STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13) CALIFORNIA ENERGY COMMISSION

New Agreement ARV-14-045 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
600 Fuels and Transportation Division	Donald Coe	27	916-654-3941

Recipient's Legal Name	Federal ID Number
Transportation Power, Inc., dba TransPower	-

Title of Project
Heavy-Duty Electric Vehicle Manufacturing Initiative (HDEVMI)

Term and Amount	Start Date	End Date	Amount
	04 / 08 / 2015	12 / 31 / 2017	$ 2,999,880

Business Meeting Information

☐ ARFVTP agreements under $75K delegated to Executive Director.

Proposed Business Meeting Date	04 / 08 / 2015	☐ Consent	☒ Discussion
Business Meeting Presenter	Donald Coe	Time Needed:	5 minutes

Please select one list serve. Altfuels (AB118- ARFVTP)

Agenda Item Subject and Description

Proposed resolution approving Agreement ARV-14-045 with Transportation Power, Inc., dba TransPower for a $2,999,880 grant to manufacture electric vehicle components for Class 8 trucks. Manufactured components will include an inverter-charger unit, battery management system, automated manual transmission, and power control and accessory subsystem. (ARFVTP funding) Contact: Donald Coe. (Staff presentation: 5 minutes)

California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
   ☒ Yes (skip to question 2) ☐ No (complete the following (PRC 21065 and 14 CCR 15378)):
   Explain why Agreement is not considered a "Project":
   Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because .
2. If Agreement is considered a "Project" under CEQA:
   ☐ a) Agreement **IS** exempt. (Attach draft NOE)
   ☐ Statutory Exemption. List PRC and/or CCR section number:
   ☒ Categorical Exemption. List CCR section number: 15302 Class 2
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why Agreement is exempt under the above section:
   The project consists of reconstruction of existing facilities where the new structure will have substantially the same purpose and capacity.
   ☐ b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
   Check all that apply
   ☐ Initial Study ☐ Environmental Impact Report
   ☐ Negative Declaration ☐ Statement of Overriding Considerations
   ☐ Mitigated Negative Declaration

List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)

Legal Company Name:	Budget
EPC Power Corp.	$ 599,880
Jing-Jin Electric Technologies (JJE) & Eaton	$ 0
Voltronix, Flux Power	$ 0

List all key partners: (attach additional sheets as necessary)

Legal Company Name:
EPC Power Corp.

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Budget Information			
Funding Source	**Funding Year of Appropriation**	**Budget List No.**	**Amount**
ARFVTF	14/15	600.118G	$2,999,880
Funding Source			$
Funding Source			$
Funding Source			$
Funding Source			$
R&D Program Area: Select Program Area		TOTAL:	$2,999,880
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer				Recipient's Project Manager			
Name:	Michael Simon			Name:	Harold Meyer		
Address:	Transportation Power, Inc. 13000 Danielson Street, Suite D			Address:	Transportation Power, Inc. 13000 Danielson Street, Suite D		
City, State, Zip:	Poway, CA 92064			City, State, Zip:	Poway, CA 92064		
Phone:	858-248-4255	Fax:	858-408-7457	Phone:	619-922-5216	Fax:	858-408-7457
E-Mail:	mike@transpowerusa.com			E-Mail:	harry@transpowerusa.com		

Selection Process Used

☒ Competitive Solicitation
☐ First Come First Served Solicitation

Solicitation #: PON-14-604

The following items should be attached to this GRF		
1. Exhibit A, Scope of Work		☒ Attached
2. Exhibit B, Budget Detail		☒ Attached
3. CEC 105, Questionnaire for Identifying Conflicts		☒ Attached
4. Recipient Resolution	☒ N/A	☐ Attached
5. CEQA Documentation	☐ N/A	☒ Attached

Agreement Manager	Date	Office Manager	Date	Deputy Director	Date

Exhibit A
SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1		Administration
2		Design Productionization of Key Components
3		Structural and Mechanical Manufacturing Preparation
4	X	Electronic Component Manufacturing and Electric Assembly Preparation
5	X	Low Volume Manufacturing Test
6		Manufacturing Capacity Expansion
7		High Volume Manufacturing Test
8		Commercial Outreach and Validation
9		Data Collection and Analysis

