

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-14-057 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Quenby Lum	43	916-327-1492

Recipient's Legal Name	Federal ID Number
DOE- Lawrence Berkeley National Laboratory	94-2951741

Title of Project
Smart Charging of Plug-in Vehicles and Driver Engagement for Demand Management and Participation in Electricity Markets

Term and Amount	Start Date	End Date	Amount
	6/1/2015	3/30/2018	\$ 1,993,355

Business Meeting Information
 ARFVTP agreements under \$75K delegated to Executive Director.

Proposed Business Meeting Date	4/8/2015	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Quenby Lum	Time Needed:	

Please select one list serve. EPIC (Electric Program Investment Charge)

Agenda Item Subject and Description

LAWRENCE BERKELEY NATIONAL LABORATORY. Proposed resolution approving Agreement EPC-14-057 with the Department of Energy's Lawrence Berkeley National Laboratory for a \$1,993,355 grant to develop and demonstrate a smart charging control system for electric vehicle supply equipment that will demonstrate both minimized utility costs through managed charging of fleet vehicles and develop approaches to engage the non-fleet PEV owners and manage their charging station loads to further reduce electric utility costs.

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":

This Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because the project involves the temporary installation of small data loggers connected to the on-board diagnostic ports of a sample (up to 40) of Alameda County fleet electric vehicles. The data loggers are commercially available and small, produce no emissions, will be installed inside vehicles, not be visible, and will not produce lights or sound.

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: _____
 Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

- 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
Kisensum Inc.	\$ 459,600
Bay Area Climate Collaborative	\$ 74,959
County of Alameda	\$ 75,000
ChargePoint, Inc.	\$ 78,571
University of California, Berkeley	\$ 0

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

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION



Legal Company Name:

Budget Information			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	13-14	301.001A	\$ 1,993,355
			\$
R&D Program Area: ESRO: ETSI		TOTAL:	\$1,993,355
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer				Recipient's Project Manager			
Name:	Betsy Quayle			Name:	Samveg Saxena		
Address:	1 CYCLOTRON RD BLDG 90R2000			Address:	1 Cyclotron Rd MS 90R1121 Mail Stop 90R2000		
City, State, Zip:	BERKELEY, CA 94720-8130			City, State, Zip:	Berkeley, CA 94720		
Phone:	510-486-4218 /	Fax:	- -	Phone:	510-269-7260 /	Fax:	- -
E-Mail:	bequayle@lbl.gov			E-Mail:	ssaxena@lbl.gov		

Selection Process Used	
<input checked="" type="checkbox"/> Competitive Solicitation	Solicitation #: PON-14-301
<input type="checkbox"/> First Come First Served Solicitation	

The following items should be attached to this GRF			
1. Exhibit A, Scope of Work		<input checked="" type="checkbox"/>	Attached
2. Exhibit B, Budget Detail		<input checked="" type="checkbox"/>	Attached
3. CEC 105, Questionnaire for Identifying Conflicts		<input checked="" type="checkbox"/>	Attached
4. Recipient Resolution	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Attached
5. CEQA Documentation	<input type="checkbox"/> N/A	<input checked="" type="checkbox"/>	Attached

_____ Agreement Manager	_____ Date	_____ Office Manager	_____ Date	_____ Deputy Director	_____ Date
-------------------------------	---------------	-------------------------	---------------	--------------------------	---------------

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Site and Fleet Characterization, Data Collection, and Data Analysis to Support Controls Strategies
3	X	Implement, Demonstrate, and Collect and Analyze Data for Fleet PEV Participation in Regulation and Spinning Ancillary Services
4		Implement, Demonstrate, and Collect and Analyze Data for Fleet and Public PEV Participation in Demand Response and Demand Management
5		Evaluation of Project Benefits
6		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AutoDR	Automated Demand Response
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DR	Demand Response
EMCS	Energy Management Control System
EVSE	Electric Vehicle Supply Equipment
ICE	Internal Combustion Engine
PG&E	Pacific Gas and Electric
PEV	Plug-in Electric Vehicle
SOC	State of Charge
SSP	Supply Side Pilot
TAC	Technical Advisory Committee
V2G-Sim	Vehicle-to-Grid Simulator

I. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

A. Purpose of Agreement

The purpose of this Agreement is to fund the demonstration of an automated control system for charging fleet and non-fleet plug-in electric vehicles (PEVs) that minimizes customer electric utility costs and impacts on electric grid.

¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

B. Problem/ Solution Statement

Problem

Converting fleets from traditional internal combustion engine (ICE) vehicles to PEVs greatly decreases, if not eliminates, fleet gasoline expenses, but increases facility electric utility costs, especially with utility tariffs designed to reward demand reduction during peak periods. At current levels of PEV penetration, the impact on the electric grid is minimal, but with expected growth of PEVs the impact on the grid, particularly at distribution points with high levels of PEV adoption, may be significant. The higher costs of PEVs compared to ICE vehicles is offset over the lifetime of the vehicles due to the lower price of fueling with electricity rather than gasoline. The lifetime cost of a PEV can be further reduced with smart managed charging. An automated control system that manages charging to minimize electric utility costs is currently not available.

Solution

This project will develop and demonstrate a smart charging control system for electric vehicle supply equipment (EVSE) that serves both fleet and non-fleet PEVs in multiple geographic locations. It will demonstrate both minimized utility costs through managed charging of fleet vehicles and develop approaches to engage the non-fleet PEV owners and manage their charging station loads to further reduce electric utility costs. This approach could also be applied to commercial/workplace charging and provide a potentially large benefit in managing daytime peak demand.

C. Goals and Objectives of the Agreement

Agreement Goals

The goal of this Agreement is to demonstrate an automated PEV charging control system that requires minimal effort by facility energy and fleet managers to deliver the most cost-effective and grid-compatible charging of fleet PEVs.

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of greater electricity reliability and lower costs by providing an automated control system that enables owners of PEV charging loads to participate in demand response (DR) programs and ancillary services markets. Customers will pay lower electric utility bills by managing PEV charging demand in response to time of use rates and even generate a source of revenue by participating in ancillary services markets. Grid reliability will be improved by managing PEV charging loads in a manner that increases or decreases demand and provides stability through regulation and reserve ancillary services as needed by utilities or grid operators.

² California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

Technological Advancement and Breakthroughs:³ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by reducing cost and charging infrastructure barriers to owning zero-emission vehicles. The cost of ownership barrier will be reduced by developing technical solutions for PEV fleet owners to minimize charging costs and unlock new value streams by enabling PEVs to participate in demand response programs and ancillary services markets. Charging infrastructure availability will be increased by making fleet charging systems available to personal PEV owners while ensuring that the operating costs for fleet managers and charging facility owners are minimized.

Agreement Objectives

The objectives of this Agreement are to:

- Collect and analyze data on PEV fleet usage and charging loads;
- Develop a managed PEV charging control system;
- Implement, demonstrate, and collect and analyze data for fleet PEV participation in regulation and spinning ancillary services;
- Implement, demonstrate, and collect and analyze data for fleet and public PEV participation in DR and demand management;
- Document fleet and charging management system cost-benefit analysis, specifications, installation, and operation.

II. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. Products that require a draft version are indicated by marking “**(draft and final)**” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, “**days**” means working days.

The Recipient shall:

For products that require a draft version

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Submit the final product to the CAM once agreement has been reached on the draft. The CAM will provide written approval of the final product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.

³ California Public Resources Code, Section 25711.5(a) also requires EPIC-funded projects to lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory and energy goals.

- If the CAM determines that the final product does not sufficiently incorporate his/her comments, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.

For products that require a final version only

- Submit the product to the CAM for approval.
- If the CAM determines that the product requires revision, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.

