv
Justin Webb	xiv
CALSTART	xiv
Jean-Baptiste	xv
Michael Ippoliti	xvi
<b>Key Personnel Table</b>	<b>xvi</b>
<b>Attachment 2 – Project Executive Summary</b>	<b>xviii</b>
<b>Attachment 3A – Project Narrative</b>	<b>1</b>
<b>Overview</b>	<b>1</b>
<b>Applicant Qualifications</b>	<b>2</b>
<b>Project Team Capabilities and Degree of Industry Collaboration</b>	<b>2</b>
<b>Project Objectives, Work Plan and Schedule</b>	<b>4</b>
<b>Budget</b>	<b>6</b>
<b>Technology</b>	<b>6</b>
Innovation	6

Yard Trucks – BYD _____	8
Service Trucks – BYD _____	8
Safety _____	9
<b>Demonstration Locations and Benefits to Disadvantaged Communities _____</b>	<b>9</b>
<b>Emission Reductions _____</b>	<b>10</b>
<b>Potential for Market Penetration and Commercialization of the Technology _____</b>	<b>11</b>
Market Assessment _____	12
Potential Market Barriers to Widespread Commercialization _____	13
Economic Benefits _____	14
Commercialization Plan _____	14
<b><i>Attachment 3B – Bibliography _____</i></b>	<b><i>I</i></b>
<b><i>Attachment 3C – Specifications and Images _____</i></b>	<b><i>III</i></b>
T9A Specifications _____	III
T5 Specifications _____	III
Charger Specifications _____	IV
BNSF San Bernardino Facility Location _____	V
BNSF Commerce Facility Location _____	VI
Daylight Transport Facility Location _____	VII
<b><i>Attachment 3D – Work Plan _____</i></b>	<b><i>VIII</i></b>
<b><i>Attachment 4 – Potential Emission Reduction Benefits and Cost Effectiveness _____</i></b>	<b><i>XIII</i></b>
Summary Tables _____	XIII
Inputs and Assumptions _____	XIII
Calculations _____	XIV
<b><i>Attachment 5A - Proposed Budget, Project Milestones, and Disbursement Schedule _____</i></b>	<b><i>XIX</i></b>
<b><i>Attachment 5B – Budget Breakdown _____</i></b>	<b><i>XXII</i></b>
Subcontractor Costs _____	XXII
In-Kind Hours _____	XXIV
BNSF Engineering Estimate for San Bernardino Upgrades _____	XXIX
BNSF Engineering Estimate for Commerce Upgrades _____	XXX
Daylight Engineering Estimate for Installing Chargers _____	XXX
<b><i>Attachment 6 – Disadvantaged Communities Eligibility Determination _____</i></b>	<b><i>XXXI</i></b>
BNSF San Bernardino _____	XXXI
BNSF Commerce _____	XXXII



<b>Daylight Fontana</b>	<b>XXXIII</b>
<b><i>Attachment 7 – Confidentiality Provision</i></b>	<b>XXXIV</b>
<b><i>Attachment 8 – Letters of Commitment</i></b>	<b>XXXV</b>
<b><i>Attachment 9 – CEQA Worksheet</i></b>	<b>XXXVI</b>
<b><i>Attachment 10 – Conflict of Interest Declaration</i></b>	<b>XXXVII</b>
<b><i>Attachment 11 – STD.204 Payee Data Record</i></b>	<b>XXXVIII</b>



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## Attachment 1 – Applicant Qualifications

### *Qualifications Narrative*

For more than twenty-five years, the San Bernardino Associated Governments (SANBAG) has been the regional leader in the development, demonstration, and advancement of low-emission alternative fuel technologies. In its capacity as both the County Transportation Commission and Council of Governments for the County of San Bernardino – the largest County in the contiguous United States – SANBAG has broad experience in the successful implementation of large-scale air quality improvement projects, especially those projects targeting emissions reductions from the heavy-duty goods movement sector. As such, SANBAG is the ideal public agency to forge a public-private partnership to demonstrate advanced zero-emission freight movement technologies in San Bernardino County. SANBAG’s experience, qualifications and capabilities that position it well to successfully execute the proposed project are summarized over the next two pages.

San Bernardino is California’s Gateway for both truck and rail freight transportation. In its capacity as the County Transportation Commission, SANBAG has responsibility for ensuring the network of freeways, railroad grade crossings, and essential infrastructure are available and capable of supporting ever-increasing levels of goods movement. However, SANBAG has long recognized its responsibility to its residents and the region at large as it pertains to improving air quality. It is for this reason that SANBAG has taken a leadership role in the demonstration and advancement of technologies that reduce emissions associated with freight transportation.

The following examples highlight SANBAG’s experience and qualifications pertaining to the implementation and administration of large-scale air quality improvement incentive programs. SANBAG’s demonstrated program management capabilities lend confidence that SANBAG will efficiently and effectively implement the proposed BNSF/Daylight Transport zero-emission heavy-duty truck demonstration project.

#### SANBAG’s Experience in Implementing Large Scale Air Quality Projects

##### INTERSTATE CLEAN TRANSPORTATION CORRIDOR

SANBAG has a long history of creating partnerships to successfully implement air quality improvement projects. In 1995, SANBAG was a founding partner in the Interstate Clean Transportation Corridor (ICTC) network, a consortium of public and private agencies dedicated to linking alternative fuel infrastructure stations throughout the Western United States.

This partnership has enabled the use of alternative fuels such as compressed and liquefied natural gas (CNG, LNG) by trucking companies that regularly use the I-10 and I-15 corridors. In addition, through its administration of federal, state, and local funding programs, including Congestion Mitigation/Air Quality (CMAQ) funds, SANBAG has been the driving agency for the construction of publicly accessible CNG and LNG fueling stations in Barstow, San Bernardino, Redlands, and numerous other locations throughout San Bernardino County. These stations enable the use of cleaner-burning natural gas by local refuse collection vehicles, municipal vehicles, and transit buses.

##### RYDER ALTERNATIVE FUELS DEMONSTRATION PROJECT

SANBAG’s ability to successfully implement large-scale air quality improvement projects was most recently showcased in the SANBAG/Ryder Alternative Fuel and Advanced Technology

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Demonstration Project, which was completed as of December 2013. This project, jointly co-funded by the US Department of Energy Clean Cities and the California Energy Commission (CEC) AB 118 programs, deployed 202 heavy-duty compressed and liquefied natural gas Class 8 semi-tractors in revenue service. The project partners included Ryder System Inc., the industry leading Fortune 500® provider of commercial transportation, logistics, and supply chain management solutions throughout North America; Cummins Westport, the leading developer of advanced technology heavy-duty natural gas engines; and Gladstein, Neandross, and Associates, a leading alternative fuels consultancy firm who assisted SANBAG in data collection.

In addition to the deployment of more than 200 advanced technology trucks, the project constructed two public access natural gas refueling stations, upgraded three maintenance shops to allow for the maintenance and repair of gaseous fueled vehicles, as well as implementing training programs for both vehicle maintenance personnel and vehicle customers.

This project was extremely successful from multiple perspectives. First, it resulted in the direct reduction of more than 4,630 metric tons of greenhouse gas emissions, 131 tons of oxides of nitrogen (NOx) emissions, an ozone precursor whose reduction is of extreme importance to the South Coast Air Quality Management District (SCAQMD), as well as reducing 2.65 tons of particulate matter, a toxic air contaminant and known carcinogen.

Economically, the project created and sustained more than 400 new US jobs, and, because of its success, Ryder has expanded the availability of low-emission natural gas trucks in their leasing options. The SANBAG-sponsored project has been a significant success for Ryder and its leasing customers. Notably, Ryder began to expand this project while it was still in progress. Since completion of the SANBAG project, Ryder has upgraded eight additional locations to accommodate natural gas vehicles and has plans to upgrade an additional nine Ryder facilities to natural gas capability.

Finally, SANBAG's work with Cummins Westport on the 8.9-liter ISL G compressed natural gas and 11.9-liter GX high-pressure direct injection (HPDI) advanced technology liquefied natural gas engines directly supported advancement in the science and technology. Specifically, the project:

- Demonstrated in real-world commercial trucking operations the Westport high-pressure direct injection LNG engine technology. The Westport HPDI technology engines accrued more than 450,000 revenue service miles under the SANBAG demonstration project.
- Demonstrated the Cummins Westport ISL G natural gas engine in more than 8.25 million revenue miles in a wide range of commercial trucking applications. This project subjected the state-of-the-art Cummins Westport ISL G to rigorous, real-world commercial trucking conditions that had previously been dominated by diesel-fueled trucks. The diversity of the participating trucking fleets allowed the natural gas technology to be demonstrated in a diverse range of operational duty cycles, ranging from short-haul, local delivery, to over-the-road driving profiles. This experience has proven extremely valuable to chassis, engine, and fuel system manufacturers as they develop the next generation of alternative fuel drive systems.

### *Staff Information*

SANBAG will be the principal investigator for the zero emission heavy-duty truck demonstration project and will be responsible for all elements of project administration. SANBAG's personnel have extensive experience in programming Federal and State funding for transportation projects. SANBAG successfully implemented a large publicly accessible LNG/LCNG fuel station in the City of Barstow – a

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critical fueling location along the Interstate Clean Transportation Corridor between Southern California and Las Vegas, Nevada – using a combination of Federal CMAQ money and funding from the CEC. In a similar effort involving CMAQ funding, SANBAG assisted the City of San Bernardino to develop and open a new publicly accessible LNG station. As previously discussed, SANBAG was the principal investigator and project administrator for the Department of Energy and CEC Alternative Fuel Truck Project.

SANBAG will work with the other partners to successfully implement all aspects of the project. As the Council of Governments and Regional Transportation Planning Authority for San Bernardino County, SANBAG is responsible for allocating Federal and State transportation dollars for the County, is the lead on several key highway construction projects, and has successfully implemented and administered numerous heavy-duty alternative fuel vehicle deployments in partnership with the US Department of Transportation/Federal Transit Administration and Federal Highway Authority, US Department of Energy, California Energy Commission, and local agencies including the South Coast AQMD.

The Program Manager for this project is Kelly Lynn. Kelly is the Chief of Air Quality & Mobility Programs at SANBAG, and is responsible for managing all air quality, alternative fuel and mobility programs. This includes overall management responsibility for all phases of project development and implementation, including but not limited to study reports, strategic tools, project reports, environmental analysis, collateral materials, developing scopes of work, requests for proposals, and contracts.

Notably, Kelly was the Principal Investigator on the SANBAG/Ryder Systems, Inc. Alternative Fuel Truck Project, which included the deployment of 202 advanced technology natural gas trucks, construction of two new CNG/LNG fueling stations, and three maintenance facilities. During the 20-month demonstration period, the natural gas trucks accrued greater than 2 million revenue miles and displaced more than 2.3 million gallons of diesel fuel, far exceeding projected goals. Kelly was responsible for all aspects of this “first of its kind” project’s administration; her diligent program oversight significantly contributed to the project’s success and was recognized by both the US Department of Energy and California Energy Commission.

Jenny Herrera will serve as the Deputy Project Manager, reporting to Ms. Lynn. For the past six years, Jenny has served as the principal Air Quality & Mobility Programs analyst. In this capacity, Jenny is responsible for all phases of development and implementation of air quality programs, including but not limited to financial and market analysis, strategic planning, survey tools, study reports, and data analysis. In addition, Jenny administers state and federal reimbursement requests on behalf of SANBAG. Jenny served as Deputy Project Manager for the recently completed Department of Energy and California Energy Commission Alternative Fuel Truck Project.

#### Resume for Kelly Lynn

A Bachelor’s degree in Political Science with more than 25 years of administrative, management, and executive level experience in developing and implementing programs which has resulted in the following skills and qualifications:

#### **EDUCATION:**

University of Southern California: Bachelor of Science in Political Science

#### **PROFESSIONAL EXPERIENCE:**

San Bernardino Associated Governments, San Bernardino, CA

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### Chief of Air Quality & Mobility Programs (2000 to Present)

- Oversees the management of the AQMP Department, as well as the implementation of air quality, alternative fuel and other mobility programs;
- Principal Investigator (PI) for the SANBAG/Ryder Systems, Inc. \$37 Million Department of Energy Alternative Fuels Demonstration Project. The project deployed 202 heavy duty CNG/LNG trucks and built two new CNG/LNG fueling stations that were both available to the public as well.
- Interface daily with public and private jurisdictions in multi-agency and multi-jurisdictional settings; including the two air districts within San Bernardino County (SCAQMD and MDAQMD), the Mobile Source Air Pollution Reduction Review Committee (MSRC) and several other regional and state technical advisory committees;
- Program and Project Management, which includes all phases of development and implementation, including but not limited to study reports, strategic tools, project reports, environmental analysis, collateral materials, developing scopes of work, requests for proposals and contracts;
- Developed and implemented statewide policies for air quality and mobility programs, including being the first Freeway Service Patrol (FSP) agency in California to introduce CNG tow trucks to their FSP Tow Truck Program to assist in serving the public;
- Chaired the Statewide Motorist Aid Committee. Has been a member of the Mobile Source Air Pollution Reduction Review Committee (MSRC) since 2000, has chaired the Regional Rideshare Exchange (RRE) Committee since 2002 which involves MTA, OCTA, SANBAG and VCTC, has chaired the Regional Rideshare Implementation Committee (RRIC) since 2003, which involves the same four county transportation commissions as noted with the RRE, and has been chairing the MSRC Transportation Control Measures (TCM) subcommittee for the last several years as well;
- Interface with the print and electronic press and media; experienced with public speaking and representing the agency in public venues.
- Oversight of air quality and mobility program transportation projects with a 15/16 FY budget of \$6 million.

### **SYNERGISTIC ACTIVITIES:**

- Currently working on developing and implementing an Electric Vehicle readiness plan for the San Bernardino County region as part of SANBAG's Council of Government tasks.
- Principal Investigator on a project that was a first of its kind. The SANBAG/Ryder Systems, Inc. Alternative Fuel Truck Project, which included the building of two new CNG/LNG fueling stations (available to the public when it was completed as well) and three maintenance facilities. During the 20-month demonstration period, the natural gas trucks accrued greater than 2 million revenue miles and displaced more than 2.3 million gallons of diesel fuel, far exceeding projected goals. This corresponds to a reduction in ozone precursor oxides of nitrogen (NO<sub>x</sub>) emissions exceeding 3.06 US tons, and carbon dioxide-equivalent (CO<sub>2</sub>E) GHG reductions exceeding 5,104 metric tons.
- Grant funds for this project came from the California Energy Commission, and the Department of Energy, with a little more than \$18 million from Ryder Systems, Inc. The project involved the

- 
- purchasing of 202 CNG/LNG trucks that could then be leased by various Ryder clients for goods movement. Clients included Staples, Kraft Foods and the 99 Cents Only Stores.
  - Member of the Mobile Source Air Pollution Reduction Review Committee (MSRC) Technical Review Committee (TAC) since 2000, which has distributed on average \$13 million each year in grants which reduce mobile source pollutions. Has chaired the MSRC Transportation Controls Measure (TCM) subcommittee for several years.

#### Resume for Jenny Herrera

A Bachelor's degree in Business Management and more than 10 years of administrative and management level experience has resulted in the following skills and qualifications:

#### **EDUCATION**

California State University, Long Beach: Bachelor of Science in Business Management

#### **PROFESSIONAL EXPERIENCE**

San Bernardino Associated Governments, San Bernardino, CA

Air Quality/Mobility Programs Management Analyst (2009 to Present)

Program and Project management including all phases of development and implementation, but also including but not limited to financial and market analysis, strategic planning, survey tools, study reports, data analysis, marketing materials, event management, development of scopes of work as well as requests for proposals and contracts, budget development and management including state and federal reimbursement requests for the following:

- Freeway Service Patrol Program
- Inland Empire 511 system
- Property Assessed Clean Energy Program
- Department of Energy and California Energy Commission Alternative Fuel Truck Project
- Call Box System
- Regional Rideshare Program

Interface daily with public and private jurisdictions in multi-agency and multi-jurisdictional settings.

#### **SYNERGISTIC ACTIVITIES:**

- Chair of the California Statewide Motorist Aid Committee for 2014 and 2015. This committee is comprised of all the counties in the State of California that operate motorist aid programs within their jurisdictions. Together the agencies collaborate to create effective and efficient programs statewide.
- Assistance in implementation and administration in the first of its kind Alternative Fuel Truck Project. Including \$20M in grant funds from the Department of Energy and the California Energy Commission, to offset costs of a \$37M compressed natural gas (CNG) project with Ryder Truck Rental which created two LNG/CNG fueling stations, as well as the purchase of 202 CNG/LNG trucks.
- Assisted in the implementation and administration of a multi-faceted, bi-county 511 traveler information phone system, website and application.
- Daily operations manager of the Freeway Service Patrol (FSP) resulting in annual revenue of \$1.4 million to the county and providing assistance to more than 35,000 motorists each year covering

67 centerline freeway miles. Worked with legislators, Caltrans, California Highway Patrol (CHP) to fund and administer the program, as well as continue to develop the program in areas such as providing new digital radio frequencies, tow truck automatic vehicle locating systems, and intelligent data gathering systems.

Name: Kelly Lynn	Hourly rate: \$170.87
Phone: (909) 215-3280	Email: <a href="mailto:klynn@sanbag.ca.gov">klynn@sanbag.ca.gov</a>
Title: Chief of Air Quality and Mobility Programs	
Expected duties: Applicant Tasks - Lead Applicant Manager, Kickoff Meeting, Monthly Progress Calls, Quarterly and Final Report Review, Manage Disbursement Requests	
Name: Jenny Herrera	Hourly rate: \$85.54
Phone: (909) 884-8276	Email: <a href="mailto:jherrera@sanbag.ca.gov">jherrera@sanbag.ca.gov</a>
Title: Management Analyst	
Expected duties: Applicant Tasks - Kickoff Meeting, Monthly Progress Calls, Quarterly and Final Report Review, Manage Disbursement Requests	

*Subcontractor and Partner Information*

SANBAG is partnering with BYD as the technology provider, I/O Controls as the data logging equipment provider, BNSF Railway and Daylight Transport as the technology demonstrators, and CALSTART as a technical partner.

BYD

BYD is a global company with over \$9B in revenue annually and 180,000 employees. BYD was founded in 1995 as a consumer electronics company and continues to be one of the pre-eminent original equipment manufacturers for smart phones, tablets, and laptops. BYD is the world’s top seller of rechargeable batteries, with approximately 25% of the global market share. BYD’s clean energy division produces battery storage stations, solar panels, and LED lights. In 2003 BYD entered the automotive market and is now the largest selling domestic car manufacturer in China, home of the company’s global headquarters. BYD is also aggressively developing electric propulsion systems for consumer cars, introducing the world’s first plug-in hybrid in 2008. BYD surpassed Tesla and Nissan as the top selling global manufacturer of battery electric cars in 2015.

BYD’s global strategy for electric transportation is to first focus on buses, taxis, vocational trucks, and material handling equipment for the following reasons: these vehicles are not as numerous as consumer cars and yet generate approximately two-thirds of global greenhouse gas emission; there is little competition in these markets from other original equipment manufacturers; and the lessons learned from these markets will aid BYD in the global rollout of its consumer cars. Today BYD is the global leader in electric bus and taxi sales, with 5,000 orders currently pending in each segment. The next focus areas for BYD are electric trucks and forklifts. Of note, BYD is currently developing prototypes and manufacturing capabilities for the following truck categories: 1) Urban Delivery Trucks: Classes 2-6; 2) Municipal Trucks: Refuse and Street Sweepers; 3) Construction Trucks: Concrete Mixers and Dump



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Trucks; 4) Port Vehicles: Drayage Trucks, Yard Tractors, High Tonnage Forklifts, RTG Conversions, Top Picks, Reach Stackers; 5) Airport Vehicles: Tugs, Belt Loaders, Cargo Carriers; 6) Material Handling: Forklifts, Narrow Aisle; and 7) Mining Trucks.

BYD's North American headquarters opened in Los Angeles in October 2011 and in 2013 BYD developed local manufacturing facilities in Lancaster, CA, purchasing 164,000 square feet of manufacturing space across two facilities. BYD has now hired over 180 Americans to support manufacturing, research, development, and sales. BYD also has agreements with the City of Lancaster to build additional dedicated facilities for high volume product lines like buses, medium duty trucks, heavy duty trucks, and forklifts. Except for the prototypes, all BYD products in this solicitation are planned to be manufactured in BYD's current manufacturing facility located at 46147 7th Street West (BYD Boulevard), Lancaster, CA 93534. Engineering, product development, and technical support will be provided from staff located at the manufacturing plant in Lancaster and from the company's North American headquarters at 1800 S Figueroa St, Los Angeles, CA 90015.

BYD has previously received AQIP funding through the Hybrid and Electric Vehicle Incentive Program (HVIP), with completed and in-process awards for 38 buses and a total voucher amount of \$3,876,000. BYD was also awarded a \$2,886,248 grant from the CEC in 2015 for the demonstration of four 35 foot buses with the Los Angeles Department of Transportation.

#### BRENDAN RILEY, VICE PRESIDENT

Brendan is the business executive in charge of BYD's North American truck team. Brendan has been with BYD since 2012 and built both the commercial and engineering staff for BYD's bus group. In this role, Brendan was responsible for hiring all fleet sales managers, product managers, engineers, and manufacturing staff to support the commercial launch of BYD's bus and coach product lines in North America. He helped negotiate the purchase of both of BYD's manufacturing facilities in Lancaster. Brendan was also directly responsible for winning BYD's initial bus orders and laying the groundwork for others, including Stanford University, LA Metro, Gardena, Long Beach Transit, Denver Regional Transportation, Howard County Maryland, and the Washington State Department of Transportation. He has since transitioned 100% to building the truck and material handling teams at BYD. Prior to BYD Brendan was VP of Sales and Marketing for PTB Sales, a semiconductor and aerospace equipment manufacturer. Brendan has a Bachelor of Arts from Universita di San Tommaso in Rome.

#### ANDY SWANTON, DIRECTOR OF BUSINESS DEVELOPMENT FOR NORTH AMERICA

Andy is the lead business development manager for BYD's North American truck team. He joined BYD in March 2015 and is responsible for identifying target customer segments, negotiating agreements with customers, and focusing product development. Previously Andy worked for a medical device company where he spearheaded the launch of dental imaging equipment and most recently led a 50 person manufacturing team. Andy was trained as an engineer and has design and construction supervision experience in the water treatment industry. Andy holds a Bachelor of Science from Tufts University, a Master of Engineering from MIT, and a MBA from Harvard Business School.

#### PRIYANKAR BALEKAI, DIRECTOR OF PRODUCT DEVELOPMENT FOR NORTH AMERICA

Pri is the lead product development manager for BYD's North American truck team. He joined BYD in April 2015 and is responsible for overseeing all of BYD's product development efforts for medium and heavy duty trucks. Pri has 18 years of experience in the vocational truck market, working in a

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variety of technical and business roles at Navistar International Corporation. Most recently Pri was in charge of product planning and strategy for Navistar's powertrain group. Pri has a Bachelor of Science in Mechanical Engineering from Illinois Institute of Technology.

BRIAN LI, PROJECT MANAGER

Brian is the lead project manager for BYD's truck and material handling product lines. In this role Brian is responsible for developing project scope, schedule, and deliverables, and managing projects from concept through to customer delivery. Brian works cross functionally with local and international engineering, sales, and executive management teams. Brian has been with BYD since October 2014, and formerly worked as a project manager in BYD's bus and coach group. Brian has a Bachelor of Science in Electrical Engineering from Shanghai Jiao Tong University in China and a Master of Science in Electrical Engineering from UCLA.

MICHAEL CONNER, TECHNICAL SERVICES

Mike is the lead technical services associate for this project. Mike has 16 years of experience servicing medium and heavy duty equipment as a mechanic, field service technician, and supervisor. He is responsible for training maintenance and driver staff at BYD customer locations, performing maintenance and on-site customer service, and providing aftermarket sales support. Most recently Mike worked for North American Bus Industries (NABI) as the regional supervisor of field service for the western region, where he managed all warranty, maintenance, and spare part sales with NABI customers.

I/O Controls

I/O Controls is an integrated control and monitoring company that will be providing the data logging hardware, as well as the cloud-based web platform for all project partners and CARB to access data related to all the trucks in this demonstration project. I/O Controls has been providing multiplex, data-logging, and cloud-based real-time vehicle monitoring for BYD buses since 2013. I/O Controls was founded in 1982 and is headquartered in Azusa, CA.

BNSF

BNSF Railway is the world's largest intermodal provider, having transported an average of about 4.6 million domestic and international intermodal shipments every year over the last five years. BNSF has 32,500 miles of track and serves more than 40 North American ports, including all the major West Coast ports, providing direct access to the country's largest and fastest-growing inland markets.

The core of the BNSF intermodal supply chain is its intermodal hub network, which is unparalleled in the industry. With more than 3,000 employees operating 25 facilities in 14 states, it is the largest network of its kind. These hubs are the connecting points for trains and trucks, where freight changes modes as it moves to its final destination. BNSF is also working to ensure its intermodal hub facilities are maintained and updated to offer the highest level of service.

BNSF's San Bernardino intermodal facility is a 154 acre facility that handles an average of six inbound and five outbound trains per day and has a fleet of 55 yard hostlers. The BNSF intermodal facility in Commerce, California, covers 48 acres and processes one inbound and one outbound train each day. There are a total of 10 yard hostlers at Commerce.

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BNSF is very focused on environmental sustainability. The company believes it is good business and good citizenship to minimize its impact on the planet and to contribute to the long-term sustainability of every community it serves. To this end, BNSF Railway has long been an industry leader in the environmental field. For example, BNSF has developed and implemented cutting edge technology to improve efficiency and reduce emissions. Some recent examples of this include:

- Idle reduction technology
- Wide span electric cranes
- Automatic systems
- Genset locomotives
- Distributed generation for locomotives

In addition to new technologies, BNSF has partnered with government agencies, including the Air Resources Board, on a number of grant projects. BNSF has received over \$23 million in grant funding from California programs such as Prop 1B, Carl Moyer, as well as from the American Recovery and Reinvestment Act to fund the repower and/or replacement of older locomotives.

#### KEVIN MAGGAY, SENIOR MANAGER OF ENVIRONMENTAL OPERATIONS

Mr. Maggay has 13 years of experience focused on air quality in the transportation and goods movement sector. Three years were spent in private consulting, eight years with the Port of Los Angeles, and almost two years with BNSF Railway. He currently oversees all air programs throughout the BNSF network. His experience includes air quality modeling, grants, and policy issues. Mr. Maggay has long been active in the technology advancement arena. With his counterparts at the Port of Long Beach he developed, implemented and managed the San Pedro Bay Ports Technology Advancement Program and co-authored the San Pedro Bay Ports Roadmap to Zero Emissions policy document. He also has applied for, received, and distributed numerous grants in a total amount of over \$75 million for goods movement sources including vessels, harbor craft, locomotives, on-road trucks and cargo handling equipment, with a focus on zero emission technologies. Additionally, Mr. Maggay served on the Board of Directors of PortTech LA, a port focused technology incubator. Mr. Maggay has a degree in Environmental Studies from the University of Southern California as well as a Global Logistics Specialist designation from California State University Long Beach. Below are selected projects that display Mr. Maggay's experience relevant to this grant.

- California Air Resources Board Air Quality Improvement Program
  - DPF on switching locomotive: \$346,178
- Other California Grants Received
  - CARB, Proposition 1B for Truck Replacements: \$48,000,000
  - EPA, DERA ARRA for Diesel Emission Reduction at Port of Long Beach: \$1,900,000
  - CARB, Proposition 1B (SCAQMD) to Repower Four Locomotives: \$3,000,000
  - CARB, Proposition 1B (SCAQMD) to Repower Six Locomotives: \$4,500,000
  - Carl Moyer (BAAQMD) to Repower Six Locomotives: \$6,617,196
  - CARB ARRA to Repower/Replace Eleven Locomotives: \$8,886,000
- Yard Tractor, On-Road Truck, and Zero Emission Project Grants Administered
  - Electric On-Road Truck with International Rectifier: \$175,000

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- Electric On-Road Truck with Transpower: \$150,000
  - Electric Yard Tractor with Balqon: \$263,500
  - Hybrid Yard Tractor with US Hybrid: \$300,000
  - Hybrid Yard Tractor with US Hybrid Phase 2: \$13,000
  - Hydrogen On-Road Truck with Vision: \$95,625
  - LNG On-Road Truck with Westport: \$250,000
  - CNG On-Road Truck with SoCalGas: \$111,577
  - Plug-in Hybrid On-Road Truck with International Rectifier: \$175,000

MIKE PAGEL, MANAGER OF INTERMODAL EQUIPMENT BUSINESS UNIT OPERATIONS

Mike Pagel has been Manager of Intermodal Equipment Business Unit Operations at BNSF Railway since July 2015. In this role, Mike supports the intermodal equipment group to drive efficiencies and growth within the business unit. Mike joined BNSF in 2008, serving for five years as Manager of Marketing Communications before being promoted Manager of Marketing Reporting & Analysis in January of 2013. Mike earned a Bachelor's degree from the University of North Texas and completed the Marketing Communications Executive Education program at the University of Wisconsin.

BRANT RING, AVP, INTERMODAL HUB OPERATIONS

Brant Ring is Assistant Vice President of Intermodal Hub Operations at BNSF Railway. In this role, he is responsible for safety and service performance across BNSF's intermodal and automotive facilities network. Throughout his career, he has held a variety of line and staff roles with progressive leadership responsibility in Operations, Finance, Network Strategy and Marketing.

Parsec – Subcontract to BNSF at Commerce Rail Yard

Parsec, Inc. specializes in intermodal operation services throughout the United States and Canada. The company's customers are primarily made up of Class I railroads and the company services those customers by loading, unloading, draying and providing comprehensive services related to the movement of trailers and containers via rail. Parsec is the subcontractor to BNSF for owning and operating the yard and service trucks used at the BNSF Commerce location.