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Michael Simon	N/A	N/A
2	Frank Falcone		EPC Power Corp.
3	Harold Meyer	N/A	N/A
4	Paul Scott, Allan Abela		EPC Power Corp.
5	N/A	N/A	N/A
6	Harold Meyer		EPC Power Corp.
7	N/A	N/A	N/A
8	Michael Simon, Joshua Goldman	N/A	N/A
9	James Burns	N/A	N/A

GLOSSARY

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

Term/ Acronym	Definition
AMT	Automated Manual Transmission
ARFVTP	Alternative and Renewable Vehicle and Technology Program
AVTM	Advanced Vehicle Technology Manufacturing

Exhibit A
SCOPE OF WORK

Term/ Acronym	Definition
BMS	Battery Management System
CAM	Commission Agreement Manager
CCM	Central Control Module
CDR	Critical Design Review
CNC	Computer Numerical Control
CPR	Critical Project Review
Energy Commission	California Energy Commission
ERP	Enterprise Resource Planning
ESS	Energy Storage Subsystem
EV	Electric Vehicle
FTD	Fuels and Transportation Division
HDEVMI	Heavy-Duty Electric Vehicle Manufacturing Initiative *(title of this project)*
HVDM	High-Voltage Distribution Module
HVMP	High-Volume Manufacturing Plan
ICU	Inverter-Charger Unit
MDS	Motive Drive Subsystem
MIG	Metal Inert Gas
NEAT	New Eagle Automated Testing tool
PCAS	Power Control and Accessory Subsystem
PCB	Printed Circuit Board
PCCRA	Preliminary Component Cost Reduction Assessment
Recipient	Transportation Power Inc. *(or "TransPower")*
SIL	Systems Integration Laboratory
TIG	Tungsten Inert Gas
VIM	Vertically Integrated Manufacturing

Exhibit A
SCOPE OF WORK

Background:

Assembly Bill (AB) 118 (Nùñez, Chapter 750, Statutes of 2007), created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). The statute authorizes the California Energy Commission (Energy Commission) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. AB 8 (Perea, Chapter 401, Statutes of 2013) re-authorizes the ARFVTP through January 1, 2024, and specifies that the Energy Commission allocate up to $20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational. The ARFVTP has an annual budget of approximately $100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

The Energy Commission issued Solicitation PON-14-604 entitled "Advanced Vehicle Technology Manufacturing" under the ARFVT Program on September 5, 2014. This competitive grant solicitation was an offer to fund the development of advanced vehicle technology manufacturing facilities in California that produce zero-, near zero-emission vehicles, or vehicle components. The resulting projects will expand alternative fuel vehicle and component manufacturing within California and advance ARFVTP's goals to reduce GHG emissions, reduce petroleum use, and provide economic and job benefits. To be eligible for funding under PON-14-604, the projects must also be consistent with the Energy Commission's ARFVTP Investment Plan updated annually. In response to PON-14-604, the Recipient submitted application #08 which was proposed for funding in the Energy Commission's Notice of Proposed Awards on February 25, 2015. PON-14-604 is hereby incorporated by reference into this Agreement in its entirety.

In the event of any conflict or inconsistency between the terms of the Solicitation and the terms of the Recipient's Application, the Solicitation shall control. In the event of any conflict or inconsistency between the Recipient's Application and the terms of Energy Commission's Award, the Energy Commission's Award shall control. Similarly, in the event of any conflict or inconsistency between the terms of this Agreement and the Recipient's Application, the terms of this Agreement shall control.

Exhibit A
SCOPE OF WORK

Problem Statement:

The problem addressed by the Recipient's *Heavy-Duty Electric Vehicle Manufacturing Initiative (HDEVMI)* project is the high cost of heavy-duty electric vehicles (EVs), which is now the principal remaining barrier to widespread commercial adoption of zero-emission goods movement technologies.