For all products

- Submit all data and documents required as products in accordance with the following Instructions for Submitting Electronic Files and Developing Software:

- **Electronic File Format**

Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the Energy Commission's software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick or CD-ROM.

The following describes the accepted formats for electronic data and documents provided to the Energy Commission as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Documents intended for public distribution will be in PDF file format. The Recipient must also provide the native Microsoft file format.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

- **Software Application Development**

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
- Visual Studio.NET (version 2008 and up). Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the Energy Commission's Information Technology Services Branch to determine whether the exceptions are allowable.

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

- Attend a "Kick-off" meeting with the CAM, the Commission Agreement Officer (CAO), and any other Energy Commission staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The administrative portion of the meeting will include discussion of the following:

- Terms and conditions of the Agreement;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- Any other relevant topics.

The technical portion of the meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
 - An updated Project Schedule;
 - Technical products (subtask 1.1);
 - Progress reports and invoices (subtask 1.5);
 - Final Report (subtask 1.6);
 - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:

- Designate the date and location of the meeting.
- Send the Recipient a *Kick-off Meeting Agenda*.

Recipient Products:

- Updated Project Schedule (*if applicable*)
- Updated List of Match Funds (*if applicable*)
- Updated List of Permits (*if applicable*)

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

The goal of this subtask is to determine if the project should continue to receive Energy Commission funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the Energy Commission and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient, and may include the CAO and any other individuals selected by the CAM to provide support to the Energy Commission.

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

The Recipient shall:

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a *CPR Agenda* and a *List of Expected CPR Participants* in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a *Schedule for Providing a Progress Determination* on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, products, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:

- CPR Report(s)
- Task Products (draft and/or final as specified in the task)

CAM Products:

- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- Progress Determination

Subtask 1.4 Final Meeting

The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:

- Meet with Energy Commission staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
 - Disposition of any state-owned equipment.
 - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
 - The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
 - Need to document the 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 *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

- Final Meeting Agreement Summary (*if applicable*)
- Schedule for Completing Agreement Closeout Activities
- All Draft and Final Written Products

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
 - Summarize all Agreement activities conducted by the Recipient for the preceding month, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
 - Provide a synopsis of the project progress, including accomplishments, problems, milestones, products, schedule, fiscal status, and any evidence of progress such as photographs.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds” section of the terms and conditions. In addition, each invoice must document and verify:
 - Energy Commission funds received by California-based entities;
 - Energy Commission funds spent in California (*if applicable*); and
 - Match fund expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. The CAM will review and approve the Final Report, which will be due at least **two months** before the Agreement end date. When creating the Final Report Outline and the Final Report, the Recipient must use a Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM.
- Submit a draft of the outline to the CAM for review and comment.
- Once agreement has been reached on the draft, submit the final outline to the CAM. The CAM will provide written approval of the final outline within 10 days of receipt.

Recipient Products:

- Final Report Outline (draft and final)

CAM Products:

- Style Manual
- Comments on Draft Final Report Outline

- Approval of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline and the Style Manual provided by the CAM.
- Submit a draft of the report to the CAM for review and comment. Once agreement on the draft report has been reached, the CAM will forward the electronic version for Energy Commission internal approval. Once the CAM receives approval, he/she will provide written approval to the Recipient.
- Submit one bound copy of the Final Report to the CAM.

Recipient Products:

- Final Report (draft and final)

CAM Products:

- Comments on Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of Energy Commission funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. 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 this 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 cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
 - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the 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 must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.

- A copy of a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter *(if applicable)*
- Match Funds Reduction Notification Letter *(if applicable)*

Subtask 1.8 Permits

The goal of this subtask 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, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
 - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
 - The schedule the Recipient will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project 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 progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits *(if applicable)*
- Updated Schedule for Acquiring Permits *(if applicable)*

- Copy of each Approved Permit (*if applicable*)

Subtask 1.9 Subcontracts

The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of the executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

- Subcontracts (*draft if required by the CAM*)

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
 - Technical area expertise;
 - Knowledge of market applications; or
 - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.

The TAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

Subtask 1.11 TAC Meetings

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Recipient shall:

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.

- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

Products:

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

III. TECHNICAL TASKS

*Products that require a draft version are indicated by marking “(draft and final)” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. **Subtask 1.1 (Products)** describes the procedure for submitting products to the CAM.*

TASK 2: Site and Fleet Characterization, Data Collection, and Data Analysis to Support Controls Strategies

The goal of this task is to inform control strategy design by collecting and analyzing facility utility meter data, fleet usage data, and PEV charging load data.

The Recipient shall:

- Install the fleet management system (FMS) at a central site to gather information on vehicle reservations and data collection of trip start/end times, distances, etc. The FMS will be similar to the fleet vehicle reservation system currently used by Alameda County and will reside on a computer at the Alameda County General Services Agency. The FMS will be configured with a web interface for fleet management inputs for specific trip start/end times and destination locations and/or estimated trip distances.
 - Train PEV fleet users on the program and use of the enhanced fleet management system.
- Establish and maintain communication between the central fleet management and the charging control system and EVSEs.
- Collect utility meter electric demand and consumption data for each meter to which EVSEs are connected to establish baseline metrics prior to implementing the smart charging system.
- Survey non-EVSE loads and distributed energy resources on each meter, to understand how the smart charging control strategy must consider other non-PEV loads to enable lowest cost operation.
- Collect EVSE load data for fleet and non-fleet vehicles connected to Alameda County charging stations, to establish baseline metrics prior to implementing the smart charging system.
- Collect time series data of both vehicle battery state of charge (SOC) and vehicle miles traveled using commercially available, small data loggers that plug directly into the on-board diagnostic ports of a sample (up to 40) Alameda County fleet PEVs. The SOC and mileage data will be used to determine the actual kWh per mile energy consumption for the fleet PEVs and for V2G-Sim calibration in Task 3. Alameda County currently uses similar data logging devices to track GPS location data for its fleet vehicles. This study would not collect or use any location data or personally identifiable information.

- Estimate cost savings on utility bills using building and EVSE load data, and fleet usage data once the managed charging system is implemented. Calculate reductions in demand charges and revenue from DR and wholesale market participation in scenarios for managed charging of fleet vehicles, public vehicles, and both fleet and public vehicles.
- Estimate the impact of using nighttime fleet charging to participate in wholesale ancillary services markets as spinning reserves and regulation (through a Pacific Gas and Electric (PG&E) supply side pilot).
- Prepare a *Fleet PEV Utilization and Charging Load Data Report* that summarizes collection and analysis of Alameda County fleet data.

Product:

- Fleet PEV Utilization and Charging Load Data Report (draft and final)

Task 3: Implement, Demonstrate, and Collect and Analyze Data for Fleet PEV Participation in Regulation and Spinning Ancillary Services

The goals of this task are to implement the fleet PEV charging control system, enroll EVSEs and related buildings to participate as Proxy Demand Resources (PDRs) in PG&E's Supply Side Pilot (SSP), and evaluate potential revenue generation for Alameda County.

The Recipient shall:

- Create/validate vehicle-to-grid simulator (V2G-Sim) modules for each fleet vehicle type to predict state of charge (SOC) based on data tracked by the fleet management system.
- Create control algorithms to manage fleet charging loads with objectives of unrestricted fleet usage and minimized utility bill costs using data inputs from fleet management system and V2G-Sim.
 - Design an optimal control approach to minimize utility bill costs without restricting vehicle mobility.
 - Develop methods to enable V2G-Sim to automatically quantify the flexibility in PEV charging for individual vehicles to defer charging and offer grid services, using inputs from the fleet management system.
 - Develop a charge control module to accept inputs from the fleet management system and V2G-Sim, identify charging trajectories for (1) individual vehicles using the optimal control approach, and (2) output targeted charging trajectories.
 - Develop communications and coordination systems between the charging control module and individual EVSEs that will modulate PEV charging.
- Implement control system for fleet PEV charge management to address the following use cases:
 - generating new revenue and minimizing grid impacts by responding to PG&E automated demand response and wholesale market demand response signals.
 - generating new revenue and offering wholesale market ancillary services through the PG&E Supply-Side Pilot program.
 - minimizing operating costs by leveraging time of use rates.
 - minimizing operating costs by mitigating demand charges.

