

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: Motiv Power Systems, Inc.

RESOLVED, that the State Energy Resources Conservation and Development Commission (Energy Commission) approves Amendment 1 for Agreement ARV-09-015 to allow a no-cost time extension of six months to December 30, 2012, and budget reallocation for the Motiv Power Systems, Inc. prototype electric shuttle bus project. Critical work that was originally slated for subcontractors will be conducted in-house by Motiv Power Systems, Inc. and will require additional time. (ARFVT funding.) Contact: Jared Cacho.

FURTHER BE IT RESOLVED, that this document authorizes the Executive Director to execute the same on behalf of the Energy Commission.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on March 14, 2012.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Harriet Kallemeyn,
Secretariat

SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Define Vehicle Specifications
3		Powertrain Design, Assembly and Testing
4	X	Vehicle Integration and Testing
5	X	Field Phase 1 Prototype
6		Advanced Battery Pack
7		Field Phase 2 Prototype
8		Data Collection and Analysis

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partners
1	Marc Herman – Motiv Jim Castelaz – Motiv		
2	Jim Castelaz – Motiv, Benson Tsai – Motiv, Vishal Parikh – Motiv, Sam Chang – Motiv, Steven Diamond – Motiv		
3	Benson Tsai – Motiv, Sam Chang – Motiv, Steven Diamond – Motiv		
4	Benson Tsai – Motiv, Sam Chang – Motiv, Steven Diamond – Motiv	Gary Bauer – Bauer	
5	Sam Chang – Motiv, Steven Diamond – Motiv	Gary Bauer – Bauer	
6	Jim Castelaz – Motiv, Benson Tsai – Motiv, Vishal Parikh – Motiv, Sam Chang – Motiv, Steven Diamond – Motiv	Franz Kruger – Seeo Mohit Singh – Seeo Hany Eitouni – Seeo	
7	Sam Chang – Motiv Steven Diamond – Motiv	Gary Bauer – Bauer	
8			

GLOSSARY

Specific terms and acronyms used throughout this scope of work are defined as follows:

Term/ Acronym	Definition
AC	Alternating Current
APC	Adaptive Power Converter
AUX	Auxiliary Power Unit
BMS	Battery Management System – electronics and control to keep the state of charge of many battery cells in close proximity to each other
BOM	Bill of Materials
CARB	California Air Resources Board

Term/ Acronym	Definition
Energy Commission	California Energy Commission
CEQA	California Environmental Quality Act
CMT-380	Capstone MicroTurbine-380 Vehicle
CPR	Critical Project Review
DC	Direct Current
EDV	Electric-drive vehicle – any vehicle that mechanically drives its wheels exclusively with (an) electric motor(s).
EPA	Environmental Protection Agency
EV	Electric Vehicle
FTD	Fuels and Transportation Division
HV	High Voltage
GHG	Greenhouse Gas
MHDV	Medium- and Heavy-Duty Vehicles
PCB	Printed circuit board
PCS	Power Control System – the name of Motiv’s power platform for EDVs
PCU	Power Control Unit – the system controller (i.e. the brain) in Motiv’s PCS

Background:

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007), created the Alternative and Renewable Fuel and Vehicle Technology Program (AB 118 Program). The statute, subsequently amended by AB 109 (Núñez, Chapter 313, Statutes of 2008), authorizes the Energy Commission to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state’s climate change policies. The Energy Commission has an annual program budget of approximately \$100 million and provides financial support for projects that:

- Develop and improve alternative and renewable low-carbon fuels;
- Optimize alternative and renewable fuels for existing and developing engine technologies;
- Produce alternative and renewable low-carbon fuels in California;
- Decrease, on a full fuel cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability;
- Expand fuel infrastructure, fueling stations, and equipment;
- Improve light-, medium-, and heavy-duty vehicle technologies;
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets;
- Expand infrastructure connected with existing fleets, public transit, and transportation corridors; and
- Establish workforce training programs, conduct public education and promotion, and create technology centers.