DAVID H. BUDIG, VP AND COO

David H. Budig has 26 years of experience at Parsec, including nine years in his current role as Vice President and Chief Operating Officer. Prior to that, he spent seven years as Parsec's Vice President of North American Operations. David earned a Business degree from Miami University (Oxford, Ohio) and is involved in a variety of organization responsibilities including his current role as Chairman of the Board of Trustees at Miami University.

Eagle – Subcontractor to BNSF at San Bernardino Rail Yard

Eagle Intermodal Services, Inc. (EISI) provides terminal operations services, principally to Class 1 railroads and industry suppliers, including ramp/deramp activities (placing trailers and containers on and off rail cars), maintenance of lifting equipment, container and chassis repair, and administrative and management functions related to rail yard operations. From humble beginnings in the early 1900s, EISI has grown into a major supplier of intermodal terminal services in the United States. The Eagle motto - "Strong Tradition, Strong People, Strong Vision" - exemplifies its commitment to provide quality service

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to its customers and partners. Eagle is the subcontractor to BNSF for owning and operating the yard and service trucks used at the BNSF San Bernardino location.

GREG OLSHAVSKY, PRESIDENT

Greg Olshavsky is President at Eagle Intermodal Services. Greg has 40 years transportation experience, including 24 years in intermodal freight operations. He is experienced in all aspects ranging from drayage to facility operations, as well as heavy maintenance.

AL THOMPSON, REGIONAL MANAGER

Al Thompson is Regional Manager at Eagle Intermodal Services. Al has 26 years of transportation experience, all intermodal-related and in various phases of the industry.

Daylight Transport

Daylight Transport is the fastest less-than-truckload (LTL) carrier in the industry. Daylight was founded in 1977 when cross-country transit times for motor freight averaged 7 to 15 days. Since then Daylight has brought transit times down to 3 days and sometimes as short as 2 days. In the last 3 years, Daylight has grown 40% and is expecting double-digit annual growth in future years. The Journal of Commerce lists Daylight as a Top 25 LTL carrier with \$202M in revenue and one of the fastest growth rates among the top 25 operators (Journal of Commerce, 2015). Daylight serves 37 states and parts of Canada.

Daylight Transport is a pioneer in its field and is committed to long-term sustainability while pursuing its goals. Daylight was a recipient of the FY 2013-14/Year 16 Carl Moyer Program Grant to replace three yard trucks at its Los Angeles Service Center with cleaner air and more efficient versions at a value of \$236,286. In the summer of 2016, Daylight will open a new service center in Fontana, California with the goal of producing zero emissions, a first in its field. Daylight will reach this goal through a combination of Solar Power, Battery Storage, and electric vehicles, all the while supporting the local community of Fontana.

JUSTIN WEBB

Justin is an Operations Specialist at Daylight and is responsible for overseeing the planning and construction for Daylight's new facility in Fontana. This facility is intended to be a zero emission facility with solar panels, battery storage, and electric trucks. Justin is a 10 year Army veteran with two deployments in Iraq and Afghanistan. In the Army Justin held numerous leadership and project management positions, exceeding the 4,500 hour PMP requirement. He was promoted to the rank of Major and honorably discharged in April 2015. Justin has a Master of Business Administration from the University of Nebraska-Lincoln, a Bachelor of Science in Mechanical Engineering from the University of Pittsburgh, a Project Management Professional certification (license # 1746964) and a Green Belt in Lean Six Sigma.

CALSTART

CALSTART is North America's leading advanced transportation technologies consortium. As a fuel-neutral non-profit organization, CALSTART works in partnership with more than 150 firms and organizations worldwide who are committed to expanding a high-tech transportation industry that promotes clean air, greenhouse gas reductions, energy independence and economic development. For

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two decades, CALSTART has served as an effective catalyst for the global advanced transportation technology industry and continues to gain momentum as a unique and increasingly important “meeting point” between key public and private sector stakeholders in the industry.

CALSTART will provide commercialization support and provide accurate market assessment as part of this project. CALSTART has a long experience in commercialization, demonstration and field testing of advanced truck and bus technologies. Examples of past and ongoing projects include:

- Demand Assessment of First-Mover Hybrid and Electric Truck Fleets, 2012-2016
- Development of Representative Regional Delivery Drive Cycles for Heavy-Duty Truck Tractors (2014)
- CALHEAT Research and Market Transformation Roadmap for Medium-and Heavy-duty Trucks, funded by California Energy Commission, PIER Program (2013)
- I-710 Project Zero-Emission Truck Commercialization Study Final Report, Funded by Ports of LA and Long Beach (2013)
- Speeding High Efficiency Truck Adoption: Recommended Policies, Incentives and Investments (2011)
- Hydraulic Hybrid Parcel Delivery Trucks Deployment, Testing and Demonstration, funded by DOE (2014)
- Battery Electric Parcel Delivery Truck Testing and Demonstration, funded by California Energy Commission (2013)
- First Hybrid Electric Utility Bucket Trucks – Evaluation and Field Testing, funded by US Army TARDEC and DOE (2010)
- Demonstration of Medium-Duty Gasoline Hybrids, funded by South Coast AQMD (2010)
- In-Service Emissions from Model Year 2012 Hydraulic Hybrid and Model Year 2008 Conventional Diesel Package Delivery Trucks (SAE, 2015)
- Near Zero-Emission Heavy Duty Truck Commercialization Study, funded by California Energy Commission (2014)
- Demonstration and Field Testing of Advanced Technology Drayage Truck, funded by California Energy Commission (present)
- Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), funded by California Air Resources Board (2010 – present)
- As California HVIP administrator from 2010 to present, CALSTART has helped the California Air Resources Board distribute 1,912 vouchers valued at over \$53 million to 350+ fleets.

#### JEAN-BAPTISTE

Jean-Baptiste is a senior project engineer. He manages and implements data collection and analysis activities for performance evaluation projects of advanced vehicle technologies such as hybrid electric, hydraulic hybrid and battery electric vehicles, as well as lithium-ion starter batteries. Prior to joining CALSTART, Jean-Baptiste worked for PSA Peugeot – Citroën in France as a Control Systems Engineer, contributing to the conception and development of a comprehensive idle speed control system for gasoline engines meeting the latest European emissions standard. Jean-Baptiste obtained a Masters Degree in Mechanical Engineering from the Ecole Polytechnique de l’Université d’Orléans in Orléans, France with a specialty in energy and thermal systems engineering. He also holds a Certificate

in International Environmental Policy from the Monterey Institute of International Studies in Monterey, California where he studied energy policy, environmental economics, electric power systems and sustainable transportation.

MICHAEL IPPOLITI

Michael is the Director of CALSTART’s Clean Transportation Solutions Group (CTSG), the consulting business unit of CALSTART. He leads CALSTART’s work with the ports, fleet, and technology developers to improve the environmental performance of their transportation operations and advance clean transportation technology. Prior to joining CALSTART, Michael was Research Director for Telematics and Automotive at ABI Research, a noted provider of white-paper research and market forecasts in technology. Michael brings many years of automotive OEM experience, with roles in market research and product planning at Volvo Cars of North America (part of Ford Motor Company) and at the Volvo Monitoring and Concept Center, where he led projects investigating the future of mobility and automobiles. He holds a Bachelor of Science in Mechanical Engineering from Tufts University and a MBA from the Tepper School of Business at Carnegie Mellon University. He is a member of the Society of Automotive Engineers (SAE), the American Marketing Association (AMA), and the Product Development and Management Association (PDMA). He is a certified New Product Development Professional (NPDP).

*Key Personnel Table*

BYD	
Name: Brendan Riley	Hourly rate: \$250
Phone: (213) 748-3980	Email: <a href="mailto:brendan.riley@byd.com">brendan.riley@byd.com</a>
Title: VP of Fleet Sales	
Expected duties: Oversight and Review for BYD Contributions: Kickoff Meeting, Progress Calls, Progress Reports, Final Report, Weekly Meetings Following Delivery of Trucks	
Name: Andy Swanton	Hourly rate: \$200
Phone: (213) 458-6918	Email: <a href="mailto:andy.swanton@byd.com">andy.swanton@byd.com</a>
Title: Director of Business Development	
Expected duties: Involved in each BYD Contribution: Kickoff Meeting, Prep for and Contribute to Progress Calls, Prepare Progress and Final Reports, Weekly Meetings following Delivery of Trucks	
Name: Priyankar Balekai	Hourly rate: General Labor \$200
Phone: (213) 399-0339	Email: <a href="mailto:priyankar.balekai@byd.com">priyankar.balekai@byd.com</a>
Title: Director of Product Development	
Expected duties: Involved in each BYD Contribution: Kickoff Meeting, Prep for and Contribute to Progress Calls, Prepare Progress and Final Reports, Weekly Meetings following Delivery of Trucks	
Name: Brian Li	Hourly rate: \$100
Phone: (213) 748-3980	Email: <a href="mailto:brian.li@byd.com">brian.li@byd.com</a>

Title: Project Management	
Expected duties: Involved in each BYD Contribution: Kickoff Meeting, Prep for and Contribute to Progress Calls, Prepare Progress and Final Reports, Weekly Meetings following Delivery of Trucks	
Name: Michael Conner	Hourly rate: \$125
Phone: (213) 359-8065	Email: <a href="mailto:michael.conner@byd.com">michael.conner@byd.com</a>
Title: Technical Services Associate	
Expected duties: Maintenance and Driver Training	
<b>BNSF</b>	
Name: Kevin Maggay	Hourly rate: \$81.02
Phone: (562) 216-3271	Email: <a href="mailto:kevin.maggay@bnsf.com">kevin.maggay@bnsf.com</a>
Title: Senior Manager of Environmental Operations	
Expected duties: Kickoff Meeting, Weekly Meetings after Truck Deliveries, Participation in Quarterly and Final Reports	
Name: Mike Pagel	Hourly rate: \$70.01
Phone: (817) 593-4061	Email: <a href="mailto:mike.pagel@bnsf.com">mike.pagel@bnsf.com</a>
Title: Marketing Communications Professional	
Expected duties: Kickoff Meeting, Weekly Meetings after Truck Deliveries, Participation in Quarterly and Final Reports	
<b>Daylight Transport</b>	
Name: Justin Webb	Hourly rate: \$65
Phone: (724) 513-2889	Email: <a href="mailto:jwebb@dylt.com">jwebb@dylt.com</a>
Title: Operations Specialist	
Expected duties: Kickoff Meeting, Weekly Meetings after Truck Deliveries, Participation in Quarterly and Final Reports	
<b>CALSTART</b>	
Name: Jean-Baptiste Gallo	Hourly rate: \$100
Phone: (626) 744-5605	Email: <a href="mailto:jgallo@calstart.org">jgallo@calstart.org</a>
Title: Senior Project Engineer	
Expected duties: Peer Review Quarterly and Final Reports, Author Report on Market Potential for Technologies Use in this Project	
Name: Michael Ippoliti	Hourly rate: \$100
Phone: (626) 744-5600	Email: <a href="mailto:mippoliti@calstart.org">mippoliti@calstart.org</a>
Title: Director, Clean Transportation Solutions Group	
Expected duties: Peer Review Quarterly and Final Reports, Author Report on Market Potential for Technologies Use in this Project	



**Brendan S. Riley**  
778 Idle Hour Ln. Sierra Madre, CA 91024  
[brendan.riley@byd.com](mailto:brendan.riley@byd.com)  
(213)245-6503

## Experience

- 2012-Present **BYD Motors** **LOS ANGELES, CA**  
**N.A. Vice President, Fleet Sales**  
In charge of Strategy, Tactics and training curriculum; Selling battery electric Buses, Cars, Trucks, Material handling equipment. Support of P.V., Energy storage and LED sales efforts for all of North America
- Awarded the largest privately funded contract for electric buses (by Stanford University)
  - Awarded the largest US electric bus contract (25 electric buses for Los Angeles Metro)
  - Negotiated the purchase and set up of two manufacturing plants in Lancaster, California to manufacture electric buses and batteries in the US.
- 1996-2012 **PTB Sales** **Azusa, CA**  
**VP Sales and Marketing**  
In charge of Sales Strategy and Tactics for a company that designs, services and sells semiconductor and aerospace equipment
- Responsible for leading cross functional teams, helping design and develop aerospace testing hardware
  - Recognized by NASA as an expert in Vacuum Technology (still consulting as of 2015).
  - Created sales and customer support teams to generate salesforce.com reports, while analyzing data for future market deliverables. Responsible for providing feedback to product design team.
  - Ran all marketing projects: Conducted competitive analysis; formed pricing strategies.

## Education

1992-1995 **Universita di SanTommaso**  
**Rome, Italy**

B.A. Philosophy

## Organizations

Served two terms as the President of the Southern California Chapter of the AVS for Science and Technology.

## Personal

Fluent in Italian; Enjoys rock climbing, skiing, golf, running, flying fixed wing and rotorcraft.

**ANDREW A. SWANTON**  
5810 Wooster Ave  
Los Angeles, CA 90056  
aswanton@mba2012.hbs.edu  
213.458.6918

**experience**

2015-present

**BYD MOTORS**

**Director of Business Development US and Canada, Electric Trucks**

**LOS ANGELES, CA**

First hire for new zero emission electric truck team for world leader in electric buses and cars.

- Identify target markets and customers for medium and heavy duty trucks and coordinate product development.
- Building team to support product and business development for North American market.

2012-2015

**DANAHER**

**ORMCO, Medical Devices – Senior Manager**

**LOS ANGELES, CA**

Managed operations team of 50 associates to design and manufacture custom appliance for orthodontic treatment.

- Instituted productivity performance metrics for all designers and grading procedure to track and improve quality. Changed manufacturing processes to reduce waste and increase accountability among each team member.
- Improved the following performance metrics while supporting 60% year over year growth: margins from 60% to 85%; lead time from 13 to 10 days; on time delivery from 95% to 99%; and quality from 14,000 to 5,000 ppm.
- Led Customer Service Team: improved 24-hr resolution rate of email inquiries from 52% in 2013 to 89% in 2015

**ORMCO, Medical Devices – Manager Digital Customer Training and Support**

**LOS ANGELES, CA**

Oversaw launch of brand new imaging equipment in orthodontic market by building field training and support staff, creating marketing materials, and training the sales team.

- Lythos Training: built training program for product launch, including online/on-demand, in-office, and remote instruction for each new customer. Hired four fulltime staff and twelve 1099 contractors to execute.
- Lythos Technical Support: built three person team to provide remote troubleshooting.

**CHEMTREAT, Chemicals – Product Manager**

**RICHMOND, VA**

Second hire in brand new Marketing Department. Operating Company grew by double digits each quarter.

- Product Management: prioritized R&D projects by cost/opportunity; rationalized SKUs eliminating 15% of products; managed cost savings projects totaling \$1.1M in 2012; led creation of pricing tools for sales team.
- Digital Marketing: introduced digital marketing to ChemTreat - search engine optimization (+30% web visitors), pay per click, virtual trade shows, and lead nurturing programs.

2008-2010

**CAMP, DRESSER & McKEE**

**Project Engineer: Los Angeles Recycled Water Master Plan**

**LOS ANGELES, CA**

- Authored winning project proposal for design of Water Reclamation Facility to recycle wastewater into drinking water. Led \$12M project by managing team of 4 to complete design deliverables. Delivered presentations to senior Los Angeles city officials.

**Design Engineer: Haworth Water Treatment Plant Upgrade**

**CAMBRIDGE, MA**

- Promoted to hydraulic design specialist by chief engineer for \$100 million water treatment facility that serves 3 million people in Bergen County, NJ. Selected and designed all flow control devices – pumps, gates, valves, weirs, etc. Spearheaded introduction of water to new facility by organizing team of 15 engineers. Team received National Design-Build Excellence Award.

**education**

2010-2012

**HARVARD BUSINESS SCHOOL**

**BOSTON, MA**

MBA

Cameron International – summer internship at \$7.0B Oil & Gas manufacturer in Houston. Determined optimal production plan for \$25M facility with capital requirements and IRRs. Recommendations were implemented.

2007-2008

**MIT (Massachusetts Institute of Technology)**

**CAMBRIDGE, MA**

Master of Engineering. GPA: 5.0/5.0. Thesis analyzing effectiveness and adoption of low-cost water purification technologies in rural Ghana. Engineered new solution being used by 35,000 people and counting.

2003-2007

**TUFTS UNIVERSITY**

**MEDFORD, MA**

Bachelor of Science, *Magna Cum Laude*, Civil Engineering. GPA: 3.7/4.0. Tau Beta Pi Honors Society.

**personal**

Enjoy basketball, dogs, water sports, live music and comedy.

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# PRIYANKAR BALEKAI

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235 Marengo Avenue, 6C, Forest Park, Illinois 60130 | C: (708) 369-9078 | [pbalekai@gmail.com](mailto:pbalekai@gmail.com)

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## Executive Profile

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Motivated professional with 17 years' progressive experience in automotive and powertrain development, including extensive experience in product execution and business development. Consistently exceed target delivery, by managing operations through process improvement, planning, program coordination, and cultivation of strong business relationships. Build and retain high performance teams by hiring, developing and motivating skilled professionals. Proven track record of creating and implementing successful programs and long-term business strategies.

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## Skill Highlights

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- New product development
  - New business development
  - Build integrated teams
  - Engaged leadership style
  - Market research and analysis
  - Business operations management
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## Core Accomplishments

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- Restructured a business unit to profit of over \$300K in a quarter compared to a loss of \$1.5 million the same quarter the previous year by refocusing priorities and budget on existing segments and building a focused high performance team.
  - Increased OEM Customers five folds in less than two years through building mutually successful relationships with a diversified customer base.
  - Significantly improved time to market from 20 months to less than 8 months through cross-functional process and team development.
  - Board of Director, Access Credit Union Bank, Broadway, Illinois.
  - Launched 2010 emission V8 diesel engine platform from inception to production at 10% under development and product cost targets.
  - PATENTS AWARDED: 6,801,846; 6,513,507; 6,401,700 in Electronic Controls, Manufacturing Integration and Design.
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## Professional Experience

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### **Navistar Truck and Engine Corporation,**

**Lisle, Illinois**

*Technical Specialist, Navistar Product Planning and Strategy group*

*11/2013 –Current*

- Develop profitable Global powertrain and vehicle strategy to compliment North American strategy while reducing investment by customizing solutions through analyzing sales, profitability and growth opportunities for each region.
- Develop pre-charter business cases for individual engine and vehicle platforms based on global market needs and regulatory trends and present to strategy board for charter approval.
- Analyze and recommend suitable partners to senior executives for Joint Venture and Collaboration opportunities to minimize product overlap, reduce development costs and maintain brand identity.
- Develop product plans for NA and Global platforms aligned with customer needs and profitability targets.

*Director, Commercial Business Operations, MaxxForce Custom Power*

*11/2010-11/2013*

- Accountable for P&L of a new engine business venture including business development, operations and customer relationships.
- Increased revenues for the business from under \$5Million to over \$13Million within 15 months.
- Assembled a high potential team and created an effective team structure to maximize sales and customer satisfaction. Achieved and maintained affordable SG&A and development costs to turn the business profitable.
- Created breakthrough strategies to increase market share and develop new market segments by using a hands on collaborative effort with OEM customers and end customers.

- Developed and analyzed delivery and customer satisfaction metrics and led collaboration with manufacturing, purchasing and quality organizations resulting in 300% Improvement in operational efficiency.
- Developed sales opportunities in Mexico and SA through existing dealers and creating customized business plans.
- Identified and executed service and aftersales network for customers with existing dealer network and partnering with vocation specific dealers through customized service contracts.
- Responsible for negotiating and executing pricing, development and sales agreement with customers working in collaboration with legal and finance organizations.

Chief Engineer, Vee Engine Platform

08/2006-11/2010

- Successfully launched the 2010 emission V8 engine platform for multiple applications with best in class fuel economy under cost targets.
- Spearheaded the effort to negotiate with supplier to bring software and control strategy development in-house to significantly minimize development time and costs by 30% plus.
- Managed and directed a technical team of over 50 direct and indirect reports in design, calibration, electronics and mechanical development including 2 direct reports in Japan on the V6 engine program for Nissan light duty truck.
- Accountable for cross functional team including purchasing, program controllers and advanced manufacturing for project optimization of timing and total product cost including capital investment, product cost and a development budget of over \$30 Million.
- Led a technical team on Advanced after treatment system for 2010 Vee engines to accomplish optimized package and precious metal use to achieve a cost effective solution.
- Managed program team for design and development of a Tier 2 Bin 5 emissions capable engine employing advanced technology and controls.

Integration Manager, Vee Engine Platform

04/2005-08/2006

- Launched the first Navistar V6 engine product on a new class 4 & 5 vehicle platform.
- Accountable for design, calibration and reliability development for V6 engine platform.
- Led cross-functional team complete product integration including vehicle electronics, vehicle features for vocational specific use and diagnostics.
- Primary customer interface on all technical product development objectives negotiations and product performance agreements based on competitive benchmarking and end user input.

Design Product Manager, Vee Engine Platform

02/2003-04/2005

- Defined product architecture including system interfaces to achieve optimal trade-off for cost and performance.
- Prioritized drawing releases and tooling authorization to meet tooling and production lead times.
- Supervised design engineers, clerical and technical staff.

Lead System Engineer, Air-Management System

04/2001-02/2003

- Developed system and component level specifications for EGR system.
- Led Control system development of Air-management -EGR, Turbo, Intake and Exhaust systems.
- Created FMEA, DVP&R and 8D resolution for Air management components along with quality, manufacturing and development teams.

Control System Engineer, Advanced Vee Engines

09/1997-04/2001

- Implemented new rapid prototyping tool for control system development using Mat lab, Simulink and dSpace.
- Validated and tested control system concepts on engine dyno, vehicle and bench.
- Created SRS (System Requirement Specification) for production release to suppliers and contractors.

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**Education**

**Bachelor of Science: Mechanical Engineering**  
Illinois Institute of Technology

**1997**  
Chicago, IL

# Brian Li

3340 Sawtelle Blvd, Apt 308, Los Angeles, CA, 90066 | 310-801-2046 | [brian.qli@gmail.com](mailto:brian.qli@gmail.com)

## EDUCATION

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- **University of California, Los Angeles** **Sep. 2012–June 2014**
  - M.S. in Electrical Engineering, Overall GPA: 3.5/4.0 Major GPA: 3.75/4.0
- **Shanghai Jiao Tong University, China** **Sep. 2008–July 2012**
  - B.S. in Electrical Engineering, Overall GPA: 3.85/4.0 Major GPA: 3.92/4.0 Rank: 1/188
  - GRE General Test: Verbal 670(94%) Quantitative 800(94%)

## PROFESSIONAL EXPERIENCE

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### **Project Manager, BYD Motors Inc.**

**Oct. 2014–Present**

- Responsible for delivering one zero-emissions electric bus to Gardena Transit Authority: defined project scope and execution plan; generated complete schedule and milestones; specified project deliverables; managed project development and manufacturing process; estimated cost and mitigated risk; drove team to finish project on schedule
- Managing the project development for BYD electric trucks including UPS Repower project, terminal tractor, drayage truck, package delivery truck and refuse truck: developing project scope and deliverables; generating schedule and milestones; tracking status of each step during project design and production process; identifying and resolving potential risks; gathering feedback analysis and improvement suggestions from sales team and providing to engineering team; providing status reports to senior management team
- Responsible for donating one zero-emissions electric bus to Vision To Learn non-profit organization: managing project from initiation to closure; communicating between customer and production team; developing project deliverables and schedule; tracking project status and milestones; contacting with vendors for production materials; identifying and resolving potential risks; providing status reports to senior management team

### **Program Manager Intern, Beats by Dr. Dre Electronics**

**June 2013–Aug. 2013**

- Accomplished product management project *Alert Notification via BLE*: defined general idea and use case; made complete schedule and milestones; specified feature requirements and deliverables; estimated cost, labor and risk; drove team to finish the feature and deliver a prototype with demo
- Managed *Wireless Sports Headphone* project: defined target audience and use case; specified functionality and deliverables; completed evaluation and selection of technology solution suppliers; finished product requirement document and verification plan; accomplished prototype development in three phases
- Performed a detailed business plan for Beats China Micro-Launch and made complete timeline with key achievement goals in each phase; increased brand awareness and generated big buzz in China
- Conducted different technical research including BLE hardware solution and application, wearable activity tracker, streaming technology, STT&TTS software and indoor positioning technology; made recommendation for each research

### **Program Manager Intern, Microsoft Corporation**

**Sep. 2011–May 2012**

- Performed a detailed technical analysis and market assessment of leading competitors for Cloud services in China and potential impacts to the market and threats to Microsoft; accomplished the project *China Cloud Competitive Analysis*
- Assisted Shanghai Jiao Tong University in building the Hyper-V based Teaching and Research Private Cloud Platform
- Participated in a location based mobile micro-blogging service project using Windows Azure and Bing Maps

### **Consultant Intern, Accenture Consulting**

**June 2011–Aug. 2011**

- Accomplished a strategy optimization project, delivered management solutions to a leading Metal & Mining Group in China
- Researched industry performance and data online, collected 300+ industry-related documents, kicked off 3 industry reports
- Generated presentable deliverables; accomplished final presentation with optimal strategy and solutions

### **Consultant Intern, Mckinsey & Company**

**June 2010–Aug. 2010**

- Accomplished data filtration and analysis of investigation *MasterCard Usage of Foreigner in China for Short-term Trips*
- Participated in project of disposable medical supplies; designed customer survey and performed detailed market assessment
- Responsible for searching and integrating industries data information, including new energy, tourism, government etc.

## **RESEARCH EXPERIENCE**

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### **Sprite Game Display Engine Design Project**

**Sep. 2012–Dec. 2012**

- Designed a Sprite Game Display Engine with emphasis on finite-state machine and memory control
- Implemented chip synthesizer by Synopsys to do speed-area optimization

### **State Key Lab of Advanced Optical Communication Systems and Networks**

**July 2011–Jan. 2012**

- Participated in testing of modulation characteristic and power consumption of Silicon- Based two-Ring Optical Modulator
- Improved design of Silicon-Based two-Micro-Ring Optical Modulator to eliminate contradictory feature between modulation bandwidth and power consumption and thus achieve optimum solution, using MATLAB to simulate

### **Shanghai Key Laboratory of Wireless Sensor Network**

**May 2011–Sep. 2011**

- Responsible for analysis and improvement of Low Energy Adaptive Clustering Hierarchy(LEACH) algorithm
- Accomplished paper "A Routing Algorithm Based on Multi-hop Transmission of Intra-cluster for Wireless Sensor Network"

## **TECHNICAL SKILLS**

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- Computer Language: C/C++, Assembly, VHDL/Verilog
- Software: MATLAB, Multisim, Quartus II, MAX+plus II, Keil C51, ADS, Cadence, Premiere, Microsoft Office
- Good hands-on lab experience including soldering, data acquisition, demonstrated use of equipments (oscilloscope, spectrum analyzer, multi-meter, network analyzer, signal generator etc.)

# MICHAEL L. CONNER

(Formerly known as Michael L Harris, preceding a legal name change in 2009)

## SUMMARY OF QUALIFICATIONS

Diesel and automotive mechanic skills with a class A with a P endorsement CDL.  
Technical skills including welding and fabrication  
Experience in part sales and management  
Specialty skills include electrical, brakes, suspension, and trouble shooting.  
Competent with Microsoft Works, Word, Office and Excel.  
Trained in College keyboarding and Document Processing  
Administration experience including scheduling, payroll, time management.