Until recently, this vision faced basic scientific and technological hurdles, as most efforts to apply battery-electric propulsion to Class 8 trucks (33,001-80,000 lb.) resulted in prototype vehicles that failed to meet performance expectations when tested under full load or placed into truck fleets for operation under real-world operating conditions. Over the past 3-4 years, the Recipient and its development team have taken significant steps toward addressing these technical hurdles by developing a new generation of leading-edge EV components custom-designed for use (and abuse) by heavy-duty trucks, including an inverter-charger unit (ICU), battery management system (BMS), and automated manual transmission (AMT). Small fleets of trucks and tractors using these components have shown marked improvements in performance and reliability over the past two years in a series of demonstrations funded by the Energy Commission and others, validating the essential feasibility of operating the largest Class 8 trucks and other heavy vehicles with battery-electric propulsion. However, these new and highly promising components remain very costly to produce because they are currently manufactured on a very small scale.

The HDEVMI project will address this economic market barrier by providing the resources to transition key Recipient-manufactured EV components into higher rates of production, which is projected to lower component manufacturing costs by one-third, leading to subsequent reductions as economies of scale are achieved in commercial production, resulting in another cost reduction of about one-third by 2020. The HDEVMI project will also enable implementation of improved quality management processes that will result in greater reliability. The cost reductions and quality improvements resulting from higher volume manufacturing will make heavy-duty electric trucks and other vehicles more affordable to fleet operators, serving as a catalyst for large-scale commercial adoption of heavy-duty EVs in California and elsewhere. These barriers have not been addressed by the market because most commercial investments in this sector have been focused on developing components for light-duty EVs, which have higher sales volumes than heavy-duty vehicles and are hence seen by most investors as offering a potentially higher rate of return. The technical hurdles faced by previous developers of heavy-duty EV components have also been discouraging to investors, although the Recipient's recent successes have the potential to turn around investor sentiment if commercial interest in heavy-duty EVs can be demonstrated.

This leads to the rationale for pursuing HDEVMI objectives at this time. With the recent demonstration of more capable heavy-duty EV components by the Recipient, investors are beginning to show interest, as evidenced by meetings the Recipient recently concluded with about a dozen investment firms in New York and San Francisco in September and October of 2014. However, the recurring theme of these discussions was that significant private investment in heavy-duty EVs will only occur once private fleet operators start ordering such vehicles commercially. The most effective way to make this happen is to drive down the manufacturing costs of these components. Hence, the time is right for public investments in transitioning the Recipient's new EV components into higher rate manufacturing. Prudent investments of this type over the next 2-3 years could lead to substantial commercial interest by 2017. This would most likely lead to substantial investor interest and availability of much larger

amounts of private capital to support large-scale adoption of heavy-duty electric trucks, tractors, school buses, and other vehicles by the end of this decade. The HDEVMI project is also extremely timely in light of the high priority the state of California has placed on reducing emissions from goods movement activities, and specific objectives the state intends to take starting in 2015 to encourage deployment of zero-emission trucks. Investments made in reducing the costs of manufacturing components for heavy-duty EVs will almost certainly produce near-term economic returns to the State in the form of reduced costs for vehicle demonstrations the State is likely to fund over the next few years, as well as longer term economic returns as a large, vibrant market for manufacturing and servicing of heavy-duty EVs takes root in California over the remainder of this decade.

Goals of the Agreement:

The goals of this Agreement are to drive down the production costs of key components required to enable heavy-duty trucks, tractors, and buses to operate on battery-electric power, while also helping to implement new quality control processes to assure the long-term reliability and robustness of these components and the vehicles that use them. This will be achieved by refining the designs of selected EV components for "productionization" and then setting up pilot production lines to manufacture these components in increasing quantities in a manner consistent with the Recipient's vertically integrated manufacturing (VIM) concept for heavy-duty EV components, subsystems, and vehicle conversions.

Objectives of the Agreement

The objectives of this Agreement are to implement the design refinements, manufacturing tools, and production processes required to achieve the aforementioned project goal, which is to achieve significant and measurable reductions in the costs of manufacturing the key components developed by the Recipient for battery-electric operation of large trucks, tractors, school buses, and other vehicles weighing up to 80,000 lbs. Specific project objectives are to:

- Achieve the necessary refinements in the designs of "high-impact" EV components to enable utilization of more efficient manufacturing processes.
- Successfully demonstrate new manufacturing processes to produce these components on a small scale, enabling estimates of future manufacturing costs to be updated and strategies to be adjusted as appropriate.
- Expand pilot manufacturing to higher volumes and demonstrate a one-third reduction in component manufacturing costs from current levels.
- Achieve significant commercial orders for heavy-duty vehicles using EV components manufactured under this project, and capital investments to support growth of manufacturing capabilities after 2017 to meet this demand.