The California Energy Commission issued solicitation PON-09-004 to provide funding opportunities under the AB 118 Program for projects which develop the commercialization of advanced medium- and heavy-duty vehicle technologies. To be eligible funding under PON-09-004, the projects must also be consistent with the Energy Commissions AB 118 Investment Plan updated annually. In response to PON-

09-004, Recipient submitted application # 6 which was proposed for funding in the Energy Commission's Notice of Proposed Awards (released on May 28, 2010 and revised June 10, 2010), and is incorporated by reference to this Agreement in its entirety.

Problem Statement:

Electric-drive vehicles (EDVs) are vehicles driven solely by an electric motor and include battery electric vehicles, series hybrids, and fuel cell vehicles. In all cases, EDVs increase wells-to-wheels efficiency, reduce the environmental impact of transportation, and reduce United States and California reliance on foreign oil. A number of companies including Tesla, General Motors (GM), etc., have shown these and the many additional benefits of electrifying light vehicles. The current state of electric vehicle technology for medium- and heavy-duty vehicles (MHDVs) is far behind that of light-duty vehicles. In order to bring those benefits to MHDVs, there are two problems sets that need to be addressed: (1) the technology challenges in the higher power level and greater energy storage requirements of MHDVs, and (2) the difficulties associated with new technology adoption in the MHDVs industry structure, which is very different from the light-duty vehicle industry structure.

California's aggressive air quality and greenhouse gas reduction goals require changes to business-as-usual technologies for MHDVs. Since so many new vehicle electrification technologies are being developed – including batteries, motors, and generators – now is a critical time to build a platform that can be used to facilitate comparison and competition among them. This platform, which must be capable of managing high power levels and large amounts of energy storage, has not been provided by anyone in the marketplace to date. Traditional MHDVs integrators lack the electrical expertise and flexibility to adapt to new component technologies. New EDV companies often fail to see the unique market structure for MHDVs and attempt a completely customized vehicle solution, as would be appropriate for the light-duty vehicle market. Fleets need an EDV electronics platform that enables large energy storage, allows customization, and minimizes the risk of choosing the 'wrong' new technology by providing a simple and low-cost upgrade path and compatibility among a wide range of new component technologies.

Goals of the Agreement:

The goal of this project is to develop, build, field, and operate a prototype electric shuttle bus that uses Motiv's Power Control System (PCS) and has more than 100 miles of all-electric range. This shuttle will demonstrate the value of Motiv's flexible PCS technology for MHDVs and gather real-time data of shuttle performance. The shuttle will transport passengers over 8,000 miles during the course of the project, all while gathering field data about the performance of different components critical to EDVs, especially batteries. To collect data and demonstrate the flexibility of Motiv's PCS, battery packs comprised of radically different cell types will be tested and compared. One pack will contain Seo's battery cells while others will contain commercially available cells. These packs will all operate on the same vehicle at the same time for 5,000 miles.

Objectives of the Agreement:

The objectives of this project are to compare lifetime and ruggedness of different battery cells during vehicle operation and measure maintenance cost, fuel cost, usable electric range, and performance for a shuttle bus with 100 miles of all-electric range. Performance measures evaluated will include grade climbing, top speed, acceleration, and auxiliary power load supply.

In addition, the project will show that a modular platform can be built that supports multiple types of energy storage cells (e.g., cells of multiple chemistries and/or capacitors) and will quantify the internal cost, payback period, and total cost of ownership of such a system.

TASK 1 ADMINISTRATION

Task 1.1 Attend Kick-off Meeting

The goal of this task is to establish the lines of communication and procedures for implementing this Agreement.

The Recipient shall:

- Attend a “Kick-Off” meeting with the Commission Project Manager, the Grants Officer, and a representative of the Accounting Office. The Recipient shall bring its Project Manager, Agreement Administrator, Accounting Officer, and others designated by the Commission Project Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Commission Project Manager will provide an agenda to all potential meeting participants.