## TECHNICAL TRAINING AND CERTIFICATIONS

ASE Master certified School Bus Technician  
ASE Master certified medium/heavy duty Truck Technician  
ASE Master certified Transit Bus Technician  
ASE Master certified Truck equipment Installation Technician  
ASE Master certified electronic truck equipment systems  
3G Welding Certification (2012)  
CAT C series engine trained  
UTI - Universal Technical Institute: Heavy Diesel  
Cummins C8.3G and C8.3G Plus  
Detroit Diesel Training  
Allison World Tech Training  
SCI CNG Tank certified  
NABI Hydraulic Fan Drive Training  
NABI Air Break Training  
Amerex Vehicle Fire Suppression Systems Certified  
Hubner Turntable Training  
Air Conditioning 608 and 609 Certification  
Twin Vision Head Sign Training  
NABI Dinex Multiplex Training  
NABI Composite Bus Collision Repair Training  
Arizona Department of Education Provisional Career And Technical Education  
Industrial and Emerging Technologies Teaching Certificate

## EMPLOYMENT HISTORY

August 2014 to Current: BYD Motors 1800 S Figueroa St Los Angeles CA 90015

### ***Field Service Regional Supervisor (Western Region)***

- Train Transit and private fleet operators on maintenance and driving of electric vehicles
- Perform maintenance at customer locations as needed
- Provide aftermarket sales support
- Manage all warranty issues on delivered vehicles

June 2013 to July 2014: **NABI** (North American Bus Industries) 106 National Drive Anniston, AL 36207

***Field Service Regional Supervisor (Western Region)***

- Work on Transit bus properties throughout the United States
- Manage all warranty issues on delivered bus lots
- Manage and Schedule Employees
- Write/Approve invoices
- Approve and track payroll
- Collaborate and confer with Regional Service Supervisors
- Assist properties with coordinating repairs
- Investigate and coordinate retrofit issues.
- Supervisor: Jim Johnson (256)-453-7181
- Salary: \$80,000.00

August 2010 to May 2013: **Maricopa Unified School District:** 44150 W. Maricopa-Casa Grande Hwy Maricopa, AZ 85138

***Mechanic/Shop Supervisor***

- Service and repair school buses
- Observe technical malfunctions and decipher course of action for repairs.
- Manage and schedule bus maintenance
- Manage and schedule employees
- Maintain part inventory
- P.R. with vendors and suppliers
- Supervisor: Fred Laguna (520)-568-5100
- Salary: \$52,000

July 2006 to August 2010: **Veolia Transportation:** 2225 W. Lower Buckeye

***Mechanic***

- Service and repair city buses
- Observe technical malfunctions and decipher course of action for repairs.
- Supervisor: Kenny Lucky (602)-256-3408
- Salary: \$27.02 hourly

February 2003 to July 2006: **NABI** (North American Bus Industries) 106 National Drive Anniston, AL 36207

***Field Service Representative***

- Work on Transit bus properties throughout the United States
- Manage all warranty issues on delivered bus lots
- Assist properties with running repairs
- Investigate and coordinate retrofit issues.
- Supervisor: Gene Smith (256)-453-7582
- Salary: \$50,000.00 plus expenses

March 2002 to January 2003: **ATC** 4811 E. Julep St. Mesa, AZ 85205

***Lead Mechanic***

- Serviced and performed repairs on 45 city buses.
- Managed the scheduling and work orders of mechanics
- Supervisor: Larry Thompson
- Salary: 19.50 hourly

April 2001 to January 2002 **Worldwide Dedicated** 2075 W. Obispo Ave. Ste 101 Mesa, AZ 85233

***Delivery Truck Driver***

- Delivered product throughout designated routes



- Kept accurate inventory of product and distribution rates
- Supervisor: Dan Bonlender (480)-544-0877
- Salary: \$26.02 hourly

September 1999 to April 2001 **Rollins Truck Leasing** 1249 W. Fairmont Tempe, AZ 85282

***Mechanic***

- Service and maintenance assigned fleet of truck and trailers
- Supervisor: Larry Hudoeck (480)-966-1426.
- Salary: \$15.75 hourly

October 2000 to March 2001 **AutoZone** (part time) 2129 W. Guadalupe Mesa, AZ 85202

***Parts, Sales Cashier***

- Sales of Auto parts
- Customer service
- Inventory and parts ordering
- Supervisor: Destry (480)-839-6111
- Salary: \$8.50 hourly (part time wages)

July 1996 to September 1999 **Arizona Autosports & Acc.** 6900 S. Priest Dr. Tempe, AZ 85282

***Owner/operator, custom automotive parts supplier, and installation shop***

- Responsible for purchasing, sales, accounting, inventory and all aspects of business ownership.
- Supervision of employees
- Supervisor: self
- Salary:\$2500.00 monthly

July1995 to July1996 **Ryder ATE** 11148 W. 48. St. Tempe, AZ 85202

***Mechanic***

- Service and maintenance of city buses
- Supervisor: Scott Wiebetow
- Salary:\$10.50 Hourly

May 1993 to July1995 **Auto Safety House** 2630 W. Buckeye Rd. Phoenix, AZ 85009

***Mechanic***

- Service and maintenance of Blue Bird school buses
- Supervisor: Phil Pollozato
- Salary:\$15.75 hourly

**EDUCATION**

August 1991 to June 1992

Universal Technical Institute (UTI), Diesel Mechanics.

3121 W. Weldon Phoenix, AZ 85019 (602)-264-4161

August 1987 to May 1991

Antelope Union High School

9168 S. Ave. 36 E. Welton, AZ.

**REFERENCES**

- **James Shropshire**  
NABI  
(256)-453-7181
- **Dan Bonlender**  
San Tan Hauling  
(480)-544-0877
- **Nick Franklin**

Auto Safety House  
(602)-689-6504

- **Tyson Stuhr**

## BNSF Resumes

### **Kevin Maggay – Project Lead Staff Senior Manager Environmental Operations BNSF Railway**

Mr. Maggay has 13 years of experience focused on air quality in the transportation and goods movement sector. Three years were spent in private consulting, eight years with the Port of Los Angeles, and almost 2 years with BNSF Railway. His experience includes air quality modelling, grants, and policy issues. In the technology advancement arena, Mr. Maggay has been quite active. With his counterparts at the Port of Long Beach he developed, implemented and managed the San Pedro Bay Ports Technology Advancement Program and co-authored the San Pedro Bay Ports Roadmap to Zero Emissions policy document. He also has applied for, received, and distributed numerous grants in a total amount of over \$75 million for goods movement sources including vessels, harbor craft, locomotives, on-road trucks and cargo handling equipment, with a focus on zero emission technologies. Mr. Maggay has a degree in Environmental Studies from the University of Southern California as well as a Global Logistics Specialist designation from California State University Long Beach. Below are selected projects that display Mr. Maggay's experience relevant to this grant.

#### **California Air Resources Board Air Quality Improvement Program**

DPF on switching locomotive - Received and managed grant in the amount of \$346,178.

#### **Other California Grants Received**

<b>Grant</b>	<b>Project Type</b>	<b>Amount</b>
CARB - Prop 1B	Truck Replacements	\$49,000,000
EPA – DERA ARRA	Diesel emission reduction for multiple port sources	\$1,900,000
CARB – Prop 1B (AQMD)	Repower four locomotives	\$3,000,000
CARB – Prop 1B (AQMD)	Repower six locomotives	\$4,500,000
Carl moyer (BAAQMD)	Repower six locomotives	\$6,617,196
CARB – ARRA	Repower/replace 11 locomotives	\$8,886,000

#### **Zero Emission Project Grants Administered**

<b>Project (Technology Provider)</b>	<b>Amount</b>
Electric On-Road Truck (International Rectifier)	\$175,000
Electric On-Road Truck (TransPower)	\$150,000
Electric Yard Tractor (Balqon)	\$263,500
Hybrid yard tractor (US Hybrid)	\$300,00
Hybrid yard tractor Phase II (US Hybrid)	\$13,000
Hydrogen on-road truck (Vision)	\$95,625
LNG on-road truck (Westport)	\$250,000
CNG on-road truck (SoCalGas)	\$111,577
Plug-in hybrid on-road truck (International Rectifier)	\$175,000

**Mike Pagel – Project Support Staff**  
**Manager of Intermodal Equipment Business Unit Operations**  
**BNSF Railway**

Mike Pagel has been Manager of Intermodal Equipment Business Unit Operations at BNSF Railway since July 2015. In this role, Mike supports the intermodal equipment group to drive efficiencies and growth within the business unit. Mike joined BNSF in 2008, serving for five years as Manager of Marketing Communications before being promoted Manager of Marketing Reporting & Analysis in January of 2013. Mike earned a Bachelor's degree from the University of North Texas and completed the Marketing Communications Executive Education program at the University of Wisconsin.

**Brant Ring – Project Support Staff**  
**Assistant Vice President, Intermodal Hub Operations**  
**BNSF Railway**

Brant Ring is Assistant Vice President of Intermodal Hub Operations at BNSF Railway. In this role, he is responsible for safety and service performance across BNSF's intermodal and automotive facilities network. Throughout his career, he has held a variety of line and staff roles with progressive leadership responsibility in Operations, Finance, Network Strategy and Marketing.

## **JUSTIN T. WEBB**

15767 Flight Ave  
Chino, CA 91708  
Cell: (724) 513-2889  
jwebb@dylt.com

### **EDUCATION**

**University of Nebraska**, Lincoln, Nebraska

**M.B.A., Finance Specialization, 2014, Beta Gamma Sigma Honor Society, GPA 3.813**

**University of Pittsburgh**, Pittsburgh, Pennsylvania

**B.S., Mechanical Engineering, 2005, GPA 3.099**

**Project Management Professional**, License Number 1746964

**Lean Six Sigma Green Belt**, Headquarters Department of Army Certified

**April 2015 to Present: Operations Specialist (Daylight Transport)** Project Manager responsible for the resource, coordination, management, collaboration and execution of a 100 door service center to be completed and fully functional no later than June 2016. Additionally responsible for researching and implanting all technology necessary to achieve a zero-emission facility. Additional duties include research, consolidation and communication of all operations training resources.

### **United States Army Experience July 2005 to April 2015:**

**May 2013 to April 2015: Senior Aviation Analyst** Supervisor of 13 military and civilian personnel of an aviation training analysis and feedback team at the National Training Center focused on problem detection, prevention and solutions for the team as well as data collection, analysis and preparation of formal battalion performance reports for ten aviation battalions of over 400 Soldiers per year. Team supply officer responsible for ordering, processing and delivering all team supplies and accountable for all team property valued over \$7.5 million. Maintain proficiency in Bell 206 helicopter.

- Led Lean Six Sigma process improvement project that increased the simulated kinetic war fighting operational rate from 83% to 98%; the highest ever recorded in team history at the National Training Center.
- Initiated a supply program that succeeded in the turn-in and redistribution of \$1.3 million in excess inventory.
- Rated as one of the best of sixteen captains in annual performance report; selected for promotion to major.

**October 2011 to May 2013: Company Commander** Led all operations, training, administrative, maintenance and logistics support functions for 46 personnel and over \$42 million in equipment and ten Bell 406 helicopters in Afghanistan, stateside and during five training exercises; served as air mission commander and pilot in command.

- Planned, resourced and executed a three year training cycle in six months despite over 50% personnel turnover; company recognized by commander as the most combat effective in task force during month long exercise.
- Led a maintenance program that achieved a 100% mission support rate while flying the most hours in the battalion.
- Developed leadership program that advanced 20 pilots in command and 14 air mission commanders; the most in the battalion; created platoon leader training guidance for battalion that resulted in 100% promotion rate for lieutenants.
- Rated number one of six company commanders in battalion and three of thirty in brigade on performance report.

### **July 2005 to October 2011: Professional Developmental Assignments**

- **Aviation Assistant Operations Officer:** Project manager responsible for training resources; developed and executed a month long exercise for over 400 Soldier battalion at an off post location validating combat readiness of battalion for Afghanistan; resourced, coordinated and executed week long joint exercise with U.S. Border Patrol confiscating 50 kilograms of narcotics and 20 drug traffickers; facilitated over 500 combat missions as a battle captain in Afghanistan.
- **Combat Engineer Platoon Leader:** Manager for 28 personnel and over \$3.5 million in equipment; led over 100 combat missions to clear 192 kilometers of highway and repair routes in Iraq; coordinated and managed military and contracted resources to disrupt 90 culverts and repair over 300 bomb craters in Iraq, reducing effective improvised explosive device rates by as much as 100% throughout the area of operation; earned company the acclaim the most effective engineer company in north Iraq; rated number two of twenty platoon leaders; selected for flight school.
- Completed Engineer Officer Basic Course, Airborne School and Ranger School from July 2005 to August 2006.

# Michael A. Ippoliti, MBA, NPDP

CALSTART CLEAN TRANSPORTATION SOLUTIONS GROUP

Pasadena, CA

**DIRECTOR | PROGRAM MANAGER | NEW BUSINESS DEVELOPMENT**

2009 - Present

- ▶ Leading projects and writing grant applications and public outreach communications with partners such as Union of Concerned Scientists, California Energy Commission, Ports of Los Angeles and Long Beach, and private industry. Overseeing efforts driving advanced technologies forward to commercialization.
- ▶ Proactively managing ongoing project accelerating the commercialization of Zero-Emission Class 8 drayage trucks as part of the I-710 corridor expansion. Designing and leading user input data collection, technology expert interviews and business case analyses. Evaluating potential technologies, guiding market analysis & planning, conducting quantitative and qualitative analyses.
- ▶ Program Manager for \$32.7 Million Clean Truck Demonstration project funded by the California Energy Commission (\$18 Million in grants). Leading administrative processes; coordinating and managing 10 teams with over 25 participating companies developing multiple clean-tech vehicles.

INNOVATION CONSULTANT

Long Beach, CA

**NEW PRODUCT DEVELOPMENT ROBOTICS STARTUP**

2008 - 2009

- ▶ Planned and executed qualitative concept testing for new product concept; results presented via interactive video highlight session with client team and senior management.
- ▶ Consulting with senior management on structure for ideation opportunity assessment, developing product roadmap and marketing/functional requirements documents (MRD/FRD).

ABI RESEARCH

Long Beach, CA | Oyster Bay, NY

**Organizational Impact | Contributions:**

- ▶ Facilitated corporate communication and promotions through presentations and interviews including *Information Week*, the *New York Times*, and *Time Magazine*. Authored influential white papers, and edited researcher output for internal use.

VOLVO CARS NORTH AMERICA

Irvine & Camarillo, CA | Rockleigh, NJ

**PRODUCT STRATEGY MANAGER**

2004 - 2007

**MARKETING INTELLIGENCE MANAGER, NORTH AMERICA**

2002 - 2004

**BUSINESS DEVELOPMENT MANAGER, VMCC**

2000 - 2002

**MARKET RESEARCH SPECIALIST**

1997 - 1999

- ▶ Developed cross-platform North American product strategy and future SUV carlines roadmap, interpreted advanced technologies strategies to support informatics product roadmaps. Concept testing for in-development small SUV.
- ▶ Represented North American market in global brand definition project, developing "Volvo Brand Book" as communications tool for worldwide brand management (2002-2004).
- ▶ As Market Intelligence Manager, supervised all market research in North America. Worked closely with US and Swedish managers, directed a 4+ international staff, and maintained a \$2.5M budget.
- ▶ At VMCC, led research efforts contributing to award winning Safety Concept Car unveiled at 2001 NAIAS (Detroit Auto Show). Worked directly with designers and engineers; presented regularly to senior Volvo executives.

## LEARNING CREDENTIALS

**MBA – MARKETING & PRODUCT DEVELOPMENT**

Carnegie Mellon University GSIA, Tepper School, Pittsburgh, PA

**BACHELOR OF SCIENCE – MECHANICAL ENGINEERING | ERGONOMICS MINOR**

Tufts University, Medford, MA

**Additional courses, seminars and workshops include:**

Ergonomics & Engineering Design – Tufts University Graduate School of Engineering Design

Project Management and Microsoft Project – Cal State Long Beach Extension

Certified New Product Development Professional (NPDP) – Product Development & Management Assoc.

# Jean-Baptiste Gallo

Pasadena, CA 91106 • cell: (510) 910-1215 • [jbegallo@gmail.com](mailto:jbegallo@gmail.com)

## Clean Transportation Professional with specialization in Electric Vehicle-Grid Integration

- Almost 7 years of experience in research, development & commercialization of clean transportation technologies.
- Excellent research, analytical and problem solving skills.
- Proven ability to successfully lead and support complex projects which bring together diverse stakeholders.
- Strong communication, interpersonal and leadership skills.

## PROFESSIONAL EXPERIENCE

### Senior Project Engineer

April 2011 to present

*CALSTART, Pasadena, California*

- Successfully led and supported all data collection and analysis projects to assess the performance and market viability of advanced vehicle technologies such as plug-in hybrid, battery electric, CNG and fuel cell vehicles.
- Contributed to the development of innovative, accurate, timely and high quality market research and analysis reports in areas such as electric vehicle-grid integration, market sizing and demand evaluation and commercialization roadmap for alternative fuels and advanced vehicle technologies.
- Presented at major national and international workshops, conferences and webinars. Published several peer-reviewed articles, conference papers and project reports.
- Led several internal sustainability efforts, which save about \$18,000 in utility costs and offset over 85 metric tons of CO<sub>2</sub> per year.

### Control Systems Engineer

March 2007 to August 2009

*Powertrain Conception & Development Department, PSA / Peugeot – Citroën, Paris, France*

- Contributed to the conception and development, from initial stages to final delivery, of a comprehensive control system to manage the idle speed process of energy efficient gasoline engines.
- Became a dependable member of the department, consistently delivered imaginative computer models and demonstrated creative problem solving abilities testing prototype vehicles.

## EDUCATION

### Certificate in International Environmental Policy

May 2010

*Monterey Institute of International Studies, Monterey, California*

- Cumulative GPA: 3.9
- Focus of Study: Energy Policy, Environmental Economics, Electric Power Systems, Sustainable Transportation

### Master's Degree in Mechanical Engineering

December 2006

*Ecole Polytechnique de l'Université d'Orléans, Orléans, France*

- Degree Concentration: Energy and Thermal Systems Engineering
- Exchange student at the University of Miami, Florida from January to May 2006
- Computer Modeling Intern at the Josef Božek Research Center of the Czech Technical University in Prague, Czech Republic from June to November 2006

## LANGUAGES

Native French and fluent in English (oral and written).

## COMPUTER SKILLS

Operating systems: Windows 7 / Mac OS X

Computer programming/modeling: Simulink/Stateflow 7.1 (advanced), Excel VBA (intermediate)

Special skills: Excel 2010 (advanced), MATLAB 7.1 (intermediate), Microsoft Project 2010 (beginner)

## ADDITIONAL INFORMATION

- Completed several UCLA Extension project management classes in 2011-2012.
- Member of the Shell Eco-marathon student association of the *Ecole Polytechnique de l'Université d'Orléans* from 2004 to 2005 (a race where the winning car travels the greatest distance using the least amount of fuel).





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## Attachment 2 – Project Executive Summary

**Title:** Multi-Class Heavy-Duty Zero-Emission Truck Development Project for Intermodal and Warehouse Facilities

**Applicant:** San Bernardino Associated Governments (SANBAG)

**Technology Demonstrator:** BYD

**Objective:** Demonstrate zero emission yard tractors and service trucks at three critical freight locations in Southern California. Successful demonstration will provide a model for the electrification of similar equipment at other major freight support facilities in California and throughout the rest of the world.

**Description:**

This project will demonstrate Class 8 heavy duty Yard Tractors and Class 5 medium duty Service Trucks. These two trucks are used at every major freight location in the United States, so this project will provide a model for truck electrification that can be scaled to any facility. The project operators are best in class freight companies: BNSF, the largest intermodal rail provider in the United States; and Daylight Transport, a leading national LTL carrier. Each of the three locations in this project will demonstrate both vehicle types for a total of 23 yard trucks and 4 service trucks, providing a range of data and reducing 1,745 tons of carbon dioxide equivalents per year and 1.65 tons of criteria pollutants per year.

The emphasis of this project are 80,000 lb. GCWR yard tractors, which are ideal trucks to electrify because the duty cycle is short, they operate in contained locations, requirements are less stringent for off-road vehicles, and there is a large market for the trucks. Furthermore, the commercialization of yard tractors will pave the way for the technology transfer to other medium and heavy duty trucks. BYD is the original equipment manufacturer for this project. BYD is currently the world leader in EV car, bus, and taxi sales and their next target market is trucks. All trucks in this project (with the exception of the prototypes) will be manufactured in California and all trucks will be operated within disadvantaged communities. Trucks will be delivered in two phases, with lessons learned from phase one incorporated in the phase two deployment. CALSTART will assist with testing and commercialization efforts. Project outcomes and data will ultimately be utilized to help inform the marketplace and pave the way for widespread commercialization of the tested vehicles.

**Total Budget Amount:** \$19,312,972

**Grant Request:** \$9,100,800

**Comment:** While SANBAG and this partnership have spent extensive effort and time developing this project, we are extremely open to working with ARB should it be determined that modifications to size, scope, and cost of the proposal would be appropriate.



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## Attachment 3A – Project Narrative

### *Overview*

San Bernardino Associated Governments (SANBAG), the applicant for the proposed project, is requesting \$9,100,800 in grant funding from ARB to combine with \$10,212,172 in match funding for a total project budget of \$19,312,972 to fund the “Multi-Class Heavy-Duty Zero-Emission Truck Development Project for Intermodal and Warehouse Facilities” project. The purpose of this project is to demonstrate zero-emission battery electric technologies to replace the two most common trucks at freight support facilities across the United States: Class 8 Yard Trucks and Class 5 Service Trucks. Both of these trucks are in the pre-commercialized stage. However, the technology demonstrator for the proposed project, BYD, is currently developing prototypes and manufacturing capabilities to support the expected rapid growth of these product lines. Both trucks will be powered entirely by BYD’s innovative electric propulsion systems, including iron phosphate batteries, inverters, and traction motors.

The end users that will be demonstrating the technologies are best in class. BNSF Railway, the largest intermodal rail operator in the world, is the principal technology demonstrator and will be demonstrating 10 yard trucks each at two different facilities in disadvantaged Southern California communities, for a total of 20 yard trucks. Daylight Transport, a leading national LTL provider, will be demonstrating an additional 3 yard trucks at a new facility in Fontana that will be supported with battery storage and solar. All three of these locations will also be demonstrating a total of four medium duty service trucks, which are used to provide maintenance and service support for yard tractors, rubber tired gantry cranes, and forklifts, and have the ability to serve in multiple other capacities and environments, which enhances future commercialization prospects.

The BNSF locations that these trucks will be deployed at are San Bernardino and Commerce. San Bernardino is a 154 acre facility that currently utilizes 55 yard trucks. The yard trucks are owned and operated by a subcontractor, Eagle Intermodal, which is a national company that primarily services the trucking operations at Class 1 railroads. Commerce is a 48 acre facility. The trucking operations at this facility are provided by Parsec, another subcontractor that primarily services Class 1 railroads. Eagle Intermodal and Parsec are national companies servicing intermodal terminal operations, combined servicing about 36% of BNSF intermodal volume, in addition to their work for other North American Railroads.

BYD will be manufacturing the trucks deployed in this project at its manufacturing facilities in Lancaster, CA. BYD is the top global seller of electric cars, taxis, and buses. The next focus area for BYD is medium and heavy duty trucks. This project will help accelerate BYD’s investment in California-based resources to both develop and manufacture electric trucks. For the North American market, all of these trucks will be manufactured in California at the Lancaster manufacturing plant. BYD also has plans to build additional dedicated facilities to support high volume product lines, with land already reserved with the City of Lancaster. With regional headquarters in Downtown Los Angeles, BYD is fully committed to California and intends all future business growth to provide jobs and economic development to the State. BYD’s commitment to job growth and investment in California recently led to it being awarded a \$3 million income tax credit from Governor Brown’s Office of Business and Economic Development.

This project is authored by SANBAG, who will also provide administrative oversight throughout the duration of the demonstration. More information on SANBAG and its history of administering

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similar projects is included in Attachment 1 – Applicant Qualifications. Each of the project partners described above and listed in Attachment 1 – Applicant Qualifications have read the Sample Agreement provided in Appendix B of this solicitation. Finally, SANBAG is proud of the strong community support for its proposed project. The level of community buy-in is represented in the diverse support letters SANBAG has received: from Southern California Edison, the American Lung Association, Mayor Pro Tem of Fontana Michael Tahan, San Bernardino Mayor R. Carey Davis, local Congressman Pete Aguilar, and local State Senator Connie Leyva.

#### *Applicant Qualifications*

As discussed at length in Attachment 1 – Applicant Qualifications, SANBAG has managed multiple technology demonstration projects and air quality reduction programs in the past. This is directly relevant to the needs of the proposed project and to meeting ARB's goals for the Multi-Source Facility Grant Solicitation. SANBAG's experience positions the organization well to successfully and efficiently execute the proposed project. Examples of past projects include the Ryder Alternative Fuels Demonstration Project, which involved 202 heavy duty clean energy vehicles, and the Interstate Clean Transportation Corridor project, a multi-jurisdictional effort to expand access to alternative fuel infrastructure stations across the Western United States. More information on these past successful projects is included in Attachment 1 – Applicant Qualifications. SANBAG's experience, strong staff and base of resources will give the ARB confidence that the proposed project will be executed and guided to a successful conclusion that ultimately furthers market commercialization of the tested technologies. As an expression of SANBAG's desire to put forward an excellent proposal that exceeds the minimum requirements outlined in the solicitation manual, SANBAG is very open to working with ARB to modify the proposal as the Board and staff sees beneficial, to hosting ARB staff and leadership as the project is being executed, and then engaging after field demonstrations have ended around the goal of sharing the lessons learned with the broader marketplace.

#### *Project Team Capabilities and Degree of Industry Collaboration*

SANBAG has assembled a highly experienced team of industry-leading partners to help facilitate the successful execution of the proposed project. This project already includes all the participants needed to execute the project, allowing for a quicker project start time and a more streamlined timeline. To this end, there is already full commitment among all project partners, roles have been clearly delineated, and all project partners have already begun taking steps to prepare to immediately begin moving the project forward upon awarding of grant funding from the ARB. SANBAG believes the level of collaboration and buy-in from such prominent intermodal rail and LTL carrier partners is unprecedented. As such, the results of this project will be of intense interest to the intermodal rail and LTL carrier industries, which as a whole have yet to embrace zero emission technologies. In other words, the commercialization prospects and the partnerships that are being formed because of this proposed project, are extremely significant. SANBAG also wants to stress that all the key staff participating in this project, including those from project partners, are best in class and bring to the table a wealth of combined expertise and real-world experience working on advanced vehicle technology demonstration projects, including previous AQIP projects. Project partner qualifications, descriptions of the roles and work to be performed by each of the project partners, and qualifications of key staff have all been addressed at length in Attachment 1 – Applicant Qualifications. Below is a high-level summary of the project partners, their roles and work, and their relevant qualifications.

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**BYD Motors** will serve as the **technology demonstrator** for the proposed project and will be providing the 23 battery electric yard trucks and 4 battery electric service vehicles. BYD Motors' experience in participating in advanced technology demonstration projects will help facilitate the successful execution of SANBAG's proposed project. Recent projects include serving as the technology demonstrator for the Los Angeles Department of Transportation and a successful demonstration and expansion of zero emission vehicle technology at Stanford University. BYD is fully committed to utilizing all results, data and lessons learned from the proposed project to further its efforts to achieve widespread market commercialization for its battery electric yard trucks and service vehicles. Outcomes from the proposed project will also inform BYD's efforts to introduce other vehicle models into the market over the next several years. Brendan Riley, BYD's Vice-President in charge of medium and heavy duty trucks, and Andy Swanton, BYD's Director of Business Development for North America, will serve as lead BYD staff for the proposed project (qualifications for both are discussed in Attachment 1 – Applicant Qualifications).

**BNSF** will serve as the **end user** for the proposed project at two of the three project locations. BNSF Railway is the world's largest intermodal freight provider, having transported an average of about 4.6 million domestic and international intermodal shipments every year over the last five years. BNSF's San Bernardino intermodal facility is a 154 acre facility that handles an average of six inbound and five outbound trains per day and has a fleet of 55 yard hostlers. BNSF's intermodal facility in Commerce covers 48 acres and processes one inbound and one outbound train each day, and has a fleet of 10 yard hostlers. In addition to serving as the end user, BNSF's role will also be to assist in planning the field demonstration, and then help oversee and manage the day-to-day field demonstration. Beyond the planning and execution of the field demonstration itself, BNSF is fully committed to partnering with SANBAG, BYD, CALSTART and the other project partners to leverage the results of the field demonstration in order to further market adoption of the tested zero emission yard trucks and service vehicles. As the world's largest intermodal freight provider, BNSF has the ability to meaningfully move the dial forward in the freight sector in terms of adopting zero emission technologies. BNSF has already previously partnered with government agencies, including the Air Resources Board, on a number of environmental and technology demonstration grant projects. For example, BNSF has received over \$23 million in grant funding from California programs such as Prop 1B, Carl Moyer, as well as the American Recovery and Reinvestment Act to fund the repower and/or replacement of older highly polluting locomotives. As part of its ongoing commitment to environmental stewardship, BNSF looks forward to working with the ARB, SANBAG and its project partners on executing the proposed SANBAG project and then using project outcomes to inform future procurement efforts by purchasers, including BNSF itself. Kevin Maggay, BNSF's Senior Manager of Environmental Operations, will serve as BNSF's lead staffer for the proposed project (qualifications are discussed in Attachment 1 – Applicant Qualifications).

**Daylight Transportation** will serve as the **end user** for the proposed project for their new facility in Fontana. Daylight is currently the fastest less-than-truckload (LTL) carrier in the industry. Daylight Transport is a pioneer in its field and is committed to long-term sustainability while pursuing its goals. To this end, Daylight was a recipient of the FY 2013-14/Year 16 Carl Moyer Program Grant to replace three yard trucks at their Los Angeles Service Center with cleaner and more efficient models at a value of \$236,286. In the summer of 2016, Daylight will open a new service center in Fontana, California with the goal of producing zero emissions - a first in its field. Daylight will utilize the results and lessons learned from this project as part of its commitment to serve as a model for other LTL carriers interested

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in adopting zero emission technologies. Justin Webb, Daylight's Operations Specialist for its new Fontana site, will serve as Daylight's lead staffer for the proposed project (qualifications are discussed in Attachment 1 – Applicant Qualifications).

Finally, **CALSTART** will provide project support, including efforts around data analysis and market commercialization. CALSTART's work to advance commercialization of zero emission vehicle technologies has long been instrumental in growing markets for zero emission vehicles. CALSTART's contribution to the proposed SANBAG project will directly lead to improved commercialization prospects for the tested yard trucks and services vehicles, and will help pave the way for market commercialization for other zero emission heavy duty vehicles as well. Jean-Baptiste, a senior project engineer with experience working on advanced vehicle technology projects, will serve as CALSTART's lead staffer for the proposed project (qualifications are discussed in Attachment 1 – Applicant Qualifications).

#### *Project Objectives, Work Plan and Schedule*

The project will demonstrate pre-commercial zero emission battery electric yard trucks and service vehicles in two distinct environments, intermodal rail yards and LTL yards, within three disadvantaged communities. By utilizing diverse vehicle types that take advantage of the same charging infrastructure, each freight facility will showcase the flexibility and commercial viability of battery electric technology within the California freight marketplace. When combined with rigorous data collection, SANBAG's proposed project will generate technical analyses that will aid the general market to make informed purchasing decisions and catalyze market penetration of zero emission technologies. SANBAG, in conjunction with CALSTART, will work with BYD and its end users, BNSF and Daylight, to ensure data will be collected and then reported to ARB's third-party data analysis provider as required. In the end, the project will strengthen the business case for commercial zero-emission technology while providing emissions benefits to disadvantaged communities, thereby meeting and exceeding the stated goals of the Multi-Source Facility Solicitation and ARB's FY 14-15 Funding Plan. Finally, it is worth mentioning that the utility provider for the proposed project, Southern California Edison, is in full support of this project and incorporates renewable energy sources as part of its total energy portfolio.