These goals are highly measurable. The Recipient has established a goal of reducing the cost of manufacturing the complete set of components required for a heavy-duty electric vehicle by one-third by 2017, based on a production volume of 100 vehicles per year. This is expected to lead to a reduction in manufacturing cost of another one-third as manufacturing volumes increase from 100/year to 2,000/year by the end of this decade. The Recipient has also established 100 EVs as its production goal for 2017, including vehicles converted by the Recipient and vehicles manufactured by original equipment manufacturers with drive system "kits" supplied by the Recipient.

The HDEVMI project objectives will be pursued in a two-phase process. During the first phase,

Exhibit A
SCOPE OF WORK

EV component design refinements for productionization will be completed and prototypes of these components will be manufactured on a low-volume pilot production line using new manufacturing tools and processes. In the second phase, after the productionized designs of the EV components and new processes have been validated at low volume, the operation will remain at the existing facility where higher volume manufacturing will be initiated. Any future expansion to a new facility, if any, would require a new formal written contract amendment which would necessarily be conditioned on Recipient demonstrating compliance with CEQA under the new factual scenario to the Energy Commission's satisfaction. In both phases, manufacturing will be accomplished using the Recipient's vertically integrated manufacturing process, which was initially developed under an Advanced Vehicle Technology Manufacturing (AVTM) grant awarded to the Recipient in 2010. The proposed HDEVMI project will build on the success of this initial AVTM project by refining the design of key components developed under the earlier project and facilitating the important transition to higher volume manufacturing.

The HDEVMI project Scope of Work is closely aligned with the specific objectives listed above. Work will be performed in a logical sequence of ten tasks that are designed to meet the project objectives in the sequence listed above. Following is a detailed listing of these tasks including descriptions of key subtasks and Recipient Products.

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 Commission Agreement Manager (CAM) shall designate the date and location of this meeting and provide an agenda to the Recipient prior to the meeting.

The Recipient shall:

- Attend a "Kick-Off" meeting with the CAM, the Commission Agreement Officer (CAO), and a representative of the Energy Commission Accounting Office. The Recipient shall bring their Project Manager, Agreement Administrator, Accounting Officer, and any others determined necessary by the Recipient or specifically requested by the CAM to this meeting.
- Discuss the following administrative and technical aspects of this Agreement:
    - Agreement Terms and Conditions
    - Critical Project Review (Task 1.2)
    - Match fund documentation (Task 1.6) No reimbursable work may be done until this documentation is in place.
    - Permit documentation (Task 1.7)
    - Subcontracts needed to carry out project (Task 1.8)
    - The CAM's expectations for accomplishing tasks described in the Scope of Work
    - An updated Schedule of Products and Due Dates
    - Monthly Progress Reports (Task 1.4)
    - Technical Products (Product Guidelines located in Section 5 of the Terms and Conditions)

- o Final Report (Task 1.5)

Recipient Products:

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

Commission Agreement Manager Product:

- Kick-Off Meeting Agenda

Task 1.2 Critical Project Review (CPR) Meetings

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. 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.

The CAM may schedule CPR meetings as necessary, and meeting costs will be borne by the Recipient.

Meeting participants include the CAM and the Recipient and may include the Commission Agreement Officer, the Fuels and Transportation Division (FTD) program lead, other Energy Commission staff and Management as well as other individuals selected by the CAM to provide support to the Energy Commission.

The CAM 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. Prepare 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 section 8 of the Terms and Conditions). If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Lead Commissioner for Transportation for his or her 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 CAM 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.

CAM 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 Agreement 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 Agreement 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 Agreement Manager will determine the appropriate meeting participants.