The administrative portion of the meeting shall include, but not be limited to, the following:

- Discussion of the terms and conditions of the Agreement
- Discussion of Critical Project Review (Task 1.2)
- Match fund documentation (Task 1.6) No work may be done until this documentation is in place.
- Permit documentation (Task 1.7)
- Subcontract execution (Task 1.8)

The technical portion of the meeting shall include, but not be limited to, the following:

- The Commission Project Manager’s expectations for accomplishing tasks described in the Scope of Work
- An updated Schedule of Products
- Discussion of Progress Reports (Task 1.4)
- Discussion of Technical Products
- Discussion of the Final Report (Task 1.5)

The Commission Project Manager shall designate the date and location of this meeting.

Recipient Products:

- Updated Schedule of Products
- Updated List of Match Funds
- Updated List of Permits

Commission Project Manager Product:

- Kick-Off Meeting Agenda

Task 1.2 Critical Project Review (CPR) Meetings

The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and to identify any needed modifications to the tasks, products, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Project Manager and as shown in the Technical Task List above. However, the Commission Project Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Recipient.

Participants include the Commission Project Manager and the Recipient and may include the Commission Grants Officer, the Fuels and Transportation Division (FTD) team lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Project Manager to provide support to the Energy Commission.

The Commission Project Manager shall:

- Determine the location, date, and time of each CPR meeting with the Recipient. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Recipient the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not modifications are needed to the tasks, schedule, products, and/or budget for the remainder of the Agreement. Modifications to the Agreement may require a formal amendment (please see the Terms and Conditions). If the Commission Project Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Transportation Committee for its concurrence.
- Provide the Recipient with a written determination in accordance with the schedule. The written response may include a requirement for the Recipient to revise one or more product(s) that were included in the CPR.

The Recipient shall:

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects. This report shall be submitted along with any other products identified in this scope of work. The Recipient shall submit these documents to the Commission Project Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

Commission Project Manager Products:

- Agenda and a list of expected participants
- Schedule for written determination
- Written determination

Recipient Product:

- CPR Report(s)

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Recipient shall:

- Meet with Energy Commission staff to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

This meeting will be attended by, at a minimum, the Recipient, the Commission Grants Office Officer, and the Commission Project Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Project Manager.

The technical portion of the meeting shall present an assessment of the degree to which project and task goals and objectives were achieved, findings, conclusions, recommended next steps (if any) for the Agreement, and recommendations for improvements. The Commission Project Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the Commission Project Manager and the Grants Officer about the following Agreement closeout items:

- What to do with any equipment purchased with Energy Commission funds (Options)
- Energy Commission's request for specific "generated" data (not already provided in Agreement products)
- Need to document Recipient's disclosure of "subject inventions" developed under the Agreement
- "Surviving" Agreement provisions, such as repayment provisions and confidential Products

- Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.

Products:

- Written documentation of meeting agreements
- Schedule for completing closeout activities

Task 1.4 Monthly Progress Reports

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement on time and within budget.

The objectives of this task are to summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, and to form the basis for determining whether invoices are consistent with work performed.

The Recipient shall:

- Prepare a Monthly Progress Report which summarizes all Agreement activities conducted by the Recipient for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Project Manager within 10 days after the end of the reporting period. The recommended specifications for each progress report are contained in the terms and conditions of this Agreement.

Product:

- Monthly Progress Reports

Task 1.5 Final Report

The goal of the Final Report is to assess the project's success in achieving its goals and objectives, advancing science and technology, and providing energy-related and other benefits to California.

The objectives of the Final Report are to clearly and completely describe the project's purpose, approach, activities performed, results, and advancements in science and technology; to present a public assessment of the success of the project as measured by the degree to which goals and objectives were achieved; to make insightful observations based on results obtained; to draw conclusions; and to make recommendations for further projects and improvements to the FTD project management processes.

The Final Report shall be a public document. If the Recipient has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Recipient shall perform the following activities for both the public and confidential versions of the Final Report.

The Recipient shall:

- Prepare an Outline of the Final Report.
- Prepare a Final Report following the approved outline and the latest version of the Final Report guidelines which will be provided by the Commission Project Manager. The Commission Project Manager shall provide written comments on the Draft Final Report within fifteen (15) working days of receipt. The Final Report must be completed on or before the end of the Agreement Term.
- Submit one bound copy of the Final Report with the final invoice.