In terms of resource acquisition, the project's yard trucks, service vehicles and associated vehicle-specific charging equipment will need to be provided by BYD for each of the performance sites. The chargers were purpose-built to support BYD's trucks and can charge at a rate of 200 kW, which will meet the needs of the trucks at each location. No comparable alternatives are currently available at any of the three project sites. No mobile refueling will be included in the project. The project will utilize existing grid electricity provided by Southern California Edison (SCE). Supply upgrades are expected for each facility, the cost of which is expected to be covered under SCE's Rule 15 and Rule 16 line extension programs. There will be an estimated \$10,000 engineering fee for each location that will be paid by BNSF and Daylight. Discussions from SCE indicate that the electricity demand for each of the three sites will not have negative impacts for the grid. BNSF and Daylight have estimated the cost of facility upgrades after the point of service from SCE, as well as charging infrastructure installation costs, which are included in the project budget. The locations of the proposed chargers are shown in Attachment 3C – Specifications and Images and the cost estimates for facility upgrades and charger installation is shown in Attachment 5B – Budget Breakdown.

Below is a high-level work plan that describes in sequence the tasks associated with the proposed project, as well as budget milestones and planned completion dates. Attachment 3D – Work Plan contains a more detailed work plan and schedule. Also below is a Gantt chart of the proposed project schedule that shows estimated durations for each task. Extensive thought and work has been

put into crafting this work plan; however, SANBAG is committed to working with the ARB to incorporate feedback from staff in order to ensure the best possible project work plan is implemented.

- Task 0 SANBAG will act as administrator throughout the project.
- Task 1 Contracting and Project Kickoff (SANBAG): **Deliverable Due Date: January 8, 2016**
- Task 2 Product Testing and Registration – acquire EPA and CARB Certifications (BYD):  
**Deliverable Due Date: April 1, 2016**
- Task 3 Electric Vehicle Supply Equipment (EVSE) Installation (BNSF/Daylight): **Deliverable Due Date: July 1, 2016; BNSF/Daylight Disbursement Request: \$1,191,800**
- Task 4 Delivery of Phase 1 Trucks (BYD): **Deliverable Due Date: July 1, 2016; BYD Disbursement Request: \$3,174,000**
- Task 5 Fleet Integration of Phase 1 Trucks (BYD/BNSF/Daylight): **Deliverable Due Date: August 1, 2016**
- Task 6 Market Assessment (CALSTART): **Deliverable Due Date: September 1, 2016; CALSTART Disbursement Request: \$120,000**
- Task 7 Phase 1 Demonstration (All Project Partners): **Deliverable Due Date: March 1, 2017**
- Task 8 Customer Outreach (BYD/CALSTART): **Deliverable Due Date: April 1, 2017; CALSTART Disbursement Request: \$150,000**
- Task 9 Phase 1 Truck Reworks (BYD): **Deliverable Due Date: June 6, 2017**
- Task 10 Continue demonstration of Phase 1 trucks (All Project Partners): **Deliverable Due Date: April 1, 2019**
- Task 11 Truck Production for Phase 2 (BYD): **Deliverable Due Date: July 7, 2017; BYD Disbursement Request: \$4,380,000**
- Task 12 Integrate Phase 2 Trucks (BYD/BNSF/Daylight): **Deliverable Due Date: August 1, 2017**
- Task 13 Phase 2 Demonstration (All Project Partners): **Deliverable Due Date: April 1, 2019**
- Task 14 Commercialization Roadmap (BYD/CALSTART): **Deliverable Due Date: April 1, 2019; CALSTART Disbursement Request: \$85,000**



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### *Budget*

The total cost of this project will be \$19,312,972. SANBAG and its project partners have the financial ability to easily exceed the minimum 25% match. With a cash match of \$8,132,875 and an in-kind match of \$2,088,297, the actual match makes up 53% of the overall project cost and far exceeds the 10% minimum cash match and 25% total match requirement. SANBAG will provide \$148,400 and BYD will provide \$1,821,014 toward match, while BNSF will provide \$6,524,380 and Daylight will provide \$1,699,378 in match funding. These large match commitments demonstrate the level of project buy-in on behalf of the project partners. Of note, this project is not dependent on any other grant award. Letters of Commitment from each third party can be found in Attachment 8 – Letters of Commitment. Finally, it is worth stating that all project partners are financially stable, well capitalized and adhere to the types of budgetary best practices that ensure each project partner can successfully meet its match commitment. And SANBAG is committed to a level of prudent fiscal oversight of the project that meets and exceeds ARB's requirements, with the goal of executing the type of project that ARB can point to in future years as a model of success.

The budget is summarized in the table below. The table includes the source of funding for each task, the amount of funds for each task, and the amount of the funds that are being used as match for the project. The cost of data loggers is included in the budget. A complete budget that breaks down all expenditures and the source of funds is included in Attachment 5A – Proposed Budget, Project Milestones, and Disbursement Schedule.

<b>Equipment and Installation</b>	<b>Data Collection</b>	<b>Administrative</b>	<b>Cash Match</b>	<b>In-Kind Match</b>	<b>Total</b>
<b>\$8,691,800</b>	<b>\$54,000</b>	<b>\$355,000</b>	<b>\$8,123,875</b>	<b>\$2,088,297</b>	<b>\$19,312,972</b>

### *Technology*

#### Innovation

The technologies in this project are innovative because for the very first time an original equipment manufacturer will be manufacturing every major electric propulsion component. Electric trucks have a promising future as environmentally friendly, quiet vehicles that have significant operational savings relative to diesel. One of the current hurdles with electric technology is ensuring that each of the electric components communicates seamlessly with the other components. The discharge from the batteries needs to be closely controlled to ensure that power is delivered promptly and reliably to the traction motors. Otherwise, operators will experience irregular propulsion and even scenarios where a truck will not respond to the throttle. These scenarios result in frustration among operators and safety hazards.

BYD's hallmark on all products has been and will continue to be vertical integration. This approach began with consumer electronics, with BYD manufacturing every component themselves, including batteries, power relays, film capacitors, flexible printed circuits, camera lenses, camera modules, connectors, cosmetic casings, LCDs, microelectronics, and chargers. BYD has taken the same



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approach with its vehicles by making every critical electric propulsion component, including batteries, inverters, traction motors, and all supporting electronic components. This innovative approach has resulted in high performing buses, taxis, and cars. BYD is transferring the same core technologies into its truck models.

BYD's battery innovation underpins all of its vehicles. The batteries are proprietary iron phosphate (Fe) batteries that were purpose-built for transportation and have three distinct advantages relative to competitive technologies: 1) They are long-lasting and retain 70% charge after 10,000 cycles compared to other lithium ion batteries that rapidly degrade after 2,000 cycles or 5-6 years of regular use; 2) They are extremely safe. The chemical reaction in BYD's cells is not an exothermic reaction, so there are no hot spots and the cells are unlikely to overheat or catch fire. Furthermore, there is no oxygen released during charging or discharging, so there is no catalyst for combustion. Lastly, BYD's Fe cells do not swell or "pillow" over time, so there is reduced risk of leakages or ruptures that could lead to fires. 3) They are environmentally-friendly. The primary components in BYD's Fe batteries are iron and phosphate. Iron is the most common element on earth by mass and phosphate is naturally occurring in the environment and is used in household detergents. The electrolyte is also non-toxic. Competitive batteries use both heavy metals and toxic electrolytes. The Fe battery is a large step forward for the electric transportation market and because it is a relatively new technology it is at the beginning of its technological maturation curve, so the performance, energy density, and price are all expected to improve in future years.

Other innovative features of the technology include the following: 1) BYD's BMS System – The batteries will be monitored, diagnosed, and controlled by BYD's proprietary battery management system (BMS), which closely monitors the voltage, temperature, and charge and discharge rates from each individual cell, module, and pack. 2) BYD's Inverters: BYD also manufactures the inverters responsible for converting AC power from the chargers to DC on board the vehicle to charge the batteries and for inverting the DC power from the batteries to AC to power the traction motors. BYD's inverters are bi-directional, which means that vehicle owners can discharge any excess power back to the grid or any other load source whenever they choose. This power can therefore serve as a backup generator to keep critical services running or perform peaking services for utilities. 3) BYD's Traction Motors: The traction motors used in each vehicle were developed by BYD and are already in use in various vehicle types. These motors are permanent magnet (neodymium) synchronous motors (PMSM) and consist of a stator and rotor assembly. 4) BYD's Data Loggers: All BYD trucks will be equipped with a health activity monitoring system (HAMS) as part of the chassis module control. This device is provided by I/O Controls, who will ensure that the data is available. The HAMS provides the ability to monitor all performance parameters in real-time from a cloud-based server, including fuel efficiency (miles/kWh), Strength of Charge (SOC), mileage/odometer readings, runtime, idle time, battery temperature, speed, and charging current/voltage. ARB and ARB's data analysis partners will be able to access the data from a web-based server. The data will be presented in chart format and will also be available for download as an excel file. Furthermore, the HAMS is more than just a data logger. It also has the ability to coordinate the charging profile of all of the vehicles to help smooth power demand. An algorithm will determine when to start/stop charging based on commands from the web server. 5) BYD's Chargers: BYD utilizes 3-phase AC charging because it is a reliable solution that is also cost effective. No transformers are required and the AC power that is delivered to the vehicle is converted to DC power to charge the batteries with the on-board inverter. 6) Other Features: In addition to these critical

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components, BYD makes the high voltage distribution boxes, the DC-DC converters, the accessory inverters for power steering, ABS brakes, and ancillary motors, and every other major electrical component. This innovative approach ensures that all components will communicate seamlessly, resulting in reliable and high performing trucks.

#### Yard Trucks – BYD

Yard trucks are the focal point of this project. Yard trucks are ideal vehicles to electrify because they spend a significant amount of time idling, they operate in contained locations, they are off-road vehicles and therefore requirements are less stringent (although BYD will pursue all necessary licensing and certifications as required by California law), and there is a large market for the technology (Port of Los Angeles, 2015). Furthermore, the commercialization of yard trucks will pave the way for the technology transfer to other Class 8 trucks, as well as a variety of medium duty trucks.

BYD's yard truck model is the T9A and it is currently in the design phase. The T9A will have 175 kWh of battery capacity, allowing it to operate for at least one continuous eight-hour shift between charges. The PMSM traction motor is a 180 kW proprietary BYD product with a maximum torque of 1,106 lb-ft and a maximum speed of 5,000 RPM. This motor is mounted between the axles of the truck and power is delivered to the rear axle with a drive shaft. The T9A is designed to match or exceed the performance of diesel trucks across each key performance specification. The T9A curb weight is 5,000-5,500 lbs. more than diesel alternatives due to the weight of the batteries, which is accounted for with higher axle ratings. The limiting factor for towing capacity is the torque on the motor. BYD's 180 kW motor has a much higher max torque value than each competitive product, meaning it will be able to exceed the towing performance of comparable vehicles for yard operations. Complete product specifications are include in Attachment 3C – Specifications and Images There will be significant operational benefits with the T9A compared to diesel equivalents. Maintenance costs will be lower as there will be no need for changing oil and transmission and other fluids, there are fewer moving parts, there is no transmission, and the component life is longer. Comparisons with other BYD electric vehicles and internal testing by BYD suggests that the average maintenance cost per mile for the T9A will be \$0.23/mile compared to \$0.39/mile for diesel yard tractors. There will also be noticeable fuel savings. The US Energy Information Administration indicates that the current diesel rate is \$2.87/gallon and the current electricity rate for the industrial sector is \$.0679/kWh. The electric efficiency of the T9A is 0.39 miles/kWh and the efficiency of diesel yard trucks is 3.50 miles/gallon of diesel. Assuming 58 miles/day and 6 operating days/week, combined maintenance and fuel savings will be around \$14,600 per truck per year. As the T9A is a truly zero emission truck, tailpipe emission tests have not been conducted.

#### Service Trucks – BYD

Each major freight support facility has off-road service trucks to perform maintenance on yard tractors, rubber tired gantry cranes, forklifts, and other vehicles within the yard. BYD is in the process of developing a zero emission electric truck that is a perfect platform for service trucks called the T5. The T5 is similar to the 16,000 GVWR service trucks that are used at each project location. These trucks will have flat beds with railings and will be used for transporting equipment, including air compressors, welders, and tools, as well as spare parts. The gross vehicle weight rating (GVWR) of the T5 is 16,100 lbs. and the curb weight is 9,500 lbs., providing 6,600 lbs. of payload capacity. The T5 is powered by a 145 kWh Fe battery module, which provides a range of 155 miles. The motor is a 150 kW in-line traction motor that is integrated with the rear axle and provides 406 lb-ft of torque.

The T5's maintenance and fuel savings will be similar to those of the T9A yard truck. Maintenance costs for the electric T5 will be \$0.08/mile compared to \$0.32/mile for diesel equivalents.

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The electric efficiency of the T5 is 0.86 miles/kWh, while the efficiency of gasoline service trucks is 9.00 miles/gallon. Assuming 100 miles/day and 6 operating days/week, combined maintenance and fuel savings will be \$10,300 per truck per year. As the T5 is a truly zero emission truck, tailpipe emission tests have not been conducted.

### Safety

Each of the BYD trucks provided in this demonstration will have built-in safety features. For example, BYD batteries are less likely to reach high temperatures because the Fe chemical reaction is not exothermic (i.e. heat is not released during charging or discharging). In the event of exposure to extreme heat, the Fe cells are designed with vents to force heat out to prevent the development of hotspots. The pack construction is also designed for safety. Laser welds are used to connect each cell, reducing heat generation. The high voltage areas in the packs are segmented into lower voltage connections, making them safer for handling during production, maintenance, or accidents. A flame retardant polymer coats the modules. Critical areas are further protected with external covers.

BYD's BMS system provides an added level of safety. Signal circuits or contactors control each cell. If any issues are detected, the BMS can disconnect the contactors to isolate the problem areas. Furthermore, each battery string is outfitted with an isolation switch, which can simultaneously disconnect the anode and cathode of the string to isolate modules or packs of cells. A leakage sensor provides another layer of protection. As a final failsafe, the connections between each cell have rapid melting fuses. If any accidents or short circuits occur, the spike in current will quickly melt the fuses.

All cables used in the high voltage system use double insulation, allowing them to withstand 3,000 V of electricity. Furthermore, the double-wire configuration of all cables makes it nearly impossible to create a circuit that could injure a person. All connectors on the cells are protected with insulated material that can withstand 2,300 V.

The 200 kW chargers comply with safety standard IEC61851 and have protection for over-temperature, short-circuiting, surges, and over-current, in addition to detection for leakage and smoke.

For maintenance and firefighter response there is a maintenance switch that cuts off the connection between the batteries and the distribution box to avoid shocks or hazards. Each truck is also outfitted with a fire extinguisher on the outside of the vehicle.

### *Demonstration Locations and Benefits to Disadvantaged Communities*

Each of the three locations in this project will demonstrate both the yard trucks and the service trucks, providing a large data set and a significant deployment of vehicles. Images of each location on the CalEnviroScreen2.0 map for disadvantaged communities are included in Attachment 6 – Disadvantaged Communities Eligibility Determination.

BNSF is a Class 1 railroad that operates intermodal rail yards in every major trade corridor west of Chicago. For this project, yard trucks and service vehicles will be deployed at two locations in Southern California: San Bernardino and Commerce. The trucks at these locations are owned and operated by subcontractors.

BNSF's San Bernardino location is an intermodal rail yard that handles the majority of the freight that BNSF transports from the Ports of Los Angeles and Long Beach to their rail yards east of California. This facility runs 24 hours per day and 365 days per year. The rail yard is located at 1535 W 4<sup>th</sup> St., San Bernardino, CA 92411. The census tract is 6071004900 and is ranked by CalEnviroScreen2.0 in the 96-100% range of disadvantaged communities. Eagle Intermodal operates 55 yard trucks and 4 service

vehicles at this location. For this demonstration project Eagle Intermodal will receive ten T9A yard trucks and two T5 service trucks. The Phase 1 deployment will consist of three T9As and one T5. Lessons learned during Phase 1 will be incorporated into the Phase 2 deployment with the remaining vehicles. The electric yard trucks will be configured with high speed AC chargers that will give Eagle Intermodal the ability to charge during lunches and breaks, allowing them to run continuously for the three consecutive shifts each day. If the T9As in this demonstration project meet Eagle Intermodal's expectations, there will be an opportunity to electrify the 45 remaining yard trucks, making the fleet completely emission free.

BNSF's Commerce intermodal rail yard that is located just south of Downtown Los Angeles at 2818 Eastern Ave., Commerce, CA 90040. The census tract is 6037532303 and is ranked by CalEnviroScreen2.0 in the 96-100% range of disadvantaged communities. This facility runs two shifts per day, 6 days per week. Parsec currently operates ten yard trucks and one service vehicle at this location, and is eager to replace their entire existing fleet with ten T9A yard trucks and one T5 service truck. Phase 1 will see the deployment of three T9As and one T5. Lessons learned during Phase 1 will be incorporated into the Phase 2 deployment with the remaining vehicles.

Daylight Transport is currently constructing a new facility that will be located at 11150 Elm Avenue, Fontana, CA 92337. The census tract is 6071002601 and, according to CalEnviroScreen2.0, it ranks in the 91-95% range of disadvantaged communities. Construction for this facility will begin in November 2015, with operations scheduled to begin in June 2016. Daylight leadership is eager to introduce electric technology due to its maintenance and fuel savings, as well as its ability to collect real-time data for each vehicle. They will also be purchasing solar panels and a battery storage station to support both the electric vehicles and the administration building. Daylight Transport will receive three T9As and one T5 for the Phase 1 deployment. There will be no Phase 2 deployment. If the technologies meet Daylight Transport's expectations, there will be an opportunity to introduce these technologies at each of Daylight's LTL facilities.

*Emission Reductions*

Included in Attachment 4 – Potential Emission Reduction Benefits and Cost Effectiveness are the estimated reductions in GHG, criteria pollutant, and toxic air contaminant emissions (PM). All calculations are included. Additionally, included in Attachment 4 – Potential Emission Reduction Benefits and Cost Effectiveness are calculations for the estimated cost-effectiveness of the project utilizing the two scenarios outlined in the solicitation manual. Below is a summary of the estimated reductions in GHG, criteria pollutant and toxic air contaminant emissions.

SUMMARY	Results	Unit
Metric ton CO2e / year	1,745	metric tons CO2e / year
Ton NOx / year	0.80	tons NOx / year
Ton ROG / year	0.04	tons ROG / year
Ton PM10 / year	0.04	tons PM10/ year
WER / year	1.65	tons criteria pollutants / year

The four requested cost effectiveness calculations are shown in the summary table below.

Category	Result
\$/ton of CO2e during demonstration	\$1,494

\$/ton of CO2e after demonstration over 10-year life	\$223
\$/ton of combined criteria pollutants during demonstration	\$1,583,333
\$/ton of combined criteria pollutants after demonstration over 10yr life	\$236,766

The potential of the tested battery electric yard truck and service vehicle technology to help California achieve its climate change and air quality goals is enormous. Battery electric vehicle technology is already reducing GHG, criteria pollutant, and toxic air contaminant emissions produced by light duty vehicles, and progress is being made in the transit bus sector. However, progress in reducing emissions from other medium and heavy duty vehicle categories has been painfully slow. This project seeks to make real the promise and potential of battery electric technology to reduce emissions from medium and heavy duty vehicles in two critical environments: intermodal rail facilities and LTL carrier facilities. If this project succeeds and successfully demonstrates reductions in emissions within these two environments in a cost-effective manner, the implications for helping California meet its increasingly aggressive climate changes goals are profound.

Finally, it is worth noting that the 23 yard trucks and 4 service trucks in this project will have significant environmental benefits, eliminating 1,745 metric tons of carbon dioxide equivalents per year. The Class 8 yard trucks are the focal point of the project and will account for a reduction of 1,698 metric tons alone. Furthermore, the weighted annual surplus emissions will be reduced by 1.65 metric tons per year. More information on the greenhouse gas reductions and cost effectiveness is included in Attachment 4 – Potential Emission Reduction Benefits and Cost Effectiveness.

*Potential for Market Penetration and Commercialization of the Technology*

The successful conclusion of the SANBAG project will help move the dial forward for widespread market adoption of the tested vehicles in these targeted markets for several reasons. First, the project will prove the viability of the electric yard trucks and service vehicles. All vehicles in this project will operate in real-world conditions and will have to meet the duty cycles of their diesel counterparts. And all vehicles in this project will face the daily wear-and-tear inherent to intermodal and LTL environments. A successful outcome of the proposed project will demonstrate that the tested vehicles are in fact viable and capable of meeting the demands placed upon them.

Second, the project will prove that the long-term economics of the proposed vehicles are sound. Electric vehicles typically have higher upfront costs compared to their diesel counterparts. However, because of the reduced long-term operational costs, electric vehicles can be the more economical option for end users over the life of the vehicle. It is critical to build the business case for electric vehicles by showing that these savings actually materialize after the vehicles have operated under real world conditions. This project will build the business case data point by data point. The final results of the project can then be used to educate the marketplace to view electric yard trucks and service vehicles as a smart and economical investment—a critically important outcome for achieving widespread market adoption.

Third, the project will establish a real-world utilization model for battery electric yard tractors and service vehicles that can be emulated by other freight operators. Because the utilization of electric vehicles is a new operational model for intermodal rail and LTL end users, part of what must be done to achieve widespread market adoption is to demonstrate a workable utilization model that can then be copied by potential purchasers in the broader marketplace. This project seeks to do just that. By

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demonstrating zero emission battery electric yard tractors and service vehicles on real-world routes, the project will serve as a template for other end users to learn from, mimic, and modify to their individual needs. Long after the SANBAG project has successfully concluded, this project will serve as an example that helps guide the decision-making of other end users interested in procuring the tested technologies. The end result will be even greater market commercialization.

### Market Assessment

Both electric trucks in this project have potential for significant market adoption among the existing project partners, other freight support operators, and the broader medium and heavy duty truck markets. In terms of a specific market niche for the tested vehicles, the project partners are emblematic of the type of end user that would specifically be interested in these vehicles. In fact, the project partners alone provide substantial opportunity for large-scale commercialization upon conclusion of the proposed project. BNSF operates 5 facilities in California with locations in Los Angeles, Oakland, and Stockton, in addition to Commerce and San Bernardino. The immediate opportunity is to completely electrify the San Bernardino facility by increasing the T9As from 10 to 55 and the T5s from 2 to 4. The next opportunity is with the Los Angeles facility, which is in a disadvantaged community. This facility is the largest intermodal rail facility in North America and runs 140 yard trucks. It operates three shifts, so the San Bernardino demonstration will provide a useful test case to prove that BYD's T9A can operate in real world conditions. Furthermore, Parsec, the subcontractor in this project for the Commerce facility, is also the subcontractor for the Los Angeles facility. The knowledge acquired from the Commerce demonstration will prepare Parsec to scale these technologies to the Los Angeles facility. Outside of California, BNSF operates 720 yard trucks across 20 facilities in 13 states.

Daylight Transport operates 5 facilities. Four of the facilities are in California, specifically Fontana, Los Angeles, Visalia, and San Francisco. If the vehicles perform as the technology demonstrators anticipate, there is potential to electrify all of the medium and heavy duty trucks at both BNSF and Daylight. Furthermore, BNSF and Daylight are pioneers and leaders in the freight support sector. Successful demonstration of the yard trucks and service trucks in this project will open the door for opportunities to electrify the same vehicles at Union Pacific and other rail roads, other LTL carriers, port terminals, private warehouses, shipping companies, and other freight customers.

The market for yard trucks in North America is approximately 40,000 to 50,000. Ottawa, the largest manufacturer in the product category, manufactures approximately 3,300 yard trucks per year and has 67% market share (Ottawa, 2015). Yard trucks are used for 10 years, according to a CALSTART paper (CALSTART, 2008). Therefore, the total market is 50,000 (3,300/67% x 10). This number is substantiated from annual emissions reports from the Port of Los Angeles and the Port of Long Beach that indicate that there are 1,714 yard trucks at the San Pedro ports (Starcrest Consulting GroupLA, 2013) (Starcrest Consulting GroupLB, 2013). The San Pedro ports represent 40% of the goods movement in North America, which is 10% of the overall freight sector (CALSTART, 2008). Therefore, the total market is 42,500: 1,714/40%/10%.

The T5 platform has a range of applications beyond use as a service truck. The same chassis, electric propulsion system, and cab can be configured as urban delivery trucks, transport refrigeration units, and a host of other applications. CTA research indicates that 60,000 Class 5 trucks are sold each year (CTA, 2015). Assuming a useful life of 15 years, the market size in North America is approximately 900,000 trucks.

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Furthermore, the development of Class 5 and Class 8 trucks will accelerate BYD's development of all medium and heavy duty trucks. BYD will hire and develop local engineering resources for the T9A and T5 that will be located at BYD's regional headquarters in Downtown Los Angeles. These engineers will acquire critical skills for developing electric trucks that can be leveraged for developing other models. Additionally, BYD will develop local manufacturing expertise at their facilities in Lancaster, CA, that will pave the way for a dedicated facility for trucks. A 2013 paper by CalHeat estimates that there are 1.5 million Class 2B to Class 8 trucks in California. The segment that could be commercialized immediately is the Class 3-8 Work-Urban category, which is 253,000 trucks. (CalHeat, 2013)

The growth rates for medium and heavy duty electric trucks in California are significant. ICF International and Energy + Environmental Economics published a report in 2014 forecasting growth rates for electric trucks under three different scenarios: a baseline case called "In Line with Current Adoption"; an aggressive scenario assuming new incentives and regulation called "Aggressive Adoption"; and a middle scenario between those two called "In Between". The "In Line with Current Adoption" forecast for port yard trucks is 0 in 2013, increasing to 318 in 2020, and 503 in 2030. The "Aggressive Adoption" suggests that 4,030 could be introduced by 2030. Furthermore, the market for port yard tractors, medium-duty vehicles, and heavy-duty vehicles in the "In Line with Current Adoption" scenario would yield growth from 1,000 trucks in 2013 to 105,803 by 2030. Another forecast published by Navigant Research suggests that hybrid and electric trucks will increase from 10,000 in 2013 to 100,000 by 2020. (ICF International; Energy+Environmental Economics, 2014) (Navigant Research, 2013). As part of this project proposal, CALSTART will conduct a market assessment to better understand the market potential for these technologies.

#### Potential Market Barriers to Widespread Commercialization

Medium and heavy duty truck operators are interested in adopting electric technology because they know that emissions regulations will become more stringent in the coming years and they'd prefer to be leading the change rather than reacting to it. However, there are three significant obstacles preventing the commercialization of the T9A and T5: customer skepticism regarding performance; the current price premium; and a lack of experience and knowledge in the industry regarding the installation and maintenance of electric vehicles. Customer skepticism can be addressed through this project by demonstrating a large-scale deployment with the most reputable companies at key freight locations.

Once performance is proven, BYD intends to utilize voucher funding through programs like the Hybrid and Electric Vehicle Incentive Program in California, the Drive Clean Chicago program, and the New York Truck Voucher Incentive Program in order to reduce the short-term price premium. These programs successfully close the price gap with diesel equivalents and are a key driver to commercializing electric trucks in the immediate future. Long-term, BYD anticipates price reductions that will foster the commercialization of the T9A and T5 without any incentives. Price reductions will come from the following sources: 1) Battery Price Reduction – BYD's Fe battery has improved in energy density by over 7% year over year during the last 4 years. The amp-hours out of each cell increased from 200 A-hrs in 2012 to 220 A-hrs in 2014 to 270 A-hrs in 2016. BYD is forecasting 10% year over year improvement through 2020 due to mass production and R&D advancements. 2) Scale Economies – Once these truck platforms are sold in higher quantities BYD will be able to mass-produce parts that are sourced internally, as well as command volume discounts from parts that are sourced externally. In BYD's past experience with buses and taxis, these scale economies have reduced the vehicle price by approximately

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15%. 3) Recoup Engineering Costs – Part of the premium for BYD’s trucks is that amortized engineering costs are included as part of the purchase price. Once these non-recurring engineering costs have been recouped, BYD can lower the price of the truck by approximately 10%. This is the same price reduction that BYD was able to offer on their bus product lines. 4) Fuel and Maintenance Savings – BYD anticipates that T9A and T5 truck owners will realize fuel and maintenance savings. However, in order to prove these savings BYD needs to acquire field service performance data that can be shared with customers.

The combination of these different cost savings results in a future state whereby BYD could provide a vehicle by 2020 that would be priced comparably or less than diesel equivalents after factoring in a 3 year payback for fuel and maintenance savings, which is the duration that most fleet operators use when considering future savings. Specifically, the T9A would be priced at a 1% premium and the T5 would be priced at a 24% discount. These economics would lead to widespread adoption of the technologies, especially from progressive private companies interested in both sustainability and long-term cost savings. Furthermore, it conservatively assumes that the diesel price will remain constant, when in reality diesel prices will likely increase due to more stringent national regulations.

#### Economic Benefits

BYD is committed to supporting all product development and manufacturing for the North American market from their offices in California. They are currently building local engineering and product development support for their North American product lines, which will be located in Downtown Los Angeles along with the Sales, Finance, and Human Resources teams. All manufacturing (with the exception of the prototypes) will be completed at one of BYD’s existing facilities in Lancaster, or in one of the many facilities that BYD intends to build in Lancaster. Therefore, the trucks in this demonstration project, as well as those that stem from this project, will provide direct economic benefits to California in the form of job creation and economic growth.

#### Commercialization Plan

As part of the global strategy to utilize this project in order to achieve large-scale commercialization of the proposed technologies, SANBAG, BYD, CALSTART, BNSF and Daylight all want to affirm a collective commitment to work closely with ARB through an iterative, collaborative process for the purposes of maximizing the commercialization potential of the project. The elements identified above are only an initial effort at articulating strategies to leverage outcomes from the project to better help inform the marketplace and potential purchasers about the tested vehicles and technologies. As lessons are learned and new opportunities are identified, SANBAG and its project partners will pivot as necessary in order to ensure the greatest possible value to ARB and the marketplace—the end goal being the widespread commercialization of zero emission battery electric yard trucks and service vehicles within intermodal rail and LTL freight environments.