  The administrative portion of the meeting shall be a discussion with the Commission Agreement 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
- 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 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 Agreement Manager within 10 days of the end of the reporting period. The recommended specifications for each progress report are contained in Section 6 of the Terms and Conditions of this Agreement.
- In the first Monthly Progress Report and first invoice, document and verify match expenditures and provide a synopsis of project progress, if match funds have been expended or if work funded with match share has occurred after the notice of proposed award but before execution of the grant agreement. If no match funds have been expended or if no work funded with match share has occurred before execution, then state this in the report. All pre-execution match expenditures must conform to the requirements 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 the Agreement's 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, if requested by the CAM.
- Prepare a Final Report following the latest version of the Final Report guidelines which will be provided by the CAM. The CAM shall provide written comments on the Draft Final Report within fifteen (15) working days of receipt. The Final Report must be completed at least 60 days before the end of the Agreement Term.
- Submit one bound copy of the Final Report with the final invoice.

Products:

- Outline of the Final Report, if requested
- 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 Agreement 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.
- Provide the appropriate information to the Commission Agreement Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Agreement 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 meeting.

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(s) for new match funds (if applicable)
- Letter that match funds were reduced (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 expenditure for which a permit is required.

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The Recipient shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Agreement 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 Agreement Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Agreement Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Agreement 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)
- A copy of each final approved permit (if applicable)

Task 1.8 Obtain and Execute Subcontracts

The goal of this task is to ensure quality products and to procure subcontractors required to carry out the tasks under this Agreement consistent with the Agreement Terms and Conditions 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, and that the budgeted expenditures are reasonable and consistent with applicable cost principles.

The Recipient shall:

- Manage and coordinate subcontractor activities.
- Submit a draft of each subcontract required to conduct the work under this Agreement to the Commission Agreement Manager for review.
- Submit a final copy of the executed subcontract.
- If Recipient decides to add new subcontractors, then the Recipient shall notify the CAM.

Products:

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

TECHNICAL TASKS

TASK 2 DESIGN PRODUCTIONIZATION OF KEY COMPONENTS

Task 2 is the first technical task to be undertaken during Phase I of the project, which encompasses Tasks 2 through 5. The goal of this task is to identify alternative manufacturing processes capable of reducing the costs of selected "high-impact" EV components and to refine the designs of these components to enable them to be manufactured using these processes.

The Recipient shall:

- Implement a new Enterprise Resource Planning (ERP) system, along with associated elements such as computer workstations, a bar-code system, and design-to-procurement software, and train employees on its use.
- Acquire and set up or install new engineering tools and equipment required for credible development of production-ready component designs, including:
    - Enhanced computer-aided design tools such as Solidworks including software suites, compilers, and work stations.
    - Motohawk and Motoflash software and flash kits, along with associated support.
    - Matlab licenses.
    - New Eagle Automated Testing (NEAT) tool and support.

- Identify new mechanical fabrication methods and tools suitable for reduction of the costs of manufacturing structural and mechanical components such as battery enclosures, driveline couplings, and Power Control and Accessory Subsystem (PCAS) support structures.
- Identify new electronic fabrication methods and tools suitable for reduction of the costs of manufacturing electronic components such as the ICU and BMS.
- Identify new electrical and mechanical assembly methods and tools suitable for reduction of assembly and subsystem assembly costs.
- Perform design revisions to components, assemblies, and subsystems as required to accommodate new manufacturing processes selected.
- Conduct a component Critical Design Review (CDR) to review and approve final component design changes.
- Provide to the CAM a comprehensive CDR Design Package, including documentation of revised component designs, tools and equipment and identification of any systems engineering issues.

Products:

- Comprehensive CDR Design Package

TASK 3 STRUCTURAL AND MECHANICAL MANUFACTURING PREPARATION

The goal of this task is to complete preparations for pilot manufacturing of structural and mechanical components such as battery enclosures, driveline couplings, and PCAS support structures.

The Recipient shall:

- Develop the layout and process flows for a new pilot production line for manufacturing of structural and mechanical components. Provide a Structural and Mechanical Plant Layout and Process Flows Report to the CAM.
- Acquire and set up or install electrical and electronic manufacturing tools and equipment required for initial validation of new manufacturing processes, including:
    - Tools for the cutting of raw material such as hydraulic sheers.
    - Computer numerical controlled (CNC) machines for final machining of structural and mechanical parts, including a CNC plasma machine, CNC mill, and CNC lathe.
    - Welding machines for metal inert gas (MIG) and tungsten inert gas (TIG) welding, along with associated weld shop fixtures and equipment.
    - Drill press equipment.
    - Lockers for storage of dies and cutting bits.
    - Cranes for lifting and moving heavy structural components such as battery enclosures

  - Structural and mechanical elements of a system test stand for final qualification of EV components.
- Prepare and submit to the CAM an inventory directory of the structural and mechanical tools acquired.
- Upgrade electrical service as required.
- Acquire permits for paint booth and upgraded electrical service.
- Provide required permits for installation of structural and mechanical manufacturing equipment to CAM.
- Provide photographs of installed structural and mechanical manufacturing equipment to CAM.