Products:

- Draft Outline of the Final Report
- Final Outline of the Final Report
- Draft Final Report
- Final Report

Task 1.6 Identify and Obtain Matching Funds

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. Although the Energy Commission budget for this task will be zero dollars, the Recipient may utilize match funds for this task. Match funds shall be spent concurrently or in advance of Energy Commission funds for each task during the term of this Agreement. Match funds must be identified in writing and the associated commitments obtained before the Recipient can incur any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state such in the letter. If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter a list of the match funds that identifies the:
 - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied.
 - Amount of each in-kind contribution, a description, documented market or book value, and its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient shall identify its owner

and provide a contact name, address and telephone number, and the address where the property is located.

- Provide a copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured. For match funds provided by a grant a copy of the executed grant shall be submitted in place of a letter of commitment.
- Discuss match funds and the implications to the Agreement if they are reduced or not obtained as committed at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Notify the Commission Project Manager within 10 days if during the course of the Agreement existing match funds are reduced. Reduction in match funds must be approved through a formal amendment to the Agreement and may trigger an additional CPR.
- Provide the appropriate information to the Commission Project Manager when additional match funds are received to offset any reductions in match funds.

Products:

- A letter regarding match funds or stating that no match funds are provided
- Copy(ies) of each match fund commitment letter(s) (if applicable)
- Letter that match funds were reduced (if applicable)
- Letter(s) for additional match funds (if applicable)

Task 1.7 Identify and Obtain Required Permits

The goal of this task is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track.

Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement. Although the Energy Commission budget for this task will be zero dollars, the Recipient shall budget match funds for any expected expenditures associated with obtaining permits. Permits must be identified in writing and obtained before the Recipient can make any expenditures for which a permit is required.

The Recipient shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. If there are no permits required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies the:
 - Type of permit

- Name, address and telephone number of the permitting jurisdictions
 - or lead agencies
 - The schedule the Recipient will follow in applying for and obtaining these permits.
- Discuss the list of permits and the schedule for obtaining them at the kick-off meeting and develop a timetable for submitting the updated list, schedule and the copies of the permits. The implications to the Agreement if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in the Progress Reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, provide the appropriate information on each permit and an updated schedule to the Commission Project Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Project Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Project Manager within 5 working days. Either of these events may trigger an additional CPR.

Products:

- Letter documenting the permits or stating that no permits are required
- A copy of each approved permit (if applicable)
- Updated list of permits as they change during the term of the Agreement (if applicable)
- Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable)

Task 1.8 Obtain and Execute Subcontracts

The goal of this task is for Recipients to identify any subcontracts required to carry out the tasks under this Agreement, and to procure them consistent with the terms and conditions of this Agreement and the Recipient's own procurement policies and procedures. It will also provide the Energy Commission an opportunity to review the subcontracts to ensure that the tasks are consistent with this Agreement, that the budgeted expenditures are reasonable and consistent with applicable cost principles.

The Recipient shall:

- Prepare a letter documenting the subcontracts required to conduct this Agreement, and submit it to the Commission Project Manager at least 2 working days prior to the kick-off meeting. If there are no subcontracts required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that subcontracts will be required during the course of the Agreement, provide in the letter:

- A list of the subcontracts that describes the anticipated maximum budget and general scope of work for each,
- A description of the procurement process to be used, and
- The schedule the Recipient will follow in applying for and obtaining these subcontracts
- Submit a draft of the subcontract to the Commission Project Manager for review and approval, and incorporate any changes recommended by the Commission Project Manager.
- Submit a final copy of the executed subcontract.

Products:

- Letter describing the subcontracts needed, or stating that no subcontracts are required
- Draft subcontracts
- Final subcontracts

TECHNICAL TASKS

TASK 2 DEFINE POWERTRAIN SPECIFICATION

The goal of this task is to develop an engineering specification for the Motiv powertrain to guide all decisions made in the design process.