CALSTART will support the commercialization plan with the following initiatives: 1) Voice of the Customer: CALSTART will organize a “voice of customer” event in Southern California, where they will focus on educating local fleets that could potentially adopt BYD’s ZE Heavy Duty Truck technology. This event will include a ride and drive, and opportunities for fleets to provide specific technical feedback on the performance of the vehicle and what additional steps are needed for fleets to adopt this technology. 2) Commercialization Plan: CALSTART will develop a commercialization roadmap for BYD’s ZE Heavy Duty Truck technology building on the market assessment and customer outreach tasks described



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above. The roadmap will define key issues impacting the commercialization of the technology, describe viable pathways to commercialization and identify commercialization gates and market phase-in stages.

The commercialization plan will be inclusive of the following elements: **1) Successful execution of the proposed project and incorporation of lessons learned:** The demonstration project will run zero emission electric yard trucks and service vehicles under circumstances that are characteristic of how typical intermodal rail and LTL end users would deploy these technologies. It will allow experienced operators like BNSF and Daylight to assess the viability of the technology on routes that have characteristics that mirror those of many other freight and rail operators. **2) Rigorous data analysis and final synthesis into a usable end product for ARB and the marketplace:** The project will subject the technologies to rigorous testing and data collection by ARB's third party data analysis firm. That data and testing will be subject to ARB review and evaluation. **3) Market engagement:** All of these elements mean that there will be a robust record of the performance of the electric yard tractors and service vehicles that are the subject of this demonstration project. This record will be a critical to bolstering BYD's ability to move their technologies deeper into the California market. Once the demonstration project is complete, BYD will be able to direct potential customers to the ARB record and put them in direct contact with SANBAG, CALSTART, BNSF and Daylight to discuss technology performance. When given the ability to analyze rigorous testing overseen by the ARB and subject to verification by respected third parties like CALSTART, prospective customers will have confidence that they know how the technology will perform and will therefore have greater confidence in making decisions about purchasing the technology. **4) Engagement with policymakers:** CALSTART, BYD and SANBAG also plan to use the results of this demonstration project in their engagement on proceedings within the Legislature and other state regulatory entities. With positive results from this demonstration project, BYD and CALSTART would be able to provide the policymakers and regulators with verified data and analysis that would better inform their work over the upcoming years. CALSTART will also leverage its deep relationships with the intermodal rail and LTL community in California, and throughout the nation, in order to socialize the data and conclusions generated by the proposed demonstration project. CALSTART will publish and provide the data to other end users, helping them fully understand how they might adopt this important technology. In the end, the data will accelerate the adoption of electric yard trucks and service vehicles in California and throughout the country.



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## Attachment 3B – Bibliography

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**Attachment 3C – Specifications and Images**

*T9A Specifications*


<b>Items</b>	<b>Spec.</b>
Length×Width×Height	20.13 ft.×98.43 in.×148.15 in.
Curb Weight	22,000 lbs.
GCWR	102,000 lbs.
Wheelbase	141.73 in.
Wheel Track (Front/Rear)	81.10/73.35 in.
Overhang (Front/Rear)	56.57/43.31 in.
Approach/Departure Angle	24°/41°
Top Speed	56 mph
Gradeability	≥24%
Operating Range	68 miles or 8 hrs.
Ground Clearance	11.81 in.
Min. Turning Radius	18.04 ft.
Radius of Gyration Front	≥5.58 ft.
Radius of Gyration Rear	≥4.66 ft.
Front Saddle Distance	19.69 in.
Max. Permissible 5th wheel	100,000 lbs. with hydraulic actuation
Tires	11R20
Front/Rear Suspension	Leaf Spring
Brake System	F/R Pneumatic Drum Brake
Steering System	EHPS
Drive Mode	4×2
Max. Power	245 hp (180 kW)
Max. Torque	1,106 lb·ft (1,500 N·m)
Battery Type	BYD Iron-Phosphate Battery
Battery Capacity	175 kWh
Charging Power	200 kW
Charging Time	< 1 hr.

*T5 Specifications*

<b>Items</b>	<b>Spec.</b>
Length×Width×Height	19.67 ft.×80.71 in.×116.14 in.
Curb Weight	9,480 lbs.
Rated Load	6,658 lbs.
GVWR	16,138 lbs.
Wheelbase	132.28 in.
Wheel Track (Front/Rear)	64.84/61.73 in.
Overhang (Front/Rear)	43.31/60.43 in.
Approach/Departure Angle	21° /16°
Top speed	62 mph

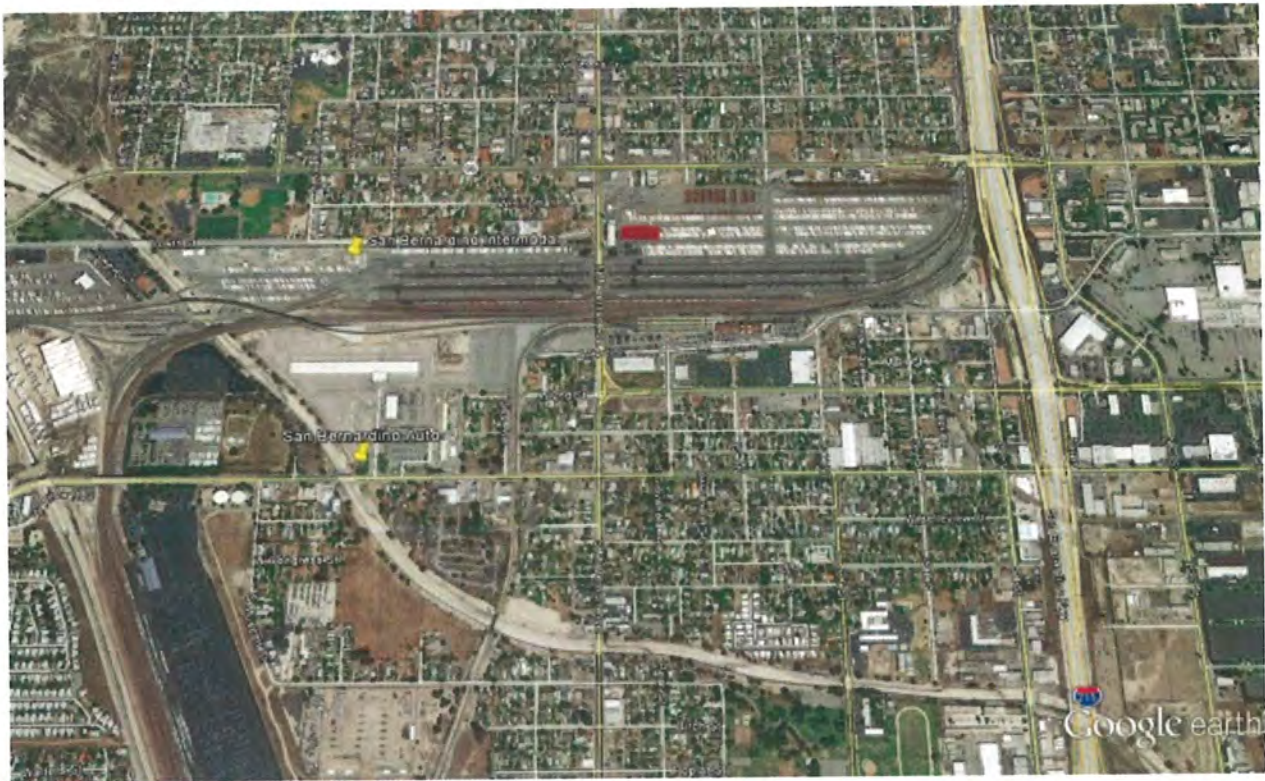
Gradeability	≥30%
Operating Range	155 miles
Tires	7.00R16 (215/75R17.5 Optional)
Suspension System	F/R Leaf Spring
Brake System	(F/R) Pneumatic Disc Brake
Steering System	EHPS + Recirculating Ball
Carriage Length × Width × Height	13.60 ft. × 80.71 in. × 77.01 in
Carriage Volume	494.41 ft <sup>3</sup>
Drive Mode	4 × 2
Max. Power	204 hp (150 kW)
Max. Torque	406lb-ft (550 N·m)
Battery Type	BYD Iron-Phosphate Battery
Battery Capacity	145 kWh
Charging Power	100 kW AC
Charging Time	1.5 hrs.

*Charger Specifications*

Model		200 kW
		
ELECTRICS	Rated Input Voltage	AC480V 3-phase
	Operating Voltage Range	AC432V-528V 3-phase
	Input Current	280A
	Input Power	200kW
	Operating Frequency	60Hz
	Output Voltage	AC432V-528V 3-phase
	Output Current	120A per 2 charging connectors
	Output Power	≤100KW per 2 charging connectors
	Output Interface Standard	IEC62196 BYD proprietary
	Number of Charging Connectors	2
	Length of Charging Cable	10 ft.
SAFETY	Protection Function	short circuit protection /over-temperature protection /surge protection
	Certification	DEKRA
	IP Degree for Enclosure	IP54

OTHER	Noise	≤60dB
	Cooling Method	Natural cooling
	Operation Temperature	-25°C ~ +40°C
	Storage Temperature	-30°C ~ +60°C
	Environment Humidity	5 ~ 95% non-condensing
	LED Indicators	Power, Connect, Charging, Complete, Error
	LCD Screen	SOC, Estimated time to 100%, ID, Charging Volume, Error

*BNSF San Bernardino Facility Location*

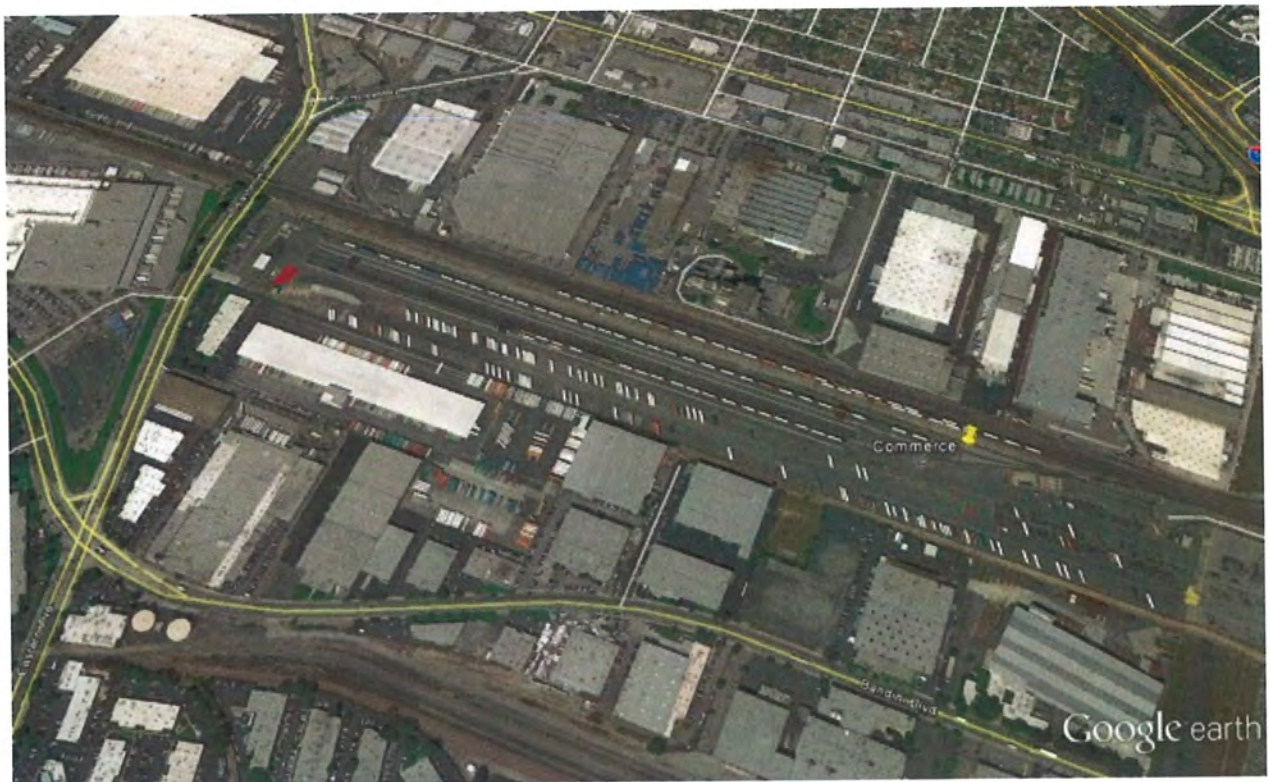


The 200 kW chargers will be sited at the location below.





*BNSF Commerce Facility Location*

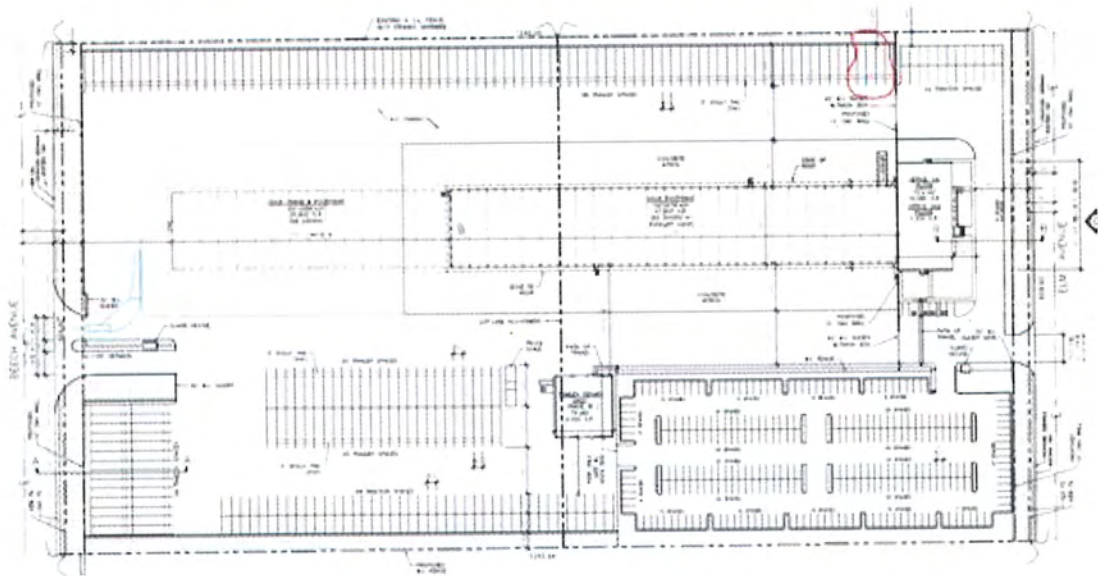


The 200 kW chargers will be sited at the location below.



*Daylight Transport Facility Location*

Daylight will site their chargers in the northeast corner of their yard, highlighted in the site plan below. This places the charging station near the main office and will allow for opportunity charges during breaks.





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## Attachment 3D – Work Plan

\*As the vehicles have no tailpipe emissions, emissions testing will not be conducted.

Task 0 SANBAG will act as administrator throughout the project.

### Task 1 Contracting and Project Kickoff

The purpose of this task is to execute the project contract and begin coordinating project partners.

Task 1.1 SANBAG will execute project contract with CARB by 12/31/2015.

Task 1.2 SANBAG will schedule project kickoff meeting for first week of 2016 between CARB, SANBAG, BYD, BNSF, Daylight, and CARB's 3<sup>rd</sup> party data analysis provider.

Task 1.3 SANBAG will send a meeting agenda to team 24 hours prior to meeting.

- Discuss work plan, milestones, and disbursement schedule.
- Update team on any issues that need to be resolved before starting work.

Task 1.4 SANBAG will lead the kickoff meeting.

**Deliverable Description: Milestone 1- Kickoff meeting**

**Deliverable Due Date: January 8, 2016**

### Task 2 Product Testing and Registration

The purpose of this task is to perform the testing and initiate the procedures necessary to acquire EPA and CARB certifications.

Task 2.1 BYD will initiate FMVSS testing on each of its vehicles. Although the trucks will be exclusively off-road for this demonstration, these trucks will eventually be used for on-road commercial applications. As such, BYD will begin FMVSS testing for both the T9A and the T5 with an expected completion date of 7/1/2016.

Task 2.2 BYD will acquire World Manufacturer Identifiers (WMI) from the Chinese government. WMIs follow the same standards as SAE International.

Task 2.3 BYD will register the T9A and T5 with the DOT NHTSA.

Task 2.4 BYD will apply for certification with the U.S. EPA.

Task 2.5 BYD will apply for certification with CARB.

**Deliverable Description: Milestone 2- Acquire EPA and CARB Certifications**

**Deliverable Due Date: April 1, 2016**

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### Task 3 EVSE Installation

The purpose of this task is to install EVSE at each project site.

- Task 3.1 BNSF and Daylight will send three (3) scaled site plans, a peak demand chart, and a charging profile for each of the three (3) project locations to Southern California Edison's (SCE) Planning Department.
- Task 3.2 SCE will perform site evaluation at all 3 locations to assess existing power supply.
- Task 3.3 SCE will perform an engineering evaluation to determine what upgrades are required, if any, including any transformer upgrades, trenching, or line extensions. It is expected that BNSF and Daylight will incur a \$10,000 fee for each location.
- Task 3.4 SCE will complete supply upgrades under tariff allowance program, Rule 15 and Rule 16.
- Task 3.5 SCE will perform rate option analysis to determine optimal program for each of the three project locations.
- Task 3.6 BNSF and Daylight will perform contracting work at facility for trenching, running conduits, and installing chargers. Estimates are provided in Attachment 5B – Budget Breakdown.
- Task 3.7 BYD will install 200 kW AC chargers at each location.

#### **Deliverable: Milestone 3 - Complete EVSE Installation at Each Location**

**Deliverable Due Date: July 1, 2016**

**BNSF/Daylight Disbursement Request: \$1,191,800**

### Task 4 Delivery of Phase 1 Trucks

- Task 4.1 BYD will develop prototype trucks. A T9A will prototype is currently in production and completion is expected by 12/31/2015. A T5 prototype was completed on 3/1/2015 and is currently available.
- Task 4.2 BYD will perform internal testing on transmission, brakes, tires, warning devices, controls/display, seats and belts, lamps, windshield defrost/defog and wiping, and hood latch.
- Task 4.3 Mileage accumulation of 5,000 miles.
- Task 4.4 BYD will procure parts for complete knockdown kits from internal BYD divisions.
- Task 4.5 BYD will ship parts to BYD's Lancaster, CA facilities.
- Task 4.6 BYD's Lancaster facilities will manufacture trucks.

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Task 4.7 BYD will complete all performance testing including powertrain, weight and rain simulation.

Task 4.8 BYD will transport Phase 1 Trucks to each technology demonstrator site.

**Deliverable Description: Milestone 4- Complete Delivery of Phase 1 Trucks**

**Deliverable Due Date: July 1, 2016**

**BYD Disbursement Request: \$3,174,000**

Task 5 Fleet Integration of Phase 1 Trucks

Task 5.1 BYD will provide 40 hours of on-site training for maintenance and driver staff at each facility.

Task 5.2 BNSF and Daylight to start using all Phase 1 Trucks.

**Deliverable Description: Milestone 5- Deployment of All Phase 1 Trucks**

**Deliverable Due Date: August 1, 2016**

Task 6 Market Assessment

Task 6.1 CALSTART will research current and future drivers for trucks demonstrated in this project, including regulatory, policy, and fuel cost.

Task 6.2 CALSTART will survey fleets to define potential customer base.

Task 6.3 CALSTART will identify current and future barriers to market.

Task 6.4 CALSTART will estimate potential truck market.

Task 6.5 CALSTART will develop a business case for BYD's T9A and T5 for freight support applications.

**Deliverable Description: Milestone 6- Market Assessment Final Report**

**Deliverable Due Date: September 1, 2016**

**CALSTART Disbursement Request: \$120,000**

Task 7 Phase 1 Demonstration

Task 7.1 BNSF and Daylight will oversee operation of all electric trucks and ensure they are in operation as much as diesel equivalents would be for a period of 6 months.

Task 7.2 BYD will host a weekly call with BNSF and Daylight for the first 12 weeks of the Phase 1 demonstration to discuss truck performance and any problems.

Task 7.3 BYD will complete any maintenance as necessary.

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**Deliverable Description: Milestone 7- Complete Phase 1 Demonstration**  
**Deliverable Due Date: March 1, 2017**

Task 8 Customer Outreach

- Task 8.1 CALSTART will reach out to potential customers.
- Task 8.2 CALSTART will conduct an event with ride and drive
- Task 8.3 CALSTART will summarize findings into a report.

**Deliverable Description: Milestone 8- Voice of the Customer Event Summary Report**  
**Deliverable Due Date: April 1, 2017**  
**CALSTART Disbursement Request: \$150,000**

Task 9 Phase 1 Truck Reworks

- Task 9.1 BYD will transport any trucks that require repair or component changes to BYD's facilities in Lancaster, CA.
- Task 9.2 BYD will complete truck reworks as appropriate.
- Task 9.3 BYD will transport reworked trucks back to each of the technology demonstrators.
- Task 9.4 BNSF and Daylight will reintroduce the Phase 1 trucks into fleet.

**Deliverable Description: Milestone 9- Deploy Reworked Phase 1 Trucks**  
**Deliverable Due Date: June 6, 2017**

Task 10 Continue demonstration of Phase 1 trucks

**Deliverable Description: Milestone 10- Demonstrate Phase 1 Trucks Through Conclusion of Project**  
**Deliverable Due Date: April 1, 2019**

Task 11 Truck Production for Phase 2

- Task 11.1 BYD will analyze performance of Phase 1 trucks and assemble lessons learned. This work will begin immediately upon deployment of the Phase 1 trucks and will continue through 1 month after the Phase 1 demonstration.
- Task 11.2 BYD will complete all engineering required to optimize design and performance of Phase 2 trucks.
- Task 11.3 BYD will procure parts for complete knockdown kits from internal BYD divisions.
- Task 11.4 BYD will ship parts to BYD's Lancaster, CA facilities.

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Task 11.5 BYD's Lancaster facilities will manufacture trucks.

Task 11.6 BYD will complete all performance testing including powertrain, weight, and rain simulation.

Task 11.7 BYD will transport Phase 2 Trucks to each facility.

**Deliverable Description: Milestone 11- Complete Delivery of Phase 2 Trucks**

**Deliverable Due Date: July 7, 2017**

**BYD Disbursement Request: \$4,380,000**

Task 12 Integrate Phase 2 Trucks

Task 12.1 BYD will provide an additional 40 hours of on-site training for maintenance and driver staff at both BNSF facilities.

Task 12.2 BNSF and Daylight will start using all Phase 2 Trucks.

**Deliverable Description: Milestone 12- Deployment of all Phase 2 Trucks**

**Deliverable Due Date: August 1, 2017**

Task 13 Phase 2 Demonstration

Task 13.1 BNSF will oversee operation of all electric trucks and ensure they are in operation as much as diesel equivalents would be through the end of the demonstration.

Task 13.2 BYD will host a weekly call with BNSF for the first 12 weeks of the Phase 2 demonstration to discuss truck performance and any problems.

Task 13.3 BYD will complete any maintenance as necessary.

**Deliverable Description: Milestone 13- Complete Phase 2 Demonstration**

**Deliverable Due Date: April 1, 2019**

Task 14 Commercialization Roadmap

Task 14.1 CALSTART will identify key issues impacting commercialization of technology.

Task 14.2 CALSTART will describe pathways to commercialization.

Task 14.3 CALSTART will identify market phase-in stages.

**Deliverable Description: Milestone 14- Commercialization Roadmap**

**Deliverable Due Date: April 1, 2019**

**CALSTART Disbursement Request: \$85,000**





## Attachment 4 – Potential Emission Reduction Benefits and Cost Effectiveness

### Summary Tables

SUMMARY	Results	Unit
metric ton CO <sub>2</sub> e / year	1745	metric tons CO <sub>2</sub> e/year
Ton NO <sub>x</sub> / year	0.80	tons NO <sub>x</sub> /yr
Ton ROG / year	0.04	tons ROG/yr
Ton PM <sub>10</sub> / year	0.04	tons PM <sub>10</sub> /yr
WER / year	1.65	tons criteria pollutants/yr
\$/metric ton CO <sub>2</sub> e reduced during the actual proposed project over a 2-year demonstration	<b>\$1,494</b>	per metric ton CO <sub>2</sub> e, Formula C-1
\$/metric ton CO <sub>2</sub> e reduced once deployed into the marketplace, one year post proposed demonstration and based on a 10-year vehicle/equipment useful life	<b>\$223</b>	per metric ton CO <sub>2</sub> e, Formula C-1
\$/ton of combined criteria pollutant and weighted PM emissions reduced during the actual proposed project over a 2-year demonstration	<b>\$1,583,333</b>	per tons criteria pollutants reduced
\$/ton of combined criteria pollutant and weighted PM emissions reduced once deployed into the marketplace, one year post proposed demonstration and based on a 10-year vehicle/equipment useful life	<b>\$236,766</b>	per tons criteria pollutants reduced

### Inputs and Assumptions

<b>General</b>			
Days/yr	313	days/yr	
Grams/Ton	907185	grams/ton	
Carbon intensity diesel	102.76	gCO <sub>2</sub> e/MJ	Table MSF App D2
Carbon intensity CARBOB	100.53	gCO <sub>2</sub> e/MJ	Table MSF App D2
Carbon intensity electricity	105.16	gCO <sub>2</sub> e/MJ	Table MSF App D2
Energy density diesel	134.47	MJ/gal	Table MSF App D1
Energy density CARBOB	119.53	MJ/gal	Table MSF App D1
Energy density electricity	3.6	MJ/kWh	Table MSF App D1
Energy efficiency ratio	2.7		Table MSF App D3
Capital Recovery Factor 2yr	0.515	2yr life; Moyer Table G-3b	
Capital Recovery Factor 10yr	0.111	10yr life; Moyer Table G-3b	
<b>Yard Hostler</b>	23	number	
Fuel Efficiency SB	2.84	gallons/hr	
Fuel Efficiency Commerce	2	gallons/hr	
Fuel Efficiency Daylight	1.2	gallons/hr	
Fuel Efficiency	2.26	gallons/hr	Geometric Mean
Hours per day SB	11.50	hrs/day	
Hours per day Commerce	12.00	hrs/day	
Hours per day Daylight	18.00	hrs/day	
Fuel Usage SB	10218	gallons/yr	

Fuel Usage Commerce	7509	gallons/yr	
Fuel Usage Daylight	6868	gallons/yr	
NOx	3.44	gNOx/gal	Table D-4 0.02 NOX
ROG	0.18	gROG/gal	Table D-4 0.02 NOX
PM10	0.148	gPM10/gal	Table D-4 0.02 NOX
Yard hostler cost at demonstration	\$96,435	price paid by project partners	
Yard hostler cost 2 years after demonstration	\$96,435	assume stays constant	
Electric Price 2015	\$300,000	current price	
Electric Price 2 years later	\$238,000	provided by BYD	
<b>Service Trucks</b>	4	number	
Fuel Usage	9	mpg gasoline	
Miles/day	46	miles/day	BNSF: 80 gal/mo; DLT 100 mi/day
NOx	0.39	gNOx/bhp-hr	Table D-14 >120hp, gas, 2010+
ROG	0.03	gROG/bhp-hr	Table D-14 >120hp, gas, 2010+
PM10	0.06	gPM10/bhp-hr	Table D-14 >120hp, gas, 2010+
Fuel Consumption Rate Factor	18.5	bhp-hr/gallons gasoline	Table D-24 Other <750 hp
Cost at demonstration	\$55,000	price paid by project partners	
Cost 2 years after demonstration	\$55,000	assume stays constant	
Electric Price at demonstration	\$150,000	current price	
Electric Price 2 years later	\$119,000	provided by BYD	

### *Calculations*

#### **Step 1a:** Calculate the baseline yard hostler annual fuel usage

$$\frac{\text{Gallon Diesel}}{\text{Year}} = \frac{(10,218\text{gal/yrSB} * 10 + 7,509\text{gal/yrCOM} * 10 + 6,686\text{gal/yrDAY} * 3)}{23} = 8,603 \text{ gallons diesel/year}$$

#### **Step 1b:** Calculate the baseline service truck annual fuel usage

$$\frac{\text{Gallon Diesel}}{\text{Year}} = \frac{1 \text{ gallon}}{9 \text{ miles}} \times \frac{46 \text{ miles}}{1 \text{ day}} \times \frac{313 \text{ days}}{1 \text{ year}} = \frac{1,599 \text{ gallons gasoline}}{\text{year}}$$

#### **Step 2a:** Convert the diesel used per year to the amount of electricity needed to do the same work for the yard hostler

$$\text{Electricity} = \frac{8,603 \text{ gal. diesel}}{\text{year}} \times \frac{134.47 \text{ MJ}}{\text{gal. diesel}} \times \frac{1 \text{ kWh}}{3.60 \text{ MJ}} \times \frac{1}{2.7} = 119,016 \frac{\text{kWh}}{\text{year}}$$

#### **Step 2b:** Convert the diesel used per year to the amount of electricity needed to do the same work for the service truck

$$Electricity = \frac{1,599 \text{ gal. gas}}{\text{year}} \times \frac{119.53 \text{ MJ}}{\text{gal. gas}} \times \frac{1 \text{ kWh}}{3.60 \text{ MJ}} \times \frac{1}{2.7} = 19,664 \frac{\text{kWh}}{\text{year}}$$

**Step 3a:** Determine the GHG emissions that are attributed to the base case diesel fueled yard hostler

$$\begin{aligned} GHG \text{ EF}_{Base \text{ Yard Hostler}} &= \frac{102.76 \text{ gCO}_2e}{\text{MJ}} \times \frac{134.47 \text{ MJ}}{\text{gal. diesel}} \times \frac{8,603 \text{ gal}}{\text{year}} \times \frac{1 \text{ metric ton CO}_2e}{1000000 \text{ grams}} \\ &= 118.9 \frac{\text{metric tons CO}_2e}{\text{year}} \end{aligned}$$

**Step 3b:** Determine the GHG emissions that are attributed to the base case diesel fueled service truck

$$\begin{aligned} GHG \text{ EF}_{Baseline \text{ Service Truck}} &= \frac{100.53 \text{ gCO}_2e}{\text{MJ}} \times \frac{119.53 \text{ MJ}}{\text{gal. gas}} \times \frac{1,599 \text{ gal. gas}}{\text{year}} \times \frac{1 \text{ metric ton CO}_2e}{1000000 \text{ grams}} \\ &= 19.2 \frac{\text{metric tons CO}_2e}{\text{year}} \end{aligned}$$

**Step 4:** Determine the GHG emissions that are attributed to the advanced technology vehicles

**All-electric yard hostler (EV Yard Hostler)**

$$\begin{aligned} GHG \text{ EF}_{EV \text{ Yard Hostler}} &= \frac{105.16 \text{ gCO}_2e}{\text{MJ}} \times \frac{3.60 \text{ MJ}}{\text{kWh}} \times \frac{119,016 \text{ kWh}}{\text{year}} \times \frac{1 \text{ metric ton CO}_2e}{1000000 \text{ grams}} \\ &= 45.1 \frac{\text{metric tons CO}_2e}{\text{year}} \end{aligned}$$

**All-electric service truck (EV Service Truck):**

$$\begin{aligned} GHG \text{ EF}_{EV \text{ Service Truck}} &= \frac{105.16 \text{ gCO}_2e}{\text{MJ}} \times \frac{3.60 \text{ MJ}}{\text{kWh}} \times \frac{19,664 \text{ kWh}}{\text{year}} \times \frac{1 \text{ metric ton CO}_2e}{1000000 \text{ grams}} \\ &= 7.4 \frac{\text{metric tons CO}_2e}{\text{year}} \end{aligned}$$

**Step 5:** Determine the annual GHG emissions reductions that are associated with the proposed project

$$\begin{aligned}
 \text{Project GHG } EF_{\text{Annual}} &= (20 + 3) \times \text{GHG } EF_{\text{Base Yard Hostler}} - (20 + 3) \times \text{GHG } EF_{\text{EV Yard Hostler}} + (3 \\
 &+ 1) \times \text{GHG } EF_{\text{Baseline Service Truck}} - (3 + 1) \times \text{GHG } EF_{\text{EV Service Truck}}
 \end{aligned}$$

$$\begin{aligned}
 \text{Project GHG } EF_{\text{Annual}} &= (20 + 3) \times 118.9 - (20 + 3) \times 45.1 + (3 + 1) \times 19.2 - (3 + 1) \times 7.4 \\
 &= 1,745 \frac{\text{metric tons CO}_2\text{e}}{\text{year}}
 \end{aligned}$$

**Step 6:** Determine the annual criteria pollutant emission reductions that are associated with the proposed project

**Baseline yard hostler:**

$$\text{NO}_x = 3.44 \text{ gNO}_x/\text{gal}$$

$$\text{ROG} = 0.18 \text{ gROG/gal}$$

$$\text{PM}_{10} = 0.148 \text{ gPM}_{10}/\text{gal}$$

$$\begin{aligned}
 \text{Baseline Yard Hostler } EM_{\text{NO}_x} &= 3.44 \frac{\text{gNO}_x}{\text{gal}} \times 8,603 \frac{\text{gal. diesel}}{\text{year}} \times \frac{1 \text{ ton}}{907185\text{g}} \\
 &= 0.0326 \text{ tons NO}_x/\text{year}
 \end{aligned}$$

$$\begin{aligned}
 \text{Baseline Yard Hostler } EM_{\text{ROG}} &= 0.18 \frac{\text{gROG}}{\text{gal}} \times 8,603 \frac{\text{gal. diesel}}{\text{year}} \times \frac{1 \text{ ton}}{907185\text{g}} \\
 &= 0.0017 \text{ tons ROG/year}
 \end{aligned}$$

$$\begin{aligned}
 \text{Baseline Yard Hostler } EM_{\text{PM}_{10}} &= 0.148 \frac{\text{gPM}_{10}}{\text{gal}} \times 8,603 \frac{\text{gal. diesel}}{\text{year}} \times \frac{1 \text{ ton}}{907185\text{g}} \\
 &= 0.0014 \text{ tons PM}_{10}/\text{year}
 \end{aligned}$$

**All-electric yard hostler:**

This is a zero-emission vehicle.