Products:

- Structural and Mechanical Plant Layout and Process Flows Report
- Required Installation Permits
- Structural and Mechanical Tools Inventory Directory
- Photographs of Installed Structural and Mechanical Manufacturing Equipment

TASK 4 ELECTRONIC COMPONENT MANUFACTURING AND ELECTRIC ASSEMBLY PREPARATION

The goal of this task is to complete preparations for pilot manufacturing of electronic components, and for assembly of electrical and electronic assemblies and subsystems. Setup of the electronic components production line will be accomplished as a joint venture between the Recipient and EPC Power Corp.

The Recipient shall:

- Develop the layout and process flows for a new pilot production line for manufacturing of electronic components such as the inverter-charger unit (ICU) and battery management system (BMS) sensor/balancing boards.
- Develop the layout and process flows for a new pilot production line for assembly of electrical subsystems such as central control modules (CCMs) and high voltage distribution modules (HVDMs).
- To the extent necessary and practical, repair and upgrade ABC150 and AV900 battery test systems currently installed at Recipient's headquarters.
- Acquire and set up or install electrical and electronic manufacturing tools and equipment required for initial validation of new manufacturing processes, including:
  - Electronic system test stands
  - MOTO Flash Kit with computer
  - Wire labeling machine
  - Automated harness test equipment

  - Lithium ion battery handling equipment and cell-level charge maintenance and test equipment
  - Electrical and electronic elements of a system test stand for final qualification of EV components
  - Fluke power instruments such as oscilloscopes, scope meters, power quality analyzers, and power loggers
  - Printed circuit board (PCB) manufacturing equipment including line loaders/unloaders, conveyor belts, printer stencil, "pick & place" machine, reflow oven, and automated optical inspection machine

- Provide documentation to the CAM illustrating the planned electronic component manufacturing plant layout and process flows.
- Provide documentation to the CAM illustrating the planned electrical and electronic assembly and subsystem plant layout and process flows.
- Provide documentation to the CAM demonstrating issuance of any required permits for installation of electronic and electrical manufacturing equipment.
- Provide CAM with an Electronic and Electrical Tools Inventory Directory that lists key electronic and electrical tools acquired under this task.
- Provide CAM with a brief report containing photographs of installed electronic and electrical manufacturing equipment.
- Conduct Critical Project Review #1 documenting installation of pilot production line equipment and demonstrating readiness to initiate the low volume manufacturing test. See Task 1.2 for details.

Products:

- Electronic Component Manufacturing Plant Layout and Process Flows
- Electrical and Electronic Assembly and Subsystem Plant Layout and Process Flows
- Required Permits for Installation of Electronic and Electrical Manufacturing Equipment
- Electronic and Electrical Tools Inventory Directory
- Photographs of Installed Electronic and Electrical Manufacturing Equipment

TASK 5 LOW VOLUME MANUFACTURING TEST

The goal of this task is to achieve an initial production run of components sufficient for a minimum of ten vehicles, using the manufacturing processes and tools implemented on preceding tasks, and to evaluate the manufacturing test processes and components to validate cost projections and support progression to higher volume manufacturing during Phase II of the project. The components will be validated through bench testing followed by testing on fully functional vehicles integrated by the Recipient under other projects.