The Recipient shall:

- Determine the component dimensions, weight limits, maximum and average power output, energy storage capacity, charge time, and additional engineering specifications.
- Prepare and submit a Vehicle Specification Document outlining the performance requirements of the vehicle
- Prepare and submit an Engineering Design Specification document containing all design specifications and justifications for specifications.
- Prepare and submit a Task List in the form of a Microsoft Project file of detailed engineering tasks for the vehicle design and testing work (phase 1 of this project). Enter these tasks into a Gantt chart, estimate resources and time necessary for each task, determine task dependencies, analyze the critical path, and allocate resources to ensure the design work is done on time and on budget.

Products:

- Vehicle Specification document
- Engineering Design Specification document.
- Task List

TASK 3 POWERTRAIN DESIGN, ASSEMBLY AND TESTING

The goal of this task is to complete the engineering design for all components of the Motiv powertrain in preparation for vehicle installation.

The Recipient shall:

- Design a Power Control Unit (PCU). This unit acts as the master controller for all components on the powertrain, including firmware, schematics, Printed Circuit Board (PCB) design, and mechanical packaging.
- Design a Motor Module.
 - Select a motor vendor from which to purchase an electric motor.
 - Design an Adaptable Power Converter (APC) unit to adapt the motor to the powertrain, including firmware, schematics, PCB design, and mechanical packaging.
 - Write a test plan for the motor module to verify the Motor Module meets the required specifications.
 - Order parts for Motor Module and assemble.
 - Perform Motor Module tests according to test plan and analyze results.
- Design a Battery Module.
 - Select a battery vendor from which to purchase cells. The battery vendor must have cells ready for immediate purchase and use.
 - Design the battery pack to package the cells together with an APC in order to meet energy capacity and power specifications, including firmware, schematics, PCB design, and mechanical packaging.
 - Write a test plan for the motor module to verify the Battery Module meets the required specifications.
 - Order parts for Battery Module and assemble.
 - Perform Battery Module tests according to the test plan and analyze results.
- Design auxiliary power unit (AUX) and additional powertrain components, including interconnects, and cabling components.
- Write a test plan for testing the powertrain system
- Assemble powertrain, including: PCU, AUX, motor module and battery module.
- Perform powertrain tests according to test plan and analyze results.
- Write and submit a Motiv Powertrain Report. This report shall include but is not limited to the powertrain design, test plans, test results and analysis of results for the entire powertrain and all subcomponents.

[Before work done by a subcontractor begins their subcontract must be executed. See Task 1.8 for details]

Products:

- Motor Module Test Plan
- Battery Module Test Plan
- Powertrain System Test Plan
- Motiv Powertrain Report

TASK 4 VEHICLE INTEGRATION AND TESTING

The goal of this task is to complete the assembly of the Phase 1 Prototype vehicle for field testing. The Phase 1 prototype vehicle includes an off-the-shelf motor and battery technology with Motiv's custom designed components and interfaces.

The Recipient shall:

- Obtain glider (vehicle chassis and body without powertrain).
- Design mounting hardware for Motiv powertrain system.
- Order mounting components.
- Mount the powertrain system into the vehicle to assemble the Prototype Vehicle.
- Write test plan for pre-field testing.
- Test vehicle to ensure that it performs to specification.
- Write Shuttle Prototype Report. This report shall include but is not limited to detailed design information, test plans, test results and analysis of results.

[CPR WILL BE HELD AT THE END OF THIS TASK. See Task 1.2 for details]
[Before work done by a subcontractor begins their subcontract must be executed. See Task 1.8 for details]

Products:

- Shuttle Prototype Report

TASK 5 FIELD TEST PHASE 1 PROTOTYPE

The goal of this task is to provide 3000 data-logged miles of shuttle service for companies who are clients of Bauer Worldwide Transportation around the Bay Area with the Phase 1 prototype shuttle vehicle.