**Baseline service truck:**

$$\text{NO}_x = 0.39 \text{ gNO}_x/\text{bhp-hr}$$

$$\text{ROG} = 0.03 \text{ gROG/bhp-hr}$$

$$\text{PM}_{10} = 0.06 \text{ gPM}_{10}/\text{bhp-hr}$$

Fuel Consumption Rate Factor = 18.5 bhp-hr/gallon gasoline

$$\begin{aligned}
 \text{Baseline Service Truck } EM_{\text{NO}_x} &= 0.39 \frac{\text{gNO}_x}{\text{bhp-hr}} \times 18.5 \frac{\text{bhp-hr}}{\text{gal. gas}} \times 1,599 \frac{\text{gal. gas}}{\text{year}} \times \frac{1 \text{ ton}}{907185\text{g}} \\
 &= 0.0127 \text{ tons NO}_x/\text{year}
 \end{aligned}$$

$$\begin{aligned}
 & \text{Baseline Service Truck } EM_{ROG} \\
 &= 0.03 \frac{g_{ROG}}{bhp - hr} \times 18.5 \frac{bhp - hr}{gal. gas} \times 1,599 \frac{gal. gas}{year} \times \frac{1 ton}{907185g} \\
 &= 0.0010 \text{ tons } ROG/year
 \end{aligned}$$

$$\begin{aligned}
 & \text{Baseline Service Truck } EM_{PM_{10}} \\
 &= 0.06 \frac{g_{PM_{10}}}{bhp - hr} \times 18.5 \frac{bhp - hr}{gal. gas} \times 1,599 \frac{gal. gas}{year} \times \frac{1 ton}{907185g} \\
 &= 0.0020 \text{ tons } PM_{10}/year
 \end{aligned}$$

**All-electric service truck:**

This is a zero-emission vehicle.

**Step 10:** Calculate the criteria emission reductions that are associated with the proposed project

$$\begin{aligned}
 \text{Project } ER_{NO_x} &= (20 + 3) \times \text{Baseline Yard Hostler } EM_{NO_x} + (3 \\
 &+ 1) \times \text{Baseline Service Truck } EM_{NO_x}
 \end{aligned}$$

$$\begin{aligned}
 \text{Project } ER_{NO_x} &= (20 + 3) \times 0.0326 + (3 + 1) \times 0.0127 \\
 &= 0.801 \text{ tons } NO_x/Year
 \end{aligned}$$

$$\begin{aligned}
 \text{Project } ER_{ROG} &= (20 + 3) \times 0.0017 + (3 + 1) \times 0.0010 \\
 &= 0.043 \text{ tons } ROG/Year
 \end{aligned}$$

$$\begin{aligned}
 \text{Project } ER_{PM_{10}} &= (20 + 3) \times 0.0014 + (3 + 1) \times 0.0020 \\
 &= 0.040 \text{ tons } PM_{10}/Year
 \end{aligned}$$

**Step 11:** Determine the weighted annual surplus emission reductions that are associated with the proposed project

$$\begin{aligned}
 WER &= 0.801 \text{ tons } NO_x/Year + 0.043 \text{ tons } ROG/Year + 20 \times 0.040 \text{ tons } PM_{10}/Year \\
 &= 1.65 \text{ tons criteria pollutants reduced}/Year
 \end{aligned}$$

**Step 12:** Determine the incremental cost of the proposed technology

**Baseline yard hostler:**

- Yard hostler cost at demonstration: \$96,435
- Yard hostler cost two years after demonstration: \$96,435

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**All-electric yard hostler:**

- All-electric yard hostler cost at demonstration: \$300,000
- All-electric yard hostler cost two years after demonstration: \$238,000

$$\begin{aligned} \text{Incremental Cost}_{2 \text{ years}} &= \$300,000 - \$96,435 = \$203,565 \\ \text{Incremental Cost}_{10 \text{ years}} &= \$238,000 - \$96,435 = \$141,565 \end{aligned}$$

**Baseline service truck:**

- Service truck cost at demonstration: \$55,000
- Service truck cost two years after demonstration: \$55,000
- 

**All-electric service truck:**

- All-electric service truck cost at demonstration: \$150,000
- All-electric service truck cost two years after demonstration: \$119,000

$$\begin{aligned} \text{Incremental Cost}_{2 \text{ years}} &= \$150,000 - \$55,000 = \$95,000 \\ \text{Incremental Cost}_{10 \text{ years}} &= \$119,000 - \$55,000 = \$64,000 \end{aligned}$$

**Project:**

$$\text{Project Incremental Cost}_{2 \text{ years}} = 23 \times \$203,565 + 4 \times \$95,000 = \$5,061,995$$

$$\text{Project Incremental Cost}_{10 \text{ years}} = 23 \times \$141,565 + 4 \times \$64,000 = \$3,511,995$$

**Step 13: Determine the GHG emission reduction cost effectiveness for the proposed project**

$$\text{GHG } C/E_{2 \text{ years}} = \frac{0.515 \times \$5,061,995}{1,745 \text{ metric tons } CO_2e} = \$1,494 / \text{metric tons } CO_2e \text{ reduced}$$

$$\text{GHG } C/E_{10 \text{ years}} = \frac{0.111 \times \$3,511,995}{1,745 \text{ metric tons } CO_2e} = \$223 / \text{metric tons } CO_2e \text{ reduced}$$

**Step 14: Determine the criteria pollutant cost effectiveness for the proposed project**

$$\begin{aligned} \text{Criteria Pollutant } C/E_{2 \text{ years}} &= \frac{0.515 \times \$5,061,995}{1.65 \text{ WER}} \\ &= \$1,583,333 / \text{tons criteria pollutants reduced} \end{aligned}$$

$$\begin{aligned} \text{Criteria Pollutant } C/E_{10 \text{ years}} &= \frac{0.111 \times \$3,511,995}{1.65 \text{ WER}} \\ &= \$236,766 / \text{tons criteria pollutants reduced} \end{aligned}$$





**Attachment 5A - Proposed Budget, Project Milestones, and Disbursement Schedule**

The total cost of this project will be \$19,312,972. SANBAG and BYD have the financial ability to exceed the minimum 25% match. This project has a cash match of \$8,123,875 or 42% of the overall project cost, which far exceeds the 10% minimum cash match requirement. The total match with in-kind contributions is 53%. SANBAG will provide \$148,400 of in-kind match funding. This project is not dependent on any other grant award. Letters of Commitment from each third party can be found in Attachment 8 – Letters of Commitment. The budget is summarized in the table below.

Items	Grant	Cash Match	In-Kind Match	Total
Equipment and Installation	\$8,691,800	\$0	\$0	\$8,691,800
Data Loggers	\$54,000	\$0	\$0	\$54,000
Admin	\$355,000	\$0	\$0	\$355,000
SANBAG	\$0	\$0	\$148,400	\$148,400
BYD	\$0	\$18,114	\$1,802,900	\$1,821,014
BNSF	\$0	\$6,429,737	\$94,643	\$6,524,380
Daylight	\$0	\$1,676,024	\$23,354	\$1,699,378
CALSTART	\$0	\$0	\$19,000	\$19,000
Total	\$9,100,800	\$8,123,875	\$2,088,297	\$19,312,972
%	47%	42%	11%	100%

A table summarizing the key project milestones with the task owner, completion date, and funding amount is included below.

Milestone No.	Task Description	Task Owner	Completion Date	Project Funds	Admin Funds
0	SANBAG to act as administrator throughout	SANBAG	N/A		
1	Kickoff Meeting	SANBAG	1/8/2016		
2	Acquire EPA and CARB Certifications	BYD	4/1/2016		
3	Complete EVSE installation at each location	BNSF, Daylight	7/1/2016	\$1,191,800	
4	Complete Delivery of Phase 1 Trucks	BYD	7/1/2016	\$3,174,000	
5	Deployment of all Phase 1 Trucks	BNSF, Daylight	8/1/2016		
6	Market Assessment Final Report	CALSTART	9/1/2016		\$120,000
7	Complete Phase 1 Demonstration	BNSF, Daylight	3/1/2017		
8	Voice of the Customer Event Summary Report	CALSTART	4/1/2017		\$150,000
9	Deploy Reworked Phase 1	BYD, BNSF,	6/6/2017		

	Trucks	Daylight			
10	Demonstrate Phase 1 Trucks through conclusion of project	BNSF, Daylight	4/1/2019		
11	Complete Delivery of Phase 2 Trucks	BYD	7/7/2017	\$4,380,000	
12	Deployment of all Phase 2 Trucks	BNSF, Daylight	8/1/2017		
13	Complete Phase 2 Demonstration	BNSF, Daylight	4/1/2019		
14	Commercialization Roadmap	CALSTART	4/1/2019		\$85,000
Total				\$8,745,800	\$355,000

A complete budget with all associated cash and in-kind matches, as well as non-match items is included below.

Direct Labor In-Kind (Inclusive of overhead & fringe)	Hours	Rate	Total	Cash Match Labor/Capital	In-Kind Match
SANBAG					
Kelly Lynn	464	\$170.87	\$79,284		\$79,284
Jenny Herrera	808	\$85.54	\$69,116		\$69,116
BYD					
Andy Swanton	1900	\$200.00	\$380,000		\$380,000
Brendan Riley	32	\$250.00	\$8,000		\$8,000
Priyankar Balekai	1782	\$200.00	\$356,400		\$356,400
Michael Conner	480	\$125.00	\$60,000		\$60,000
Brian Li	1680	\$100.00	\$168,000		\$168,000
BNSF					
Kevin Maggay	178	\$81.02	\$14,421		\$14,421
Mike Pagel	178	\$70.01	\$12,462		\$12,462
Daylight					
Justin Webb	178	\$65.00	\$11,570		\$11,570
CALSTART					
Jean-Baptiste Gallo	95	\$100.00	\$9,500		\$9,500
Michael Ippoliti	95	\$100.00	\$9,500		\$9,500
Driver Training	1840	\$33.35	\$61,364		\$61,364
Maint Training	480	\$37.88	\$18,180		\$18,180
<b>Subcontractor Costs</b>			<b>Total</b>	<b>Cash Match Labor/Capital</b>	<b>In-Kind Match</b>
EVSE Upgrades San Bernardino					
SCE Charge for Upgrading Supply			\$10,000	\$10,000	
Site Upgrades & Charger Install			\$570,900		
EVSE Upgrades Commerce					

SCE Charge for Upgrading Supply			\$10,000	\$10,000	
Site Upgrades & Charger Install			\$570,900		
EVSE Upgrades Daylight			\$50,000		
Yard Tractors					
Fuel Cost			\$516,561	\$516,561	
Driver Cost			\$5,757,845	\$5,757,845	
Maintenance Cost			\$141,923	\$141,923	
Maintenance Cost - BYD			\$172,500		\$172,500
Phase 1 Rework Cost - BYD			\$135,000		\$135,000
Equipment Transport - BYD			\$20,500		\$20,500
Service Trucks					
Fuel Cost			\$19,670	\$19,670	
Driver Cost			\$1,645,423	\$1,645,423	
Maintenance Cost			\$4,338	\$4,338	
Maintenance Cost - BYD			\$15,000		\$15,000
Phase 1 Rework Cost - BYD			\$22,500		\$22,500
Equipment Transport - BYD			\$5,000		\$5,000
Data Logger Web Service			\$18,114	\$18,114	
CALSTART Market Assessment			\$120,000		
CALSTART Customer Outreach			\$150,000		
CALSTART Commercialization Roadmap			\$85,000		
<b>Direct Costs</b>	<b>Number</b>	<b>Price</b>	<b>Total</b>	<b>Cash Match Labor/Capital</b>	<b>In-Kind Match</b>
Phase 1 Yard Trucks	9	\$300,000	\$2,700,000		
Phase 1 Service Trucks	3	\$150,000	\$450,000		
Phase 1 Data Loggers	12	\$2,000	\$24,000		
Phase 2 Yard Trucks	14	\$300,000	\$4,200,000		
Phase 2 Service Trucks	1	\$150,000	\$150,000		
Phase 2 Data Loggers	15	\$2,000	\$30,000		
200 kW Chargers	23	\$20,000	\$460,000		\$460,000
Total			\$19,312,972		
Cash Match (min 10%)			\$8,123,875	42%	
In-Kind Match (min 25% with cash)			\$2,088,297	11%	
Grant Ask			\$9,100,800	47%	



## Attachment 5B – Budget Breakdown

### *Subcontractor Costs*

	BNSF SB	BNSF Commerce	Daylight Transport	Notes
Days per Week	6	6	6	
Days per Year	312	312	312	
Length of Phase 1 (yrs)	2.4	2.4	2.4	8/1/2016 through 4/1/2019 less 3 months for reworks
Length of Phase 2 (yrs)	1.4	1.4	1.4	8/1/2017 through 4/1/2019
<b>Yard Tractors</b>				
Hours Used Per Day	11.5	12	18	
Number of Tractors Phase 1	3	3	3	
Number of Tractors Phase 2	7	7	0	
<b>Fuel Cost</b>				
Efficiency of T9A (kWh/hr)	22	22	22	
Power Required/day (kWh/day)	252	263	394	
Electricity Rate (\$/kWh)	\$0.14	\$0.14	\$0.14	
Fuel Cost (\$/day)	\$35.69	\$37.11	\$55.67	
Fuel Cost Phase 1 (\$)	\$80,809	\$84,041	\$126,062	
Fuel Cost Phase 2 (\$)	\$110,612	\$115,037	\$0	
Fuel Cost Total	\$191,421	\$199,078	\$126,062	
			<b>\$516,561</b>	
<b>Driver Cost</b>				
Driver Salary Rate (\$/hr with benefits)	\$43.75	\$32.00	\$24.30	
Driver Cost Phase 1 (\$)	\$1,143,062	\$869,511	\$990,427	
Driver Cost Phase 2 (\$)	\$1,564,644	\$1,190,202	\$0	
Driver Cost Total	\$2,707,705	\$2,059,713	\$990,427	
			<b>\$5,757,845</b>	
<b>Maintenance Cost</b>				
Maintenance/yr (\$/yr)	\$2,250	\$600	\$12,804	SB rate for non-diesel components Commerce rate is for non-fuel related components Daylight - \$21,711 per truck/yr - x \$0.23/0.39 for electric
Maintenance Cost Phase 1 (\$)	\$16,329	\$4,355	\$92,926	
Maintenance Cost Phase 2 (\$)	\$22,352	\$5,961	\$0	
Maintenance Cost Total	\$38,682	\$10,315	\$92,926	
			<b>\$141,923</b>	
<b>Maintenance Cost - BYD</b>				
Maintenance/truck by BYD (% price)	2.50%	2.50%	2.50%	Estimation of maintenance cost for repairing at BYD facility
Maintenance Cost - BYD	\$75,000	\$75,000	\$22,500	

			<b>\$172,500</b>	Cost is assumed by BYD and is not included as match
Phase 1 Rework Cost - BYD				
Rework/truck by BYD (% price)	5%	5%	5%	Estimation of cost to swap components
Phase 1 Rework Cost - BYD	\$45,000	\$45,000	\$45,000	
			<b>\$135,000</b>	
Equipment Transport Cost				
Equipment Transport (\$/one-way trip)	\$500	\$500	\$500	
Phase 1 Trips	3	3	3	Delivery, Return for Rework, and Delivery
Phase 2 Trips	1	1	1	
Phase 1 Cost	\$4,500	\$4,500	\$4,500	
Phase 2 Cost	\$3,500	\$3,500	\$0	
			<b>\$20,500</b>	
Service Trucks				
Miles per Day	28	28	100	SB - 80 gallons/month, assume 9 mpg, Daylight 50 miles x 2
Number of Tractors Phase 1	1	1	1	
Number of Tractors Phase 2	1	0	0	
Fuel Cost				
Efficiency of T5 (kWh/mile)	1.07	1.07	1.07	
Power Required/day (kWh/day)	30	30	107	
Electricity Rate (\$/kWh)	\$0.14	\$0.14	\$0.14	
Fuel Cost (\$/day)	\$4.23	\$4.23	\$15.11	
Fuel Cost Phase 1 (\$)	\$3,194	\$3,194	\$11,408	
Fuel Cost Phase 2 (\$)	\$1,874	\$0	\$0	
Fuel Cost Total	\$5,068	\$3,194	\$11,408	
			<b>\$19,670</b>	
Driver Cost				
Driver Salary Rate (\$/hr with benefits)	\$52.08	\$52.08	\$33.42	This cost is included in the maintenance cost for both trucks
Driver Cost Phase 1 (\$)	\$453,596	\$471,740	\$453,991	
Driver Cost Phase 2 (\$)	\$266,096	\$0	\$0	
Driver Cost Total	\$719,692	\$471,740	\$453,991	
			<b>\$1,645,423</b>	
Maintenance Cost				
Maintenance/yr (\$/yr)	\$500	\$500	\$500	Rate provided by demonstrators for non-diesel components
Maintenance Cost Phase 1 (\$)	\$1,210	\$1,210	\$1,210	
Maintenance Cost Phase 2 (\$)	\$710	\$0	\$0	
Maintenance Cost Total	\$1,919	\$1,210	\$1,210	
			<b>\$4,338</b>	
Maintenance Cost - BYD				

Maintenance/truck by BYD (% price)	2.50%	2.50%	2.50%	Estimation of maintenance cost for repairing at BYD facility
Maintenance Cost - BYD	\$7,500	\$3,750	\$3,750	
			<b>\$15,000</b>	Cost is assumed by BYD and is not included as match
Phase 1 Rework Cost - BYD				
Rework/truck by BYD (% price)	5%	5%	5%	Estimation of cost to swap components
Phase 1 Rework Cost - BYD	\$7,500	\$7,500	\$7,500	
			<b>\$22,500</b>	
Equipment Transport Cost				
Equipment Transport (\$/one-way trip)	\$500	\$500	\$500	
Phase 1 Trips	3	3	3	Delivery, Return for Rework, and Delivery
Phase 2 Trips	1	1	1	
Phase 1 Cost	\$1,500	\$1,500	\$1,500	
Phase 2 Cost	\$500	\$0	\$0	
			<b>\$5,000</b>	
Data Loggers Web Service				
Data Loggers Monthly Service (\$/truck)	\$30	\$30	\$30	
Data Loggers Web Service Cost	\$7,571	\$7,060	\$3,484	
			<b>\$18,114</b>	

*In-Kind Hours*

Direct Labor Detail	Hours	Rate	Total	Description
<b>Kickoff Meeting</b>				
SANBAG				
Kelly Lynn	16	\$170.87	\$2,733.92	
Jenny Herrera	16	\$85.54	\$1,368.64	
BYD				
Andy Swanton	16	\$200	\$3,200.00	
Brendan Riley	16	\$250	\$4,000.00	
Priyankar Balekai	16	\$200	\$3,200.00	
Michael Conner	0	\$125	\$0.00	
Brian Li	0	\$100	\$0.00	
BNSF				
Kevin Maggay	16	\$81	\$1,296.24	
Mike Pagel	16	\$70	\$1,120.22	
Daylight				
Justin Webb	16	\$65	\$1,040.00	
CALSTART				
Jean-Baptiste Gallo	16	\$100	\$1,600.00	

Michael Ippoliti	16	\$100	\$1,600.00	
			<b>\$21,159.03</b>	

Direct Labor Detail	Hours	Rate	Total	Description
<b>Monthly Progress Calls</b>				
SANBAG				
Kelly Lynn	312	\$170.87	\$53,311.44	8 hours per for 39 months
Jenny Herrera	312	\$85.54	\$26,688.48	8 hours per for 39 months
BYD				
Andy Swanton	156	\$200.00	\$31,200.00	4 hours per for 39 months
Brendan Riley	0	\$250.00	\$0.00	
Priyankar Balekai	78	\$200.00	\$15,600.00	2 hours per for 39 months
Michael Conner	0	\$125.00	\$0.00	
Brian Li	0	\$100.00	\$0.00	
BNSF				
Kevin Maggay	78	\$81.02	\$6,319.18	2 hours per for 39 months
Mike Pagel	78	\$70.01	\$5,461.09	2 hours per for 39 months
Daylight				
Justin Webb	78	\$65.00	\$5,070.00	2 hours per for 39 months
CALSTART				
Jean-Baptiste Gallo	39	\$100.00	\$3,900.00	
Michael Ippoliti	39	\$100.00	\$3,900.00	1 hour per for 39 months
			<b>\$151,450.19</b>	

Direct Labor Detail	Hours	Rate	Total	Description
<b>Quarterly Reports</b>				
SANBAG				
Kelly Lynn	104	\$170.87	\$17,770.48	8 hours per for 13
Jenny Herrera	416	\$85.54	\$35,584.64	32 hours per for 13
BYD				



Andy Swanton	1560	\$200.0 0	\$312,000.0 0	40 hours per for 13
Brendan Riley	0	\$250.0 0	\$0.00	
Priyankar Balekai	1560	\$200.0 0	\$312,000.0 0	40 hours per for 13
Michael Conner	0	\$125.0 0	\$0.00	
Brian Li	1560	\$100.0 0	\$156,000.0 0	40 hours per for 13
BNSF				
Kevin Maggay	52	\$81.02	\$4,212.79	4 hours per for 13
Mike Pagel	52	\$70.01	\$3,640.73	4 hours per for 13
Daylight				
Justin Webb	52	\$65.00	\$3,380.00	4 hours per for 13
CALSTART				
Jean-Baptiste Gallo	32.5	\$100.0 0	\$3,250.00	
Michael Ippoliti	32.5	\$100.0 0	\$3,250.00	2.5 hours per for 13
			<b>\$851,088.6 4</b>	

Direct Labor Detail	Hours	Rate	Total	Description
<b>Final Report</b>				
SANBAG				
Kelly Lynn	16	\$170.8 7	\$2,733.92	
Jenny Herrera	64	\$85.54	\$5,474.56	
BYD				
Andy Swanton	80	\$200.0 0	\$16,000.00	
Brendan Riley	16	\$250.0 0	\$4,000.00	
Priyankar Balekai	80	\$200.0 0	\$16,000.00	
Michael Conner	0	\$125.0 0	\$0.00	
Brian Li	80	\$100.0 0	\$8,000.00	
BNSF				
Kevin Maggay	8	\$81.02	\$648.12	
Mike Pagel	8	\$70.01	\$560.11	
Daylight				

Justin Webb	8	\$65.00	\$520.00	
CALSTART				
Jean-Baptiste Gallo	7.5	\$100.00	\$750.00	
Michael Ippoliti	7.5	\$100.00	\$750.00	
			<b>\$55,436.71</b>	

Direct Labor Detail	Hours	Rate	Total	Description
<b>Weekly Progress Calls Upon Phase 1 and Phase 2 Deliveries</b>				
SANBAG				
Kelly Lynn	0	\$170.87	\$0.00	
Jenny Herrera	0	\$85.54	\$0.00	
BYD				
Andy Swanton	48	\$200.00	\$9,600.00	2 hrs for 12 weeks for 2 phases
Brendan Riley	0	\$250.00	\$0.00	
Priyankar Balekai	48	\$200.00	\$9,600.00	2 hrs for 12 weeks for 2 phases
Michael Conner	0	\$125.00	\$0.00	
Brian Li	0	\$100.00	\$0.00	
BNSF				
Kevin Maggay	24	\$81.02	\$1,944.36	1 hrs for 12 weeks for 2 phases
Mike Pagel	24	\$70.01	\$1,680.34	1 hrs for 12 weeks for 2 phases
Daylight				
Justin Webb	24	\$65.00	\$1,560.00	1 hrs for 12 weeks for 2 phases
CALSTART				
Jean-Baptiste Gallo	0	\$100.00	\$0.00	
Michael Ippoliti	0	\$100.00	\$0.00	
			<b>\$24,384.70</b>	

Direct Labor Detail	Hours	Rate	Total	Description
<b>Progress Reports for and Management of Disbursements</b>				

SANBAG				
Kelly Lynn	16	\$170.87	\$2,733.92	8 hours per for 2
BYD				
Andy Swanton	40	\$200.00	\$8,000.00	20 hours per for 2
Brian Li	40	\$100.00	\$4,000.00	20 hours per for 2
			<b>\$14,733.92</b>	
<b>Training Maintenance and Driver Staff</b>				
BYD				
Michael Conner	480	\$125.00	\$60,000.00	40 hrs for each maintenance & service x 2 phases; 3 locations
Eagle, Parsec, Daylight Drivers	1840	\$33.35	\$61,364.00	2 drivers per truck (46) for 40 hours
Eagle, Parsec, Daylight Maint	480	\$37.88	\$18,180.00	4 maintenance techs at 3 locations for 40 hours
			<b>\$139,544.00</b>	

BNSF Engineering Estimate for San Bernardino Upgrades



Kansas City, KS  
September 3, 2015

To Nathan Waller

From: Barry Grieser Facilities Engineering

Subject: San Bernardino, CA BNSF Electric Charging Stations Estimate

In line with your recent request, you will find listed below a BUDGETARY ESTIMATE associated with the BNSF electric charging stations, San Bernardino, CA electric charging station project. This estimate is for 1 electrical service to feed the 10 electric charging stations (Item 1), equipment pads (Item 2) directional boring to supply power to the services (Item 3) ATS (Item 4), and engineering. This estimate is based on 10 electric charging stations that require electrical power.