Exhibit A
SCOPE OF WORK

The Recipient shall:

- Acquire raw materials required to support manufacturing of in-house produced components for ten heavy-duty EVs.
- Manufacture in-house produced components for ten heavy-duty EVs including:
    - Ten new-design ICUs, each capable of controlling two drive motors
    - Fifty battery enclosures
    - Sensor/balancing boards for monitoring 2,000+ cells
    - Ten main PCAS structures
    - Ten dual motor structures
    - Ten motor-transmission couplings
- Carefully monitor and document the cost of manufacturing each unit, comparing costs to components manufactured using previous processes and identifying trends from production of the first to last unit under this production run.
- Update projections of higher volume manufacturing costs and document cost tabulations, analyses, and conclusions in a Preliminary Component Cost Reduction Assessment (PCCRA).
- Test initial components on test stands and validate all components on Class 8 trucks or vehicles of a similar weight class.
- Provide CAM with a brief report containing photographs and test data confirming manufacturing of components for ten heavy-duty EVs and documenting their suitability for use.
- Provide CAM with a Preliminary Component Cost Reduction Assessment, documenting initial estimates of cost savings that can be achieved by modifying the designs of drive system components.
- Provide CAM with an initial Business Plan that builds on the manufacturing plans described in the Recipient's proposal for this project and incorporates the new knowledge gained during Phase I of this project (Tasks 2 through 5).

  Conduct Critical Project Review #2. See Task 1.2 for details

Products:

- Photographs and test data confirming manufacturing of components for ten heavy-duty EVs and documenting their suitability for use
- Preliminary Component Cost Reduction Assessment
- Initial Business Plan

Exhibit A
SCOPE OF WORK

TASK 6 MANUFACTURING CAPACITY EXPANSION

Task 6 is the first technical task to be undertaken during Phase II of the project. The goal of this task is to expand manufacturing capacity to levels required to immediately produce components for at least 100 vehicles per year by 2017, with a clear path for growth to 600 vehicles per year by 2019. This will involve relocating much of the equipment purchased under Tasks 3 and 4 to a larger facility upon completion of the low-volume production run achieved under Task 5.

The Recipient shall:

- Update production layouts and process flows developed under Tasks 3 and 4, as required, to support the target manufacturing volume of producing components for 600 vehicles per year at the new facility by 2019.
- Prepare a High-Volume Manufacturing Plan (HVMP) documenting updated production layouts, process flows, and implementation plans to achieve high-volume production targets.
- Secure any necessary permits for facility improvement, including installation of all equipment required for manufacturing expansion.
- Arrange for facility improvements at the facility to support high volume EV component manufacturing.
- Purchase new equipment deemed to be necessary to achieve production volume targets. New equipment to meet Phase II project objectives is likely to include:
    - Additional structural cutting, forming, and welding tools.
    - Additional electronic assembly fixtures.
    - Automated inventory control system.
    - Expanded battery cell processing tools and fixtures.
    - Systems Integration Laboratory (SIL) for final product testing.
    - 20-100 motor-transmission couplings.
- Test initial components on test stands and validate all components on Class 8 trucks or vehicles of a similar weight class.
- Provide CAM with a HVMP summarizing plans to achieve higher volume manufacturing of drive system components.
- Provide CAM with a brief report containing photographs of manufacturing equipment installed in new manufacturing facility.

Products:

- High-Volume Manufacturing Plan
- Photographs of Manufacturing Equipment Installed in Manufacturing Facility

Exhibit A
SCOPE OF WORK

TASK 7 HIGH VOLUME MANUFACTURING TEST

The goal of this task is to achieve an initial production run of components sufficient to validate the high-volume production line. Components will be manufactured for a minimum of twenty and as many as 100 vehicles, depending on demand for the Recipient EV components from other customers or funding sources in 2017. The components will be validated through bench testing followed by testing on fully functional vehicles integrated by the Recipient under other projects.

The Recipient shall:

- Acquire raw materials required to support manufacturing of in-house produced components for 20-100 heavy-duty EVs.
- Manufacture in-house produced components for 20-100 heavy-duty EVs including:
    - 20-100 new-design ICUs, each capable of controlling two drive motors.
    - 100-500 battery enclosures.
    - Sensor/balancing boards for monitoring 4,000-20,000 cells.
    - 20-100 PCAS structures.
    - 20-100 dual motor structures.
    - 20-100 motor-transmission couplings.
- Carefully monitor and document the cost of manufacturing each unit, comparing costs to components manufactured using previous processes and identifying trends from production of the first to last unit under this production run.
- Update projections of higher volume manufacturing costs and document cost tabulations, analyses, and conclusions in a Final Component Cost Reduction Assessment.
- Test initial components on test stands and validate all components on Class 8 trucks or vehicles of a similar weight class.
- Provide CAM with a brief report containing photographs and test data confirming manufacturing of components for 20-100 heavy-duty EVs and documenting their suitability for use.
- Provide CAM with a Final Component Cost Reduction Assessment containing updates to estimates of cost reductions that can be achieved by modifying the designs of drive system components.