The Recipient shall:

- Operate the shuttle to move people between stops along defined shuttle routes for a total of 3000 miles
- Charge the shuttle overnight, consistently and collect the charge profile.
- Collect the following Raw Data during shuttle operation: position; speed; acceleration; motor temperature; power electronics temperatures; any system faults; auxiliary power loads; representative battery temperatures; state-of-

charge, balancing power, and capacity reductions for each battery cell, kW – hr used.

- Transmit all of the above data wirelessly and real-time to a database
- Store and analyze the collected data to evaluate vehicle and component (battery, motor, power electronics) performance
- Display data with basic visualization on a Password-Protected Website
- Use the Raw Data to maintain a Bug and Maintenance Log
- Maintain the shuttle as necessary during this task, including preventative maintenance
- Write Phase 1 Report detailing the design and performance of the prototype vehicle

[CPR WILL BE HELD AT THE END OF THIS TASK. See Task 1.2 for details.]

Products:

- Raw Data
- Accesses to the Password-Protected Website
- Bug and Maintenance Log
- Phase 1 Report

TASK 6 ADVANCED BATTERY MODULE

The goal of this task is to complete the advanced battery module for the Motiv Powertrain.

The Recipient shall:

- Write specification for Seeo battery module (e.g. Advanced Battery Module).
- Write a test plan for the battery module to verify the Advanced Battery Module meets the required specifications
- Prepare a Task List in the form of a Microsoft Project file of detailed engineering tasks for the Advanced Battery Module design and testing work (phase 2 of this project). Enter these tasks into a Gantt chart, estimate resources and time necessary for each task, determine task dependencies, analyze the critical path, and allocate resources to ensure the design work is done on time and on budget.
- Design Seeo advanced battery cells.
- Design the battery pack to package the advanced cells together with an APC in order to meet energy capacity and power specifications.
- Fabricate battery cells.
- Order parts for Advanced Battery Module and assemble into the Advance Battery Module Prototype
- Perform Advanced Battery module tests in accordance with the test plan and analyze results.
- Write Advanced Battery Pack Report. This report shall include but is not limited to detailed design information, test plans, test results and analysis of results.

[Before work done by a subcontractor begins their subcontract must be executed. See Task 1.8 for details]

Products:

- Advanced Battery Module Specification
- Task List
- Advanced Battery Pack Report

TASK 7 FIELD PHASE 2 PROTOTYPE

The goal of this task is to provide 5000 data-logged miles of shuttle service for companies who are clients of Bauer Worldwide Transportation around the Bay Area with the Phase 2 prototype shuttle vehicle. This mileage is in addition to that logged by the Phase 1 shuttle.

The Recipient shall:

- Update the Motiv Powertrain with Phase 2 Prototype Components (Advanced Battery Module)
- Operate the shuttle to move people between stops along defined shuttle routes for a total of 5000 miles
- Charge the shuttle overnight, consistently and collect the charge profile
- Collect the following Raw Data during shuttle operation: position; speed; acceleration; motor temperature; power electronics temperatures; any system faults; auxiliary power loads; representative battery temperatures; state-of-charge, balancing power, and capacity reductions for each battery cell, kW-hr used.
- Transmit all of the above data wirelessly and real-time to a database
- Store and analyze the collected data to evaluate vehicle and component (battery, motor, power electronics) performance
- Use the Raw Data to maintain a Bug and Maintenance Log
- Compare Seeo cell performance to other cell performance
- Display data with basic visualization on a Password-Protected Website
- Maintain the shuttle as necessary during this task, including preventative maintenance
- Write Phase 2 Report

Products:

- Raw Data
- Access to Password-Protected Website
- Bug and Maintenance Log
- Phase 2 Report

TASK 8 DATA COLLECTION and ANALYSIS

The goal of this task is to collect data on the economic benefits and local impacts of the project throughout the term of the project, analyze that data for project sustainability and include that analysis in the Final Report.