	Material		Labor		Other dollars	Total dollars
	quant	dollars	quant	dollars		
1 Electrical Service - Power Transformer, Panelboards, Breakers, Switchgear, Conduit, & Conductors.	1 Lots	175,000	1,000 mH	100,000		275,000
2 Equipment Pads & Bollards.	1 Lots	15,000	300 mH	30,000		45,000
3 Directional Boring - Includes HDPE Pipe & Conductors.	1 Lots	50,000	160 mH	16,000		66,000
4 Automatic Transfer Switch ATS	1 Lots	75,000	80 mH	8,000		83,000
5 Engineering/CM					50,000	50,000
subtotal:		315,000	1,540 mH	154,000	50,000	519,000
Contingency		10.0%				51,900
<b>Totals:</b>		<b>\$315,000</b>		<b>\$154,000</b>	<b>\$50,000</b>	<b>\$570,900</b>

Barry Grieser  
Facilities Engineering

*BNSF Engineering Estimate for Commerce Upgrades*



Kansas City, KS  
September 4, 2015

To Nathan Waller

From: Barry Grieser Facilities Engineering

Subject: Commerce Yard, CA BNSF Electric Charging Stations Estimate

In line with your recent request, you will find listed below a BUDGETARY ESTIMATE associated with the BNSF electric charging stations, Commerce Yard, CA electric charging station project. This estimate is for 1 electrical service to feed the 10 electric charging stations (Item 1), equipment pads (Item 2) directional boring to supply power to the services (Item 3) ATS (Item 4), and engineering. This estimate is based on 10 electric charging stations that require electrical power.

	Material		Labor		Other	Total
	quant	dollars	quant	dollars	dollars	dollars
1 Electrical Service - Power Transformer, Panelboards, Breakers, Switchgear, Conduit, & Conductors.	1 Lots	175,000	1,000 mH	100,000		275,000
2 Equipment Pads & Bollards.	1 Lots	15,000	300 mH	30,000		45,000
3 Directional Boring - Includes HDPE Pipe & Conductors.	1 Lots	50,000	160 mH	16,000		66,000
4 Automatic Transfer Switch ATS	1 Lots	75,000	80 mH	8,000		83,000
5 Engineering/CM					50,000	50,000
subtotal:		315,000	1,540 mH	154,000	50,000	519,000
Contingency		10.0%				51,900
<b>Totals:</b>		<b>\$315,000</b>		<b>\$154,000</b>	<b>\$50,000</b>	<b>\$570,900</b>

Barry Grieser  
Facilities Engineering

*Daylight Engineering Estimate for Installing Chargers*

Items	Cost
Panel	\$20,000
Underground wiring conduit terminals	\$15,000
Labor to install the panel and weather resistant cabinet interconnect enclosures	\$10,000
Additional materials	\$5,000
<b>Total estimated cost</b>	<b>\$50,000</b>



## Attachment 6 – Disadvantaged Communities Eligibility Determination

Each of the facilities in this project is located in a top 25% disadvantaged community in California and complies with **Step 1 – Located Within** of the *Interim Guidance to Agencies Administering Greenhouse Gas Reduction Fund Monies*, released November 3, 2014, specifically:

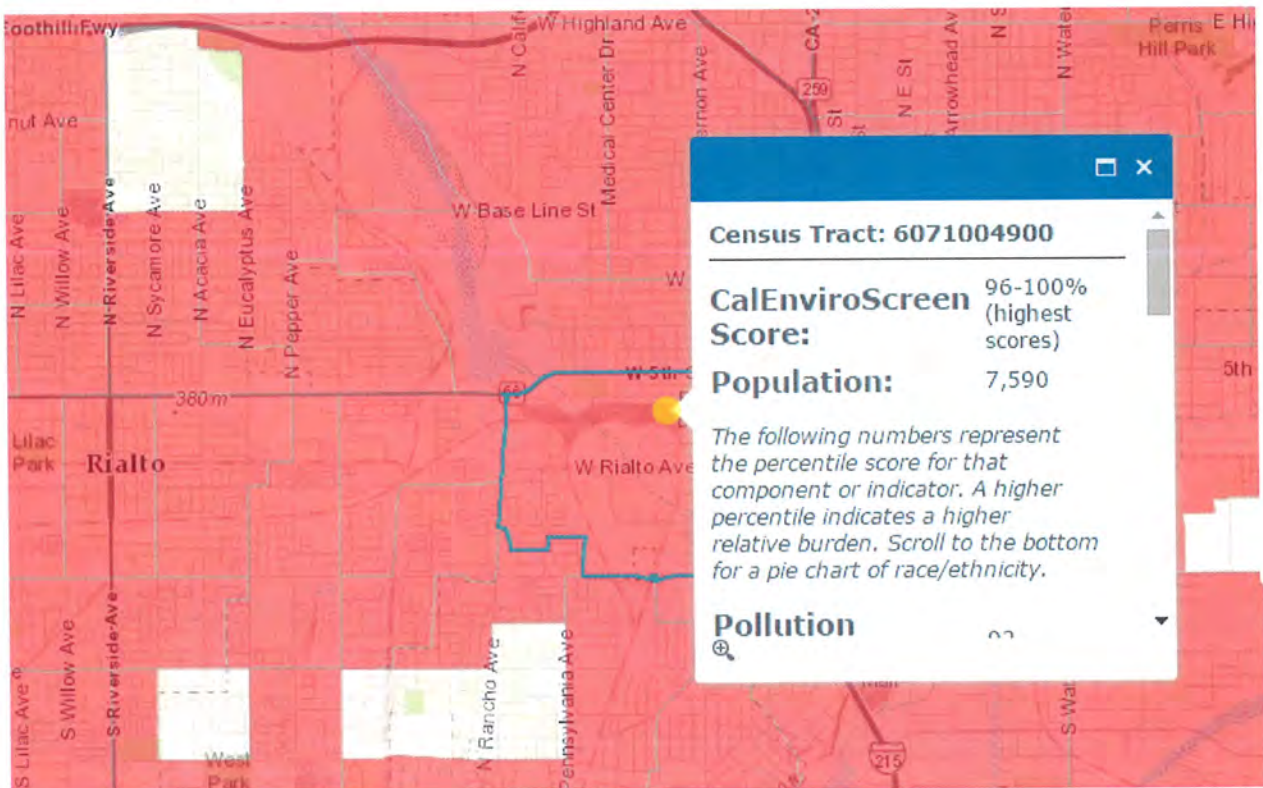
- Step 1A: Project provides incentives for vehicles or equipment to those with a physical address in a DAC - YES
- Step 1B: Project provides incentives for vehicles or equipment that will be domiciled in a DAC - YES

The addresses for each facility is:

- 1535 W 4<sup>th</sup> St, San Bernardino, CA 92411
- 2818 Eastern Ave, Commerce, CA 90040
- 11150 Elm Avenue, Fontana, CA 92337

More detail regarding these communities is provided in section Attachment 3A – Project Narrative.

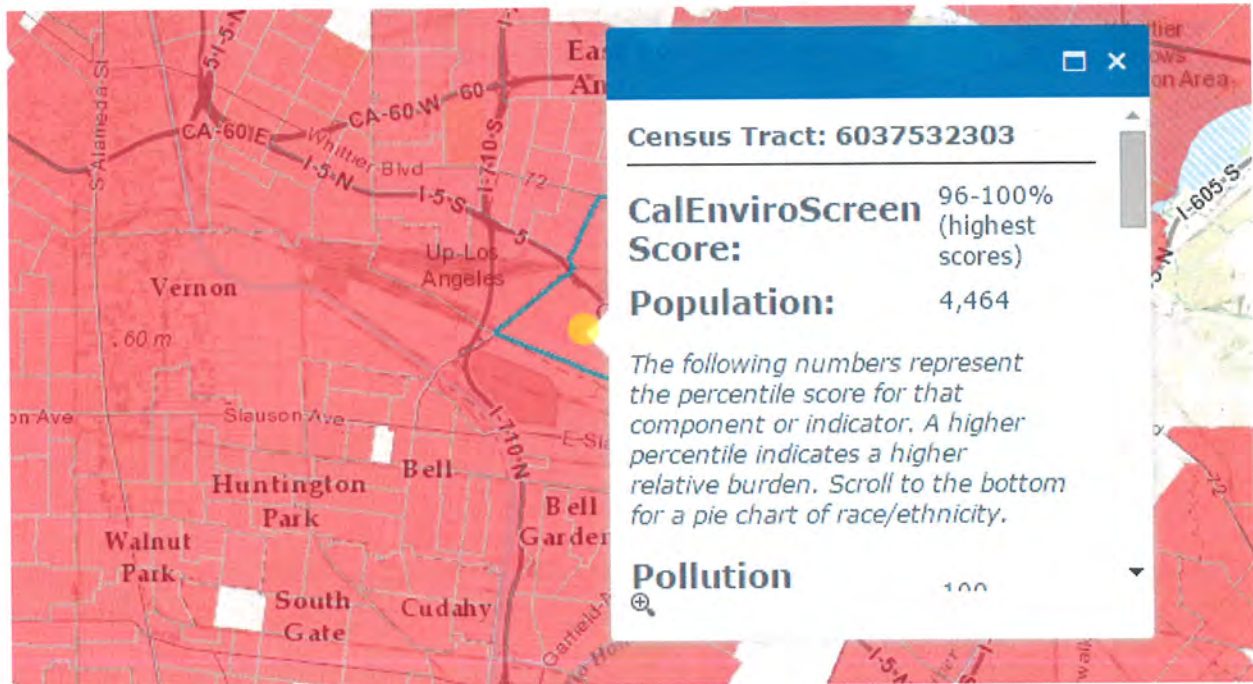
### BNSF San Bernardino



CalEPAEnviroScreen2.0 Evaluation Criteria	Percentile Rank
Ozone	98.47%
PM2.5	74.24%
<b>Pollution Burden Score</b>	<b>94.46%</b>

Asthma	97.13%
Education	95.05%
Poverty	94.39%
Unemployment	92.90%
<b>Population Characteristics Score</b>	<b>96.31%</b>

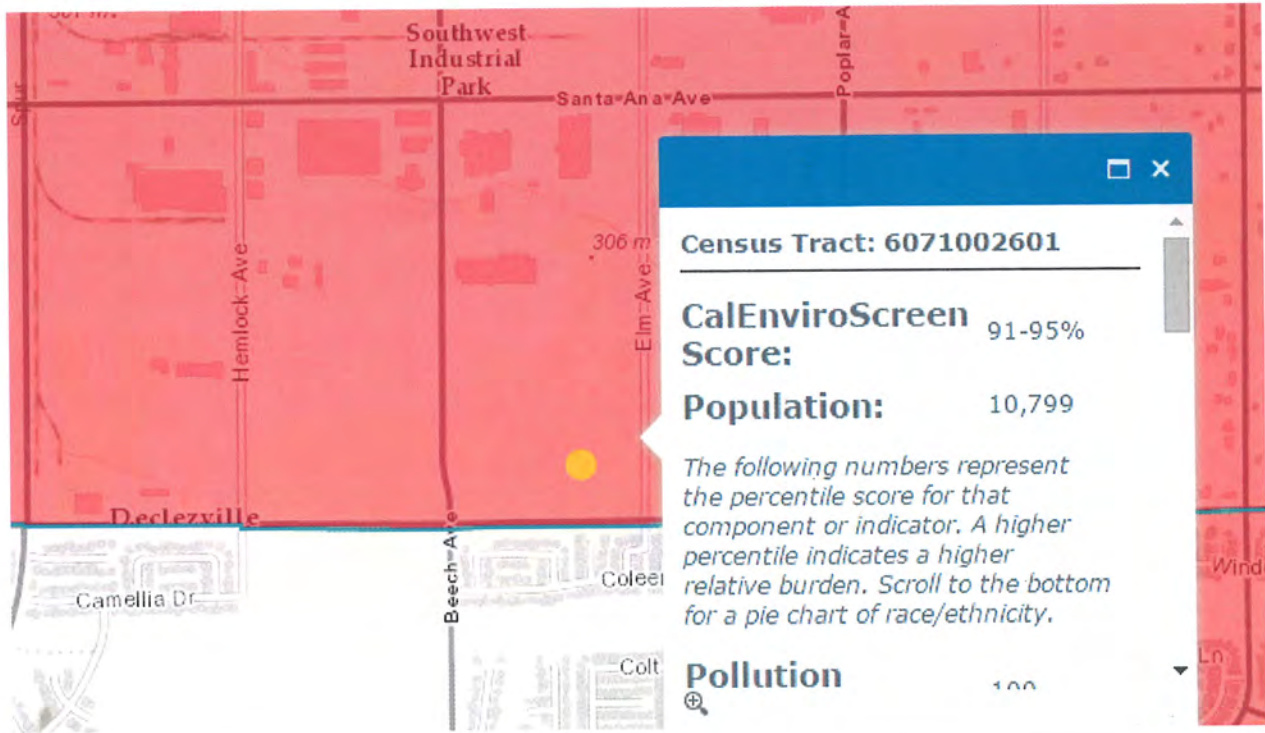
*BNSF Commerce*



CalEPAEnviroScreen2.0 Evaluation Criteria	Percentile Rank
PM2.5	88.26%
Diesel PM	94.66%
<b>Pollution Burden Score</b>	<b>99.50%</b>
Education	96.57 %
Unemployment	90.76%
<b>Population Characteristics Score</b>	<b>81.17%</b>



Daylight Fontana



CalEPAEnviroScreen2.0 Evaluation Criteria	Percentile Rank
Ozone	95.14%
PM2.5	93.67%
<b>Pollution Burden Score</b>	<b>99.89%</b>
<b>Population Characteristics Score</b>	<b>56.67%</b>



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**Attachment 7 – Confidentiality Provision**

### Confidentiality Provision

The following statement must be signed and returned to ARB with your application if the application includes confidential information that you want to be protected as trade secrets.

\* \* \* \* \*

The restriction on disclosing this information shall not apply to any information identified by the applicant as confidential that (a) is already known to the public or the ARB at the time of disclosure, or (b) is or becomes publicly known through no wrongful or negligent act on the part of the review panel members or the ARB.

The applicant further agrees that s/he has read the following confidentiality provision and agrees to its terms and conditions.

It is understood that in the course of carrying out this agreement, the ARB may provide Confidential Information to non-ARB reviewers. Each review panel member agrees to use his/her best effort to hold Confidential Information in confidence and shall return it to the ARB upon the completion of the agreement.

This obligation shall apply only to Confidential Information that is designated or identified as such in writing by the ARB prior to the disclosure thereof. All Confidential Information shall be sent only to the review panel members. Moreover, this obligation shall not apply to any Confidential Information which: (a) is or becomes publicly known through no wrongful or negligent act on the part of the review panel; (b) is already known to the review panel member at the time of disclosure; (c) is independently developed by the review panel member without breach of this agreement; or (d) is generally disclosed to third parties by the ARB without similar restrictions on such third parties."

X   
Applicant's signature

9/21/15  
Date



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**Attachment 8 – Letters of Commitment**



## San Bernardino Associated Governments

1170 W. 3rd Street, 2nd Fl, San Bernardino, CA 92410

Phone: (909) 884-8276 Fax: (909) 885-4407

Web: [www.sanbag.ca.gov](http://www.sanbag.ca.gov)



- 
- San Bernardino County Transportation Commission
  - San Bernardino County Transportation Authority
  - San Bernardino County Congestion Management Agency
  - Service Authority for Freeway Emergencies
- 

Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, California 95812-2815

RE: SAN BERNARDINO ASSOCIATED GOVERNMENTS (SANBAG) LETTER OF COMMITMENT FOR THE DEMONSTRATION OF MULTI-CLASS HEAVY-DUTY ZERO-EMISSION TRUCK DEVELOPMENT PROJECT FOR INTERMODAL AND WAREHOUSE FACILITIES

Dear Ms. Williams:

San Bernardino Associated Governments (SANBAG) is honored and pleased to submit this letter of commitment to the California Air resources Board (CARB) for the “Multi-Class Heavy-Duty Zero-Emission Truck Development Project for Intermodal and Warehouse Facilities.” This Project will test twenty-three yard tractors and four service vehicles across three California locations.

SANBAG is exceptionally qualified to be the lead applicant and to administer this important project. As the Council of Governments and the Transportation Planning Agency for the largest county (in geographic size) in the United States, SANBAG has had a tremendous amount of experience in programming state and federal funding for a wide range of transportation projects, as well as the implementation of numerous projects including a recent, “first of its kind” Alternative Fuel Project which resulted in the construction of two natural gas fueling stations and the deployment of 202 heavy-duty natural gas vehicles. The vehicles included 182 Freightliner M2-112 tractors featuring the Cummins ISL-G engine, in both single-axle and tandem-axle day cab configurations. The order also included 20 Peterbilt 286 tractors, featuring the Cummins Westport GX LNG engine, all in tandem-axle day cab configurations. Funding for the project was provided by the US Department of Energy Clean Cities, the California Energy Commission AB118, and Ryder Truck Systems, Inc.

SANBAG maintains the ability and resources to manage a project of this magnitude and has the ability to establish contracts, coordinate funding with appropriate accounting systems, coordinate data collection, administrative, reporting and other functions required for project implementation.

As the Grantee for this application, SANBAG is committed to achieving the overall goals of the Air Resources Board and this project to advance zero emission technologies and assist with the movement toward a more sustainable freight system in California.

Subject to legally required Board of Director approval, SANBAG will fulfill its role in the project. SANBAG staff will recommend approval to the Board. Under the project such responsibilities would include overseeing administrative and contractual requirements, preparing for monthly and quarterly meetings, processing of reporting to the CARB, participating in presentations, the final report and other project milestones.

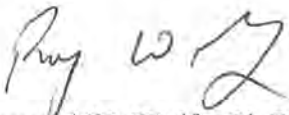
Responsibility for the execution for this project will be provided by Kelly Lynn, Chief of Air Quality and Mobility Programs for SANBAG. Working closely with CARB, SANBAG and the rest of the project team look forward to moving California and eventually the rest of the nation to a greater understanding of zero emission technologies.

This letter also serves as SANBAG's statement of financial commitment which is a projected in-kind contribution in the amount of \$148,400. This in-kind contribution consists of administrative, contractual, finance and project management services that will be provided by SANBAG staff.

In closing, this letter serves as SANBAG's affirmation that staff has read the sample agreement and is prepared to do a legal review upon grant award, at which time the agreement would be submitted to the Board of Directors for approval.

Thank you for the opportunity and consideration. We look forward to working with CARB.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ray W. Wolfe', written in a cursive style.

Raymond W. Wolfe, Ph.D.  
SANBAG Executive Director





Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, California 95812-2815

RE: BYD LETTER OF COMMITMENT FOR MULTI-SOURCE FACILITY DEMONSTRATION

Dear Ms. Williams:

BYD is pleased to submit this letter of commitment to the California Air Resources Board (CARB) to support SANBAG's grant application for the Multi-Source Facility Demonstration Solicitation. The application is requesting \$9,100,800 through 2014-2015 Air Quality Improvement Program and Low Carbon Transportation Greenhouse Gas Reduction Fund Investments: Multi-Source Facility Demonstration Project. The Project, to be carried out at three freight support facilities in Southern California, will include 23 yard trucks and 4 service trucks.

This demonstration represents an excellent opportunity for BYD to partner with CARB, along with BNSF Railway, Daylight Transport, and CALSTART to advance zero emission technologies and move to a more sustainable freight and cargo-handling system in California.

This letter serves as BYD's statement of commitment to fulfill its role in the Project. BYD agrees to meet all the deadlines presented in the Project Work Plan and provide electric trucks and yard hostlers that meet the specifications outlined in the Project proposal. BYD will use its existing facilities in Lancaster, CA to manufacture the equipment and does not require any additional resources. BYD is supporting this project with a total contribution of \$1,821,014, which includes \$18,114 in cash match for supporting a web-based platform for all data on the trucks and \$1,802,900 in in-kind match for attending all meetings, writing all reports, and equipment transport, in addition to absorbed costs for maintenance and re-work costs and the charging equipment.

Lastly, this letter serves as BYD's affirmation that staff has read the Sample Agreement and is prepared to do a legal review upon receiving notification of a grant award.

Thank you for the opportunity and consideration. We look forward to working with CARB.

Sincerely,

Stella Li  
President, BYD Motors



John D. Lovenburg  
Vice President Environmental

BNSF Railway Company  
2500 Lou Menk Dr., AOB-3  
Fort Worth, TX 76131-2828

(817) 352-1459  
(817) 352-2398 Fax

September 21, 2015

Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, California 95812-2815

RE: BNSF LETTER OF COMMITMENT FOR SANBAG MULTI-CLASS HEAVY-DUTY  
ZERO-EMISSION TRUCK DEVELOPMENT PROJECT FOR INTERMODAL AND  
WAREHOUSE FACILITIES

Dear Ms. Williams:

BNSF Railway (BNSF) is pleased to submit this letter of commitment to the California Air Resources Board (CARB) to support the San Bernardino Associated Governments' Multi-Class Heavy-Duty Zero Emission Truck Development Project for Intermodal and Warehouse Facilities (Project) grant application. The application is requesting **\$9.10** million through the Advanced Technology Freight Demonstrations: Multi-Source Facility Demonstration Project. The Project would test twenty three yard tractors and four service vehicles across three California locations at a total cost of \$19,312,972.

This Project represents an excellent opportunity for the freight industry to partner with CARB to advance zero emission technologies and move to a more sustainable freight system in California

This letter serves as BNSF's statement of commitment to fulfill its role in the Project. Under the Project, BNSF would provide real estate for charging systems and yard tractors; drivers through our third party contractors; fuel/electricity; and most importantly, a suitable real-world test environment at two BNSF facilities.

This letter also serves as BNSF's statement of total financial commitment of \$6,524,380. This is a total of in-kind contributions in the amount of **\$94,643** and cash contributions in the amount of \$6,429,737. This in-kind contribution consists of technical and administrative services, as well as driver training. BNSF cash contributions will go towards driver, fuel, and maintenance costs.

Lastly, this letter serves as BNSF's affirmation that staff have read the sample agreement and are prepared to do a legal review upon grant award.

Thank you for the opportunity and consideration. We look forward to working with CARB.

Sincerely,

A handwritten signature in blue ink that reads "John Lovenburg".

John Lovenburg  
Vice President Environmental



Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, California 95812-2815

RE: DAYLIGHT LETTER OF COMMITMENT FOR MULTI-SOURCE FACILITY DEMONSTRATION

Dear Ms. Williams:

Daylight Transport, LLC is pleased to submit this letter of commitment to the California Air Resources Board (CARB) to support SANBAG's grant application for the Multi-Source Facility Demonstration Solicitation. The application is requesting \$9,100,800 through 2014-2015 Air Quality Improvement Program and Low Carbon Transportation Greenhouse Gas Reduction Fund Investments: Multi-Source Facility Demonstration Project. The Project, to be carried out at three freight support facilities in Southern California, will include 23 yard trucks and 4 service trucks.

This demonstration represents an excellent opportunity for Daylight Transport, LLC to partner with CARB, along with BYD and CALSTART, to advance zero emission technologies and move to a more sustainable freight system in California.

This letter serves as Daylight Transport, LLC's statement of commitment to fulfil its role in the Project. Under the Project Daylight Transport, LLC would provide charging infrastructure; real estate for charging systems and yard tractors; drivers; and most importantly, a suitable real-world test environment. Daylight Transport, LLC is supporting this project with a total contribution of \$1,699,378, which includes \$1,676,024 in cash match for a combination of project oversight salaries, driver and maintenance training, fuel costs, maintenance costs and driver costs as well as \$23,354 in in-kind match for attending all meetings, writing all reports, and equipment transport.

Lastly, this letter serves as Daylight Transport, LLC's affirmation that the staff has read the Sample Agreement and is prepared to do a legal review upon receiving notification of a grant award.

Thank you for the opportunity and consideration. We look forward to working with CARB.

Sincerely,

A handwritten signature in cursive script that reads "Justin Webb".

Justin Webb  
Project Manager, Daylight Transport, LLC



Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, California 95812-2815

RE: CALSTART Letter of Commitment for the "Multi-Class Heavy-Duty Zero-Emission Truck Development Project for Intermodal and Warehouse Facilities" Project

**Clean Transportation  
Technologies and Solutions**

[www.calstart.org](http://www.calstart.org)

Board of Directors

**Mr. John Boesel**  
CALSTART

**Mr. Michael Britt**  
United Parcel Service

**Mr. Jack Broadbent**  
Bay Area Air Quality  
Management District

**Ms. Caroline Choi**  
Southern California Edison

**Ms. Donna DeMartino**  
San Joaquin Valley Regional  
Transit District

**Ms. Karen Hamberg**  
Westport Innovations

**Mr. Brian Olson**  
QUANTUM Technologies  
World Wide Inc.

**Mr. Puon Penn**  
Wells Fargo Bank

**Dr. Jeffrey Reed**  
Southern California Gas  
Company

**Mr. Pasquale Romano**  
ChargePoint

**Mr. Dipender Saluja**  
Capricorn Investment Group

**Mr. Chris Stoddart**  
New Flyer Industries Limited

**Mr. George Survant**  
Time Warner Cable

**Mr. Stephen Trichka**  
BAE Systems

Dear Ms. Williams:

CALSTART is pleased to submit this letter of commitment to support the San Bernardino Associated Governments' (SANBAG) "Multi-Class Heavy-Duty Zero-Emission Truck Development Project for Intermodal and Warehouse Facilities" (Project) grant application. The application is requesting \$9,100,800 million through the Advanced Technology Freight Demonstrations: Multi-Source Facility Demonstration Project. The Project would test twenty-three yard tractors and four service vehicles across three California locations including two BNSF Class 1 railroad yards and a Daylight Transport facility.

This Project represents an excellent opportunity for the multi-modal freight movement industry to advance zero emission technologies and move to a more sustainable freight system in California. In particular, this demonstration can help greatly reduce emissions at those critical points allowing mode-shifting: where regional on-road freight can be transferred to efficient long haul rail.

This letter serves as CALSTART's statement of commitment to fulfil its role in the Project. Under the Project, CALSTART, as a contractor in support of BYD, would perform work to drive faster commercialization via market assessment, future customer engagement and post demo road-mapping to ensure the demonstration activity moves into early vehicle production post-project.

This letter also serves as CALSTART's statement of financial commitment of \$19,000 in in-kind contributions to the SANBAG project. This in-kind contribution consists of staff labor taking part in and contributing to on-going project team meetings and industry supporting outreach during the life of the project.

Thank you for the opportunity and consideration. We look forward to working with the SANBAG project team on this well-structured project, involving a Class 1 railroad and a major world manufacturer of battery electric trucks and buses.

Sincerely,

Bill Van Amburg  
Senior Vice President

OFFICES IN :

48 S. Chester Ave PASADENA, CA 91106 • 626.744.5600 • FAX: 626.744.5610 | 14062 Denver West Pkwy Suite 300 LAKEWOOD, CO 80401-3188 • 303.825.7550  
501 Canal Blvd., Suite G RICHMOND, CA 94804 • 510.307.8700 • FAX: 510.307.8706 | 155 Water Street, 5<sup>th</sup> Floor Unit 13 Brooklyn, NY 11201 • 718.303.0787



September 21, 2015

Lisa Williams  
Air Resources Board  
Mobile Source Control Division  
P.O. Box 2815  
Sacramento, California 95812-2815

RE: Southern California Edison (SCE) letter of support for the San Bernardino Associated Governments' (SANBAG's) application for the "Multi-Source Facility" Demonstration Project

Dear Ms. Williams:

SCE is pleased to submit this letter of support to the California Air Resources Board (CARB) for the San Bernardino Associated Governments' (SANBAG's) Multi-Source Facility Demonstration Project (Project) grant application. The application is requesting \$9.10 million through the Advanced Technology Freight Demonstrations: Multi-Source Facility Demonstration Project solicitation which is funded with the Air Quality Improvement Program and Low Carbon Transportation Greenhouse Gas Reduction Fund (GGRF) Investments. The Project would test twenty-three yard tractors and four service vehicles in three locations served by SCE<sup>1</sup> at a total cost of \$19.3 million. We understand that SANBAG's partners in this Project include BYD, BNSF Railroad and Daylight Transport LLC

SCE is a subsidiary of Edison International and is an investor-owned electric utility operating in the State of California, covering over 50,000 square miles and serving 14 million people.

This Project represents an excellent opportunity for the freight industry to partner with CARB to advance zero emission technologies and move to a more sustainable freight system in California.

Under the Project, SCE would provide project support services that we provide to our large business EV customers. Specifically, our Business Customer Division would be able to help SANBAG and/or the project partners understand the factors that affect the project's energy costs, provide a customized rate analysis to help SANBAG and/or the project partners determine the most cost-effective eligible rate plan for each

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<sup>1</sup> 1535 W 4<sup>th</sup> St, San Bernardino, CA with ten 200 kW charging stations, 2) 2818 Eastern Ave, Commerce, CA with ten 200 kW charging stations, and 3) 11150 Elm Avenue, Fontana, CA with three 200 kW charging stations

location, and coordinate efforts with SCE's Distribution Planning Department to determine potential Rule 15 and 16 infrastructure upgrade costs and allowances. The Planning group at SCE would also be able to provide advice on the feasibility of serving a specific location for the charging stations and at what cost. SCE's Rules and tariffs apply to SANBAG and its project partners for the cost of electricity and other related charges. SCE's Advanced Technology division expects to participate in this project as a technical advisor, with the scope of the activities to be agreed upon by SCE and the SANBAG.

Because this is an unfunded collaboration and SCE will not be seeking reimbursement, SCE expects to be able to provide this type of support without being subject to the terms and conditions that may apply to a sub-recipient or vendor for the project.

Thank you for the opportunity to support SANBAG's application. We look forward to working with CARB, SANBAG, and the other project partners

Sincerely,



Lisa Cagnolatti  
Vice President, Business Customer Division  
Southern California Edison



**AMERICAN LUNG ASSOCIATION IN CALIFORNIA**  
441 MAC KAY DRIVE, SAN BERNARDINO, CA 92408  
phone: 909.884.5864 | fax: 909.884.6249

September 17, 2015

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

**RE: SANBAG Multi-Source Facility Demonstration Project Application**

Dear Chair Nichols:

The American Lung Association in California is pleased to write in support of the application submitted by the San Bernardino Associated Governments (SANBAG) in response to the Multi-Source Facility Demonstration Project grant program.