Products:

- Report of Photographs and Test Data
- Final Component Cost Reduction Assessment

TASK 8 COMMERCIAL OUTREACH AND VALIDATION

The goal of this task is to continue to promote Recipient's EV components for commercial sale and to attract private capital for expansion of Recipient's manufacturing, sales, and distribution capabilities. This task will be undertaken at Recipient's expense and will run concurrently with other tasks throughout the project.

The Recipient shall:

- Invest private capital in expanding Recipient's business in accordance with its Business Plan. Current discussions with prospective investors and financial partners will continue until sufficient capital is raised to meet Recipient's 2019 manufacturing targets, via one or more fund-raising rounds.
- Promote its EV products, including those manufactured under this project, via various channels including:
    - Presentations at trade shows and technical symposia.
    - Maintenance of a state-of-the-art website and digital media campaign.
    - Direct outreach to major vehicle fleet owners and operators.
    - Demonstration of components and vehicles at trade shows and other industry events involving exhibits.
    - Issuance of news releases.
    - Distribution of product literature.
    - Advertising in industry publications.
- Provide the Energy Commission with updates on significant commercial achievements related to commercial sales or raising of private capital.
- Provide CAM with an Updated Business Plan containing updates to the Initial Business Plan developed under Task 5, based on new knowledge gained during Phase II of the project.

Products:

- Written Notification regarding successful acquisition of significant commercial component orders or private capital financing rounds, to the Commission Project Manager
- Updated Business Plan

TASK 9 DATA COLLECTION AND ANALYSIS

The goal of this task is to collect operational data from the project, to analyze that data for economic and environmental impacts, and to include the data and analysis in the Final Report.

The Recipient shall:

- Develop data collection test plan.
- Troubleshoot any issues identified.

- Collect 6 months of throughput, usage, and operations data from the project including, but not limited to:
  - Maximum capacity of the new fueling system
  - Gallons of gasoline and/or diesel fuel displaced (with associated mileage information)
  - Expected air emissions reduction, for example:
    - Non-methane hydrocarbons
    - Oxides of nitrogen
    - Non-methane hydrocarbons plus oxides of nitrogen
    - Particulate Matter
    - Formaldehyde
  - Duty cycle of the current fleet and the expected duty cycle of future vehicle acquisitions
  - Specific jobs and economic development resulting from this project
- Identify any current and planned use of renewable energy at the facility.
- Identify the source of the alternative fuel.
- Describe any energy efficiency measures used in the facility that may exceed Title 24 standards in Part 6 of the California Code Regulations.
- Provide data on potential job creation, economic development, and increased state revenue as a result of expected future expansion.
- Provide a quantified estimate of the project's carbon intensity values for life-cycle greenhouse gas emissions.
- Compare any project performance and expectations provided in the proposal to Energy Commission with actual project performance and accomplishments.
- Collect data, information, and analysis described above and include in the Final Report.

Products:

- Data collection information and analysis will be included in the Final Report

RESOLUTION NO: 15-0408

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: TRANSPOWER

RESOLVED, that the State Energy Resources Conservation and Development Commission (Energy Commission) adopts the staff CEQA findings contained in the Agreement Request Form; and

RESOLVED, that the Energy Commission approves Agreement ARV-14-045 from PON-14-604 with **Transportation Power, Inc., dba TransPower** for a **$2,999,880** grant to manufacture electric vehicle components for Class 8 trucks. Manufactured components will include an inverter-charger unit, battery management system, automated manual transmission, and power control and accessory subsystem; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her designee shall 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 April 8, 2015

AYE: [List of Commissioners]
NAY: [List of Commissioners]
ABSENT: [List of Commissioners]
ABSTAIN: [List of Commissioners]

Harriet Kallemeyn,
Secretariat