The Recipient Shall:

- Analyze the project
 - The analysis must:
 - Describe how the project supports new technology advancement for vehicles, vessels, engines, and other equipment, and promote the deployment of such technologies in the marketplace. Describe any actual results, in terms of gasoline or diesel fuel displaced, or other appropriate metric. To the extent possible describe how the project, provided a measurable transition from the nearly exclusive use of petroleum fuels to a diverse portfolio of viable alternative fuels that meets California's petroleum reduction and alternative fuel use goals.
 - Describe how the project incorporated and achieved the sustainability goals. Use a mix of quantitative and qualitative information, as appropriate to the constraints of the project. Provide a quantified estimate of the project's carbon intensity values for life-cycle scale greenhouse gas emissions.
 - Describe how the project provided economic benefits to California by promoting California-based technology firms, new job creation, new business development, economic benefit to low income communities, avoidance of disproportionate impacts to disadvantaged communities, and increased state revenue. Identify the jobs and economic development from this project.
 - Describe how the project demonstrated the cost-effectiveness of the proposed technology in achieving greenhouse gas emissions reduction.
- Include this analysis in the Final Report (See task 1.5 for details)

Products:

- None, all data from this task will be included in the Final Report (Task 1.5).

GRANTS/CONTINGENT AWARD REQUEST



To: Grants and Loans Office

Date: 02 / 17 / 2012

Project Manager: Jared Cacho Phone Number: (650) 654-5040 ext. _____
Office: Emerging Fuels and Technologies Division: Transportation MS- 27
Project Title: Prototype Shuttle for Motiv's Power Control System

Type of Request: (check one)

New Agreement: (include items A-F from below) Agreement Number: Assigned by the G&L Office

Program: _____
 Solicitation Name and/or Number: _____
 Legal Name of Recipient: _____
 Recipient's Full Mailing Address: _____

Recipient's Project Officer: _____ Phone Number: () - ext. _____
 Agreement Start Date: ____ / ____ / ____ Agreement End Date: ____ / ____ / ____

Amendment: (Check all that apply) Agreement Number: ARV-09-015

Term Extension – New End Date: 12 / 30 / 12
 Work Statement Revision (include Item A from below)
 Budget Revision (include Item B from below)
 Change of Scope (include Items A – F as applicable from below)
 Other: (Specify) _____

ITEMS TO ATTACH WITH REQUEST:

- A. Work Statement
- B. Budget
- C. Recipient Resolution, if applicable. (Resolution may be requested in Special Conditions if not currently available.)
- D. Special Conditions, if applicable.
- E. CEQA Compliance Form
- F. Other Documents as applicable
 - Copy of Score Sheets
 - Copy of Pre-Award Correspondence
 - Copy of All Other Relevant Documents

California Environmental Quality Act (CEQA)

CEC finds, based on recipient's documentation in compliance with CEQA:

Project exempt: Section _____ NOE filed: ____ / ____ / ____
 Environmental Document prepared: Type _____ NOD filed: ____ / ____ / ____
 Other: Explain _____

CEC has made CEQA finding described in CEC-280, attached

Funding Information:

*Source #1: _____ Amount: \$ _____ Statute: _____ FY: _____ Budget List #: _____
 *Source #2: _____ Amount: \$ _____ Statute: _____ FY: _____ Budget List #: _____
 *Source #3: _____ Amount: \$ _____ Statute: _____ FY: _____ Budget List #: _____

If federally funded, specify federal agreement number: _____
 * Source Examples include ERPA, PIER-E, PIER-NG, FED, GRDA, ARFVT, OTHER.

Business Meeting Approval: (refer to Business Meeting Schedule)

Proposed Business Meeting Date: 03 / 14 / 2012 Consent Discussion
 Business Meeting Participant: Jared Cacho Time Needed: 5 (minutes)

Agenda Notice Statement: (state purpose in layperson terms)

Possible approval of a Grant / Contingent Award to...
 no-cost time extension of 6 months and budget reallocation for the Motiv prototype shuttle project. Critical work that was originally slated for subcontractors will be conducted in-house by Motiv. The completion of the project will require additional time not realized when the project was first awarded. This would extend the end date to 12/30/12.

Project Manager _____ Date _____ Office Manager _____ Date _____ Deputy Director _____ Date _____