If awarded grant funding, this project will demonstrate the transformative potential of electrifying intermodal rail facilities. Rail facilities are currently a serious contributor of greenhouse gas and other harmful particulate emissions. Unfortunately, wide-scale adoption of zero emission technologies within intermodal rail-yards has been slow, with negative consequences to the environment and public health.

SANBAG's Multi-Source project will field multiple battery heavy-duty yard tractors and other service vehicles at several locations, allowing for rigorous comparative testing across different types of real-world environments. By deploying zero emission vehicles in BNSF's Class I rail yards and Daylight Transportation's logistics facility, the proposed project will help prove that green freight technology is both mature and economically viable. In the end, this will help pave the way for widespread electrification of the entire freight sector, with enormous benefits for society and the environment.

The American Lung Association in California thanks you in advance for your consideration of this application. Should you have any questions, please contact Terry M. Roberts at 909.321.3290 or [terry.roberts@lung.org](mailto:terry.roberts@lung.org).

The mission of the American Lung Association in California is to save lives by improving lung health and preventing lung disease. Our advocacy work includes creating smokefree environments, enhancing tobacco prevention and control programs, reducing air pollution and climate change, and improving health care, in addition to providing programs and resources to community members and funding critical research.

Sincerely,

Terry M. Roberts  
Managing Director  
American Lung Association in California

Visit [lung.org/california](http://lung.org/california)

Watch [youtube.com/californialung](http://youtube.com/californialung)

Like [facebook.com/alacalifornia](https://facebook.com/alacalifornia)

Follow [twitter.com/californialung](https://twitter.com/californialung)

PETE AGUILAR  
31ST DISTRICT, CALIFORNIA

1223 LONGWORTH HOUSE OFFICE BUILDING  
WASHINGTON, DC 20515  
(202) 225-3201

685 EAST CARNEGIE DRIVE  
SUITE 100  
SAN BERNARDINO, CA 92408  
(909) 890-4445

**Congress of the United States**  
**House of Representatives**  
**Washington, DC 20515-0531**

COMMITTEE ON AGRICULTURE  
SUBCOMMITTEE ON COMMODITY  
EXCHANGES, ENERGY, AND CREDIT  
SUBCOMMITTEE ON NUTRITION  
COMMITTEE ON  
ARMED SERVICES  
SUBCOMMITTEE ON EMERGING  
THREATS AND CAPABILITIES  
SUBCOMMITTEE ON STRATEGIC FORCES

September 17, 2015

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

**RE: SANBAG Multi-Source Facility Demonstration Project Application**

Dear Chair Nichols,

This letter is to express my support for the San Bernardino Associated Governments (SANBAG) application for funding under the Multi-Source Facility Demonstration Project grant program.

This project will demonstrate the potential for electrifying intermodal rail facilities and highlights the advantages of developing zero emission technology within intermodal rail yards.

SANBAG's Multi-Source project will field multiple battery heavy-duty yard tractors and other service vehicles at several locations, including the BNSF rail yard in downtown San Bernardino along 4<sup>th</sup> Street and Daylight Transport in Fontana. The project will allow for rigorous comparative testing across different types of real-world environments. By deploying zero emission vehicles in BNSF's Class I rail yards and Daylight Transportation's logistics facility, the proposed project will illustrate that green freight technology is both beneficial and economically viable.

I encourage you to give this application full and fair consideration, consistent with applicable laws and regulations. If you have any questions, please feel free to contact Curt Lewis, our Grants Coordinator at 909-890-4445.

Sincerely,



Pete Aguilar  
Member of Congress



CAPITOL OFFICE  
STATE CAPITOL  
ROOM 4061  
SACRAMENTO, CA 95814  
TEL (916) 651-4020  
FAX (916) 651-4920

DISTRICT OFFICES  
11780 CENTRAL AVENUE  
CHINO, CA 91710  
TEL (909) 591-7016  
FAX (909) 591-7096

464 W 4TH STREET  
SAN BERNARDINO, CA 92401  
TEL (909) 888-5360  
FAX (909) 591-7096

# California State Senate

SENATOR  
**CONNIE M. LEYVA**  
TWENTIETH SENATE DISTRICT



CHAIR  
DEMOCRATIC CAUCUS

COMMITTEES  
RULES  
APPROPRIATIONS  
EDUCATION  
ENERGY, UTILITIES &  
TELECOMMUNICATIONS  
JOINT LEGISLATIVE AUDIT  
TRANSPORTATION &  
HOUSING

September 14, 2015

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

**RE: SANBAG Multi-Source Facility Demonstration Project Application**

Dear Chair Nichols:

I am pleased to support the application submitted by the San Bernardino Associated Governments (SANBAG) for the Multi-Source Facility Demonstration Project grant program.

If awarded grant funding, this project will demonstrate the transformative potential of electrifying intermodal rail facilities. While wide-scale adoption of zero emission technologies within intermodal rail-yards has been slow, projects like this could help inform future efforts to positively impact the environment and public health.

SANBAG's Multi-Source project will field multiple battery heavy-duty yard tractors and other service vehicles at several locations, including the BNSF rail yard in downtown San Bernardino along 4<sup>th</sup> Street and Daylight Transport in Fontana. This project will allow for rigorous comparative testing across different types of real-world environments. By deploying zero emission vehicles in BNSF's Class I rail yards and Daylight Transportation's logistics facility, the proposed project can help develop green freight technology is both mature and economically viable.

Thank you in advance for your consideration of this application. If you have any questions, please feel free to reach me at (909) 591-7016.

Sincerely,

A handwritten signature in cursive script that reads "Connie M. Leyva".

Connie M. Leyva  
Senator, 20<sup>th</sup> District



**OFFICE OF THE MAYOR  
R. CAREY DAVIS**

300 North "D" Street • San Bernardino • CA 92418-0001  
909.384.5133 • Fax: 909.384.5067  
[www.ci.san-bernardino.ca.us](http://www.ci.san-bernardino.ca.us)

September 16, 2015

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

**RE: SANBAG Multi-Source Facility Demonstration Project Application**

Dear Chair Nichols:

On behalf of the City of San Bernardino, I am pleased to write in support of the application submitted by the San Bernardino Associated Governments (SANBAG) in response to the Multi-Source Facility Demonstration Project grant program.

If awarded grant funding, this project will demonstrate the transformative potential of electrifying intermodal rail facilities. Rail facilities are currently a contributor of greenhouse gas and other particulate emissions. While wide-scale adoption of zero emission technologies within intermodal rail-yards has been slow, the adoption of projects such as this will have a tremendously positive impact to the environment and public health.

SANBAG's Multi-Source project will field multiple battery heavy-duty yard tractors and other service vehicles at several locations, including the BNSF rail yard in downtown San Bernardino along 4<sup>th</sup> Street and Daylight Transport in Fontana, allowing for rigorous comparative testing across different types of real-world environments. By deploying zero emission vehicles in

**RE: SANBAG Multi-Source Facility Demonstration Project Application**

September 16, 2015

Page 2 of 2

BNSF's Class I rail yards and Daylight Transportation's logistics facility, the proposed project will help prove that green freight technology is both mature and economically viable. In the end, this will help pave the way for alternative widespread energy solutions such as the possible electrification of the freight sector, with enormous benefits for society and the environment.

The City of San Bernardino thanks you in advance for your consideration of this application.

Should you have any questions, please contact my office.

Sincerely,

A handwritten signature in blue ink that reads "R. Carey Davis". The signature is written in a cursive, flowing style.

R. Carey Davis  
Mayor



## Council Member Michael Tahan



September 17, 2015

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

**RE: SANBAG Multi-Source Facility Demonstration Project Application**

Dear Chair Nichols:

The City of Fontana is pleased to write in support of the application submitted by the San Bernardino Associated Governments (SANBAG) in response to the Multi-Source Facility Demonstration Project grant program.

If awarded grant funding, this project will demonstrate the transformative potential of electrifying intermodal rail facilities. Rail facilities are currently a contributor of greenhouse gas and other particulate emissions. While wide-scale adoption of zero emission technologies within intermodal rail-yards has been slow, the adoption of projects such as this will have a tremendously positive impact to the environment and public health.

SANBAG's Multi-Source project will field multiple battery heavy-duty yard tractors and other service vehicles at several locations, including the BNSF rail yard in downtown San Bernardino along 4<sup>th</sup> Street and Daylight Transport in Fontana, allowing for rigorous comparative testing across different types of real-world environments. By deploying zero emission vehicles in BNSF's Class I rail yards and Daylight Transportation's logistics facility, the proposed project will help prove that green freight technology is both mature and economically viable. In the end, this will help pave the way for alternative widespread energy solutions such as the possible electrification of the freight sector, with enormous benefits for society and the environment.

The City of Fontana thanks you in advance for your consideration of this application. Should you have any questions, please contact me at (909) 262-4770 or Amy Colbrunn, Assistant to the City Manager at (909) 350-6556.

Very truly yours,

Michael Tahan  
Mayor Pro Tem City of Fontana and SANBAG Board Member



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**Attachment 9 – CEQA Worksheet**

## **Attachment 9: CALIFORNIA ENVIRONMENTAL QUALITY ACT WORKSHEET**

This attachment must be submitted as part of the application if the project proposal includes proposed infrastructure installation (e.g., electric vehicle supply equipment or hydrogen refueling station). Additional information regarding this requirement is available in Appendix F.

The California Environmental Quality Act (CEQA) (Public Resources Code §§ 21000 et seq.) requires public agencies to identify the significant environmental impacts of their actions and to avoid or mitigate them, if feasible.<sup>2</sup> Under CEQA, an activity that may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment is called a “project” (Public Resources Code § 21065). Agency compliance with CEQA may include preparing a Notice of Exemption or conducting an Initial Study and preparing a Negative Declaration, a Mitigated Negative Declaration, or, if there are significant impacts, an Environmental Impact Report.

The Lead Agency is the public agency that has the greatest responsibility for preparing environmental documents under CEQA, and for carrying out, supervising, or approving a project. Where the grant recipient is a public agency, the Lead Agency is typically the recipient. Where the grant recipient is a private entity, the Lead Agency is the public agency that has greatest responsibility for supervising or approving the project as a whole.<sup>3</sup> When issuing contracts, grants, or loans, the Air Resources Board (ARB or Board) is typically a “Responsible Agency” under CEQA, which means that it may make its own CEQA findings based on review of the Lead Agency’s environmental documents. If ARB is the only public agency with responsibility for approving the project, then ARB may act as the Lead Agency and prepare its own environmental documents (based on analysis provided by the applicant).

This worksheet will help ARB determine what kind of CEQA review, if any, is necessary, and which agency will be performing that review as a Lead Agency. No project can be selected, nor can any grant be executed, until the Lead Agency has determined that the project is exempt from CEQA requirements, or the CEQA requirements have been satisfied.

Please answer all questions in the worksheet below as completely as possible. It may also help you to think through the CEQA process necessary for your proposed project. The ARB may request additional information in order to clarify responses provided on this worksheet.

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<sup>2</sup> To view frequently asked questions and answers about CEQA, please visit <http://resources.ca.gov/ceqa/more/faq.html>.

<sup>3</sup> 14 CCR §§ 15050, 15051. The Lead Agency typically has general governmental powers (such as a city or county), rather than a single or limited purpose (such as an air pollution control district).

1. What are the physical aspects of the project? (Check all that apply and provide brief description of work, including any size or dimensions of the project).

Project Aspect	Yes	No	Description of Project Aspect
Construction (including grading, paving, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes, minor construction activities are associated with this undertaking. Pavement surface will be disturbed to install electrical conduit and to extend utility service to a localized segment of the maintenance yard at each address disclosed in Section 2. This activity is categorically exempt under CEQA Article 19, Section 15303 (d).
Trenching	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes, trenching is associated with this undertaking. The installation of Electric Vehicle Supply Equipment (EVSE), i.e. the above-ground BYD 200 kW AC charging stations, entails trenching within the existing paved maintenance/freight yards to lay electric conduit, extending utilities to supply the charging stations. This activity is categorically exempt under CEQA Article 19, Section 15303 (d).
New or replaced pipelines	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No new or existing pipeline-activities are within the scope of this undertaking.
Construction of underground facilities (including tanks)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No construction of underground facilities is within the scope of this undertaking.
Modification or conversion of a facility	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes, this undertaking entails minor facility modification through the installation of charging stations, but will not convert the facility. The facilities will be modified by extending utility services to above-ground BYD 200 kW AC charging stations. Each project site will have: San Bernardino 10 chargers, Commerce 10 chargers, Fontana 3 chargers. This activity is categorically exempt under CEQA Article 19, Section 15303 (d).
New or modified operation of a facility or equipment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project will test new equipment but will not change operations. <ul style="list-style-type: none"> <li>• San Bernardino: 10 chargers for 12 new BYD zero-emissions trucks</li> <li>• Commerce: 10 chargers for 11 new BYD zero-emissions trucks</li> <li>• Fontana: 3 chargers for 4 new BYD zero-</li> </ul>



			emissions trucks This activity is categorically exempt under CEQA Article 19, Section 15303 (d).
On-road demonstration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No, this undertaking does not entail on-road demonstration, rather the focus is off-road demonstration.
Paper study (including analyses on economics, feedstock availability, workforce availability, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Yes, this undertaking entails studies. The purpose of this project is to demonstrate zero-emission electric technologies to determine feasibility of replacing the corresponding diesel trucks at freight support facilities. There will be economic analyses of both operational- and maintenance-savings of fuel, oil, equipment parts, etc. Each zero-emission truck will have a battery management system, compiling data to assist with future air quality and emissions studies.
Laboratory research	<input type="checkbox"/>	<input checked="" type="checkbox"/>	There is no laboratory research within the scope of this undertaking
Temporary or mobile structures (skid-mounted)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No, there are no temporary or mobile structures within the scope of this undertaking.
Design/Planning	<input type="checkbox"/>	<input checked="" type="checkbox"/>	There are no physical aspects related to design and planning within the scope of this undertaking.
Other (describe and add pages as necessary)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	All activities have been disclosed above.

**2. Where is the project located or where will it be located? (Attach additional sheets as necessary.)**

	Address	County	Type of Work to Be Completed at Site
1.	1535 W 4 <sup>th</sup> St, San Bernardino, CA	San Bernardino	Utility extensions to accommodate 2,000 kW peak demand.
2.	2818 Eastern Ave, Commerce, CA	Los Angeles	Utility extensions to accommodate 2,000 kW peak demand.
3.	11150 Elm Avenue, Fontana, CA	San Bernardino	Utility extensions to accommodate 600 kW peak demand.

**3. Will the project potentially have environmental impacts that trigger CEQA review? (Check a box and explain the answer for each question. Additionally, please provide a complete description of any direct physical changes and**

reasonably foreseeable indirect changes to the environment that may result from the project. Please provide as much detail as possible. You may provide additional information on supplemental pages as necessary.)

Question	Yes	No	Don't Know	Explanation
Is the project site environmentally sensitive?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, the project sites are on established paved facilities with no native habitat observable.
Is the project site on agricultural land?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, the project sites are on established paved facilities with no associated agricultural uses.
Is the land on which the project would be built previously disturbed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. San Bernardino: Yes, the project site is an intermodal rail yard that BNSF uses to transport freight. 2. Commerce: Yes, the project site is an intermodal rail yard that BNSF uses to transport freight. 3. Fontana: Yes, the project site is a transport yard currently being constructed and thus is disturbed.
Is this project part of a larger project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, the project has interdependent utility and is not part of a larger project.
Is there public controversy about the proposed project or larger project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, there is no public controversy associated with this project.
Will historic resources or historic buildings be impacted by the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, there are no historic resources or buildings associated with this project.
Is the project located on a site the Department of Toxic Substances Control and the Secretary of the Environmental Protection have identified as being affected by hazardous wastes or cleanup problems?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, none of the sites have hazardous wastes associated with them. The GeoTracker database was consulted and no sites of concern were identified at the project addresses. GeoTracker is the Water Boards' data management system for managing sites that impact groundwater (i.e. Underground Storage Tanks, Department of Defense' Site Cleanup Program) as well as

Question	Yes	No	Don't Know	Explanation
				permitted facilities such as operating USTs and land disposal sites.
Will the project generate noise or odors in excess of permitted levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, the project will not generate noise or odor in excess of permitted levels. Rather, the project will result in the reduction of both noise and odor with introduction of zero-emission vehicles; thus the project will have a net-positive impact on the environment.
Will the project increase traffic at the site and by what amount?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, this project does not increase the capacity of transportation facilities and thus does not increase traffic.
Is the project expected to result in environmental impacts to any other resource area (e.g., air quality, aesthetics, water quality)? (Add pages as necessary.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No, the project will not result in any negative environmental impacts. Rather the project will have a net-positive impact on the environment resulting from reduced carbon emissions, elimination of petroleum-based inputs to truck fleets, incorporation of renewable energies in the charging of zero-emission vehicles, reduced noise impacts from electric vehicles, and positive community impacts with new employment opportunities in economically disadvantaged areas.

**4. Will the project require discretionary permits or determinations, as listed below?**

Type of Permit	No	Modified	New	Approving Agency	Reason for Permit, Summary of Process, and Anticipated Date of Issuance
Air Quality Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--
Water Quality Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--
Conditional Use Permit or Variance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--
Building Expansion Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--
Hazardous Waste Permit	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--
Rezoning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--
Authority to Construct	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--
Other Permits (List types)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	--	--

**5. Of the agencies listed in #4, have you identified and contacted the public agency who will be the lead CEQA agency on the project?**

**Yes.** Provide the name and contact information for the lead agency.

San Bernardino Associated Governments  
 Jenny Herrera, Management Analyst  
 Air Quality & Mobility Programs Department  
 1170 W. 3rd Street, 2nd Floor, San Bernardino, CA 92410  
 Email: [jherrera@sanbag.ca.gov](mailto:jherrera@sanbag.ca.gov) Office: 909.884.8276

6. If you identified an agency with discretionary approval authority over the project (see Item 4 above), has as the public agency prepared environmental documents (e.g., Notice of Exemption, Initial Study/Negative Declaration/Mitigated Negative Declaration, Environmental Impact Report, Notice of Determination) under CEQA for the proposed project?

No. Explain why no document has been prepared. Propose a process for obtaining lead agency approval and estimated date for that approval (must occur before ARB will approve the grant).

Prior to the grant approval, the San Bernardino Associated Governments (SANBAG) will issue a Notice of Exemption (see Appendix I), for the California Environmental Quality Act (CEQA).

Under CEQA, this project is classified as not having a significant effect on the environment, and declared to be categorically exempt from preparation of an environmental document ( Section 21083, Public Resources Code; Reference: Section 21084, Public Resources Code). This proposed project is exempt from CEQA analysis under Article 19, Section 15303 (d): *New Construction or Conversion of Small Structures: Utility Extensions*. The provision states: **Class 3 consists of construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure.** The numbers of structures described in this section are the maximum allowable on any legal parcel. Examples of this exemption include, but are not limited to: (d) Water main, sewage, **electrical**, gas, and other **utility extensions**, including street improvements, of reasonable length to serve such construction.

The Air Resources Board(ARB) is the responsible agency for this undertaking, may wish to prepare their own CEQA documentation.

Furthermore, this project is exempt from National Environmental Policy Act (NEPA) analysis, in that this project does not entail the federal nexus (i.e. federal funding, federal permits/approval, or federal lands).

**Certification: I certify to the best of my knowledge that the information contained in this worksheet is true and complete. I further certify that I am authorized to complete and sign this form on behalf of the proposing organization.**

Name: Raymond W. Wolfe, Ph.D.

Title: SANBAG Executive Director

Signature: 

Phone Number: Office: 909.884.8276

[rwolfe@sanbag.ca.gov](mailto:rwolfe@sanbag.ca.gov)

Email: \_\_\_\_\_

Date: 9/21/15

APPENDIX 1

San Bernardino Associated Governments  
SANBAG

## Notice of Exemption

**Project Title:** MULTI-CLASS HEAVY-DUTY ZERO-EMISSION TRUCK DEVELOPMENT  
PROJECT FOR INTERMODAL AND WAREHOUSE FACILITIES

**Project Location:** San Bernardino, City of Commerce, and Fontana, California

**Public Meeting Date:** December 2, 2015

**Project Description:** The proposed project will demonstrate zero-emission yard tractors and service trucks at three freight locations in Southern California, operated by BNSF, BNSF and Daylight Transport, respectively in: San Bernardino, City of Commerce, and Fontana. Each of the three locations will replace their fleets in two phases with electric zero-emission vehicles and improve their operational facilities with utility extensions to power the new fleet.

This notice is to advise that the San Bernardino Associated Governments, as the lead agency, approve the above action on September 21, 2015. The Air Resources Board, as the responsible agency, may make its own CEQA findings based on review of the SANBAG's environmental documents.

San Bernardino Associated Governments concluded that this regulatory action is exempt from the requirements of CEQA, as described in CEQA Guidelines under Article 19, Section 15303 (d): *New Construction or Conversion of Small Structures: Utility Extensions*.

These documents may also be examined by:

San Bernardino Associated Governments  
Air Quality & Mobility Programs Department  
1170 W. 3rd Street, 2nd Floor, San Bernardino, CA 92410

**Certified:**   
Raymond W. Wolfe, Ph.D. – SANBAG Executive Director

**Date:** 9/21/15





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**Attachment 10 – Conflict of Interest Declaration**



## CONFLICT OF INTEREST DECLARATION

As a Multi-Source Facility Demonstration Program Grantee, San Bernardino Associated Governments (SANBAG) has no known conflict of interest, current, ongoing, or pending direct or indirect interest, which poses an actual, apparent, or potential conflict of interest with our ability to fulfill the duties of the Grantee. These may include but are not limited to financial arrangements with or interest in zero or near zero-emission technology providers, vehicle manufacturers, or related organizations.

---

SANBAG Executive Director

A handwritten signature in black ink, appearing to read "Ray Wolfe", is written over a horizontal line.

---

Raymond W. Wolfe, Ph.D.

9/21/15

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Date



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**Attachment 11 – STD.204 Payee Data Record**

### PAYEE DATA RECORD

(Required when receiving payment from the State of California in lieu of IRS W-9)  
 STD. 204 (Rev. 5/06)\_DHCS

<b>1</b>	<b>INSTRUCTIONS:</b> Complete all information on this form. Sign, date, and return to the State agency (department/office) address shown at the bottom of this page. Prompt return of this <b>fully completed</b> form will prevent delays when processing payments. Information provided in this form will be used by State agencies to prepare Information Returns (1099). See reverse side for more information and Privacy Statement. <b>NOTE:</b> Governmental entities, federal, state, and local (including school districts), are not required to submit this form.															
<b>2</b>	PAYEE'S LEGAL BUSINESS NAME (Type or Print) San Bernardino Associated Governments															
	SOLE PROPRIETOR—ENTER NAME AS SHOWN ON SSN (Last, First, M.I.)	E-MAIL ADDRESS hflores@sanbag.ca.gov														
	MAILING ADDRESS 1170 W. 3rd Street, 2nd Floor	BUSINESS ADDRESS 1170 W. 3rd Street, 2nd Floor														
	CITY, STATE, ZIP CODE San Bernardino, CA 92410	CITY, STATE, ZIP CODE San Bernardino, CA 92410														
<b>3</b>	ENTER FEDERAL EMPLOYER IDENTIFICATION NUMBER (FEIN): <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">3</span> - <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">4</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">8</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">8</span> <span style="border: 1px solid black; padding: 2px;">1</span>		<b>NOTE:</b> Payment will not be processed without an accompanying taxpayer I.D. number.													
PAYEE ENTITY TYPE  CHECK ONE BOX ONLY	<table style="width:100%; border: none;"> <tr> <td style="width:30%; vertical-align: top;"> <input type="checkbox"/> PARTNERSHIP   <input type="checkbox"/> ESTATE OR TRUST   <input type="checkbox"/> INDIVIDUAL OR SOLE PROPRIETOR                      ENTER SOCIAL SECURITY NUMBER:                 </td> <td style="width:30%; vertical-align: top;"> <b>CORPORATION:</b>  <input type="checkbox"/> MEDICAL (e.g., dentistry, psychotherapy, chiropractic, etc.)  <input type="checkbox"/> LEGAL (e.g., attorney services)  <input type="checkbox"/> EXEMPT (nonprofit)  <input checked="" type="checkbox"/> ALL OTHERS                 </td> <td style="width:40%; vertical-align: top;"> <table border="1" style="width:100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td> </tr> </table> </td> </tr> </table>			<input type="checkbox"/> PARTNERSHIP  <input type="checkbox"/> ESTATE OR TRUST  <input type="checkbox"/> INDIVIDUAL OR SOLE PROPRIETOR ENTER SOCIAL SECURITY NUMBER:	<b>CORPORATION:</b> <input type="checkbox"/> MEDICAL (e.g., dentistry, psychotherapy, chiropractic, etc.) <input type="checkbox"/> LEGAL (e.g., attorney services) <input type="checkbox"/> EXEMPT (nonprofit) <input checked="" type="checkbox"/> ALL OTHERS	<table border="1" style="width:100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td><td style="width:12.5%;"></td> </tr> </table>										
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	(SSN required by authority of California Revenue and Tax Code Section 18646)															
<b>4</b>	<table style="width:100%; border: none;"> <tr> <td style="width:30%; vertical-align: top;"> <input checked="" type="checkbox"/> California resident—qualified to do business in California or maintains a permanent place of business in California.   <input type="checkbox"/> California nonresident (see reverse side)—Payments to nonresidents for services may be subject to State income tax withholding.   <input type="checkbox"/> No services performed in California.  <input type="checkbox"/> Copy of Franchise Tax Board waiver of State withholding attached.                 </td> <td style="width:70%;"></td> </tr> </table>			<input checked="" type="checkbox"/> California resident—qualified to do business in California or maintains a permanent place of business in California.  <input type="checkbox"/> California nonresident (see reverse side)—Payments to nonresidents for services may be subject to State income tax withholding.  <input type="checkbox"/> No services performed in California. <input type="checkbox"/> Copy of Franchise Tax Board waiver of State withholding attached.												
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<b>5</b>	I hereby certify under penalty of perjury that the information provided on this document is true and correct. Should my residency status change, I will promptly notify the State agency below.															
	AUTHORIZED PAYEE REPRESENTATIVE'S NAME (Type or Print) William Stawarski	TITLE Chief Financial Officer														
	SIGNATURE 	DATE September 18, 2015	TELEPHONE ( 909 ) 884-8276													
<b>6</b>	Please return completed form to:															
	Department/Office: <u>Department of Health Care Services- TPLRD</u>															
	Unit/Section: _____															
	Mailing Address: _____															
	City/State/ZIP: _____															
	Telephone: (    ) _____ FAX: (    ) _____															
	E-Mail Address: _____															

**PAYEE DATA RECORD**

STD. 204 (Rev. 5/06)\_DHCS (Page 2)

<p><b>1</b></p>	<p><b>Requirement to Complete Payee Data Record, STD. 204</b></p> <p>A completed Payee Data Record, STD. 204, is required for payments to all non-governmental entities and will be kept on file at each State agency. Since each State agency with which you do business must have a separate STD. 204 on file, it is possible for a payee to receive this form from various State agencies.</p> <p>Payees who do not wish to complete the STD. 204 may elect to not do business with the State. If the payee does not complete the STD. 204 and the required payee data is not otherwise provided, payment may be reduced for federal backup withholding and nonresident State income tax withholding. Amounts reported on Information Returns (1099) are in accordance with the Internal Revenue Code and the California Revenue and Taxation Code.</p>
<p><b>2</b></p>	<p>Enter the payee's legal business name. Sole proprietorships must also include the owner's full name. An individual must list his/her full name. The mailing address should be the address at which the payee chooses to receive correspondence. Do not enter payment address or lock box information here.</p>
<p><b>3</b></p>	<p>Check the box that corresponds to the payee business type. Check only one box. Corporations must check the box that identifies the type of corporation. The State of California requires that all parties entering into business transactions that may lead to payment(s) from the State provide their Taxpayer Identification Number (TIN). The TIN is required by the California Revenue and Taxation Code Section 18646 to facilitate tax compliance enforcement activities and the preparation of Form 1099 and other information returns as required by the Internal Revenue Code Section 6109(a).</p> <p>The TIN for individuals and sole proprietorships is the Social Security Number (SSN). Only partnerships, estates, trusts, and corporations will enter their Federal Employer Identification Number (FEIN).</p>
<p><b>4</b></p>	<p><b><u>Are you a California resident or nonresident?</u></b></p> <p>A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California.</p> <p>A partnership is considered a resident partnership if it has a permanent place of business in California. An estate is a resident if the decedent was a California resident at time of death. A trust is a resident if at least one trustee is a California resident.</p> <p>For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident.</p> <p>Payments to all nonresidents may be subject to withholding. Nonresident payees performing services in California or receiving rent, lease, or royalty payments from property (real or personal) located in California will have 7% of their total payments withheld for State income taxes. However, no withholding is required if total payments to the payee are \$1,500 or less for the calendar year.</p> <p>For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below:</p> <p>Withholding Services and Compliance Section:      1-888-792-4900      E-mail address: wscs.gen@ftb.ca.gov          For hearing impaired with TDD, call:                      1-800-822-6268      Website: www.ftb.ca.gov</p>
<p><b>5</b></p>	<p>Provide the name, title, signature, and telephone number of the individual completing this form. Provide the date the form was completed.</p>
<p><b>6</b></p>	<p>This section must be completed by the State agency requesting the STD. 204.</p>
<p><b>Privacy Statement</b></p> <p>Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, State, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it.</p> <p>It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and State law imposes noncompliance penalties of up to \$20,000.</p> <p>You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the business services unit or the accounts payable unit of the State agency(ies) with which you transact that business.</p> <p>All questions should be referred to the requesting State agency listed on the bottom front of this form.</p>	