- Coordinate PEV managed charging with existing systems, including integration with existing building energy management systems, and provide grid support for localized distribution systems. Collect and analyze at least 12 months (unless a shorter time is approved in writing by the CAM) of fleet vehicle usage, EVSE demand, building demand, electricity costs, and potential SSP revenue to quantify system performance. Survey fleet users on the usability of the fleet management system.
- Use system performance data to refine control strategies and methods to maximize system performance.
- Survey fleet owner, manager(s), and users on the impacts of integrating the PEV smart charging system.
- Prepare a *Smart Charging Control System for a Dispersed PEV Fleet Report* that provides:
 - a detailed description of each component of the control system,
 - an evaluation of the system's integration and performance from the fleet owner's perspective,
 - documentation of results with respect to utility savings, operator satisfaction, and
 - other metrics agreed upon with the CAM.

Product:

- Smart Charging Control System for a Dispersed PEV Fleet Report (draft and final)

Task 4: Implement, Demonstrate, and Collect and Analyze Data for Fleet and Public PEV Participation in DR and Demand Management

The goal of this task is to implement control system components that incorporate non-fleet vehicles that use fleet EVSEs to manage demand charges and responses to demand response events in which Alameda County facilities participate.

The Recipient shall:

- Determine method(s) for influencing/controlling public vehicle charging patterns.
- Create mechanisms to communicate with public EVSE users and allow them to enter vehicle/charger usage data (e.g. phone app).
- Implement a control system for managing fleet and public PEV charging that enables operator to participate in demand response programs and mitigate demand charges. The primary non-fleet PEV managed charging use cases in this task are:
 - Minimizing operating costs by leveraging time of use rates.
 - Minimizing operating costs by mitigating demand charges.
 - Coordinating PEV managed charging with existing systems, including integration with existing building energy management systems, and providing grid support for localized distribution systems.
- Collect and analyze at least 12 months (unless a shorter time is approved in writing by the CAM) of fleet vehicle usage, EVSE demand, building demand, and utility cost data after implementing a managed charging system for demand response and demand charge mitigation. Quantify the system performance using this data collection and analysis.
- Refine control strategies and system structure to maximize system performance to capture the greatest cost savings benefits without affecting driver mobility needs.

- Using experience from installing, implementing, and operating the smart charging control system, determine improvements to PEV charging infrastructure and the grid that would accelerate deployment of smart charging systems for fleet and non-fleet PEV charging.
- Identify and provide solutions to barriers (technical, financial, etc.) to commercializing the smart charging control systems demonstrated in this project.
- Prepare a *Smart Charging Control System for Demand Management of Fleet and Non-Fleet PEVs Report* that provides a detailed description of each component of the control system, an evaluation of its performance, recommendations for improvements to the grid and/or PEV infrastructure, and a discussion of the barriers to commercializing the system.

Product:

- Smart Charging Control System for Demand Management of Fleet and Non-Fleet PEVs Report (draft and final)

TASK 5: Evaluation of Project Benefits

The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
 - For Product Development Projects and Project Demonstrations:
 - Published documents, including date, title, and periodical name.
 - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
 - Greenhouse gas and criteria emissions reductions.
 - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
 - Additional Information for Product Development Projects:
 - Outcome of product development efforts, such copyrights and license agreements.
 - Units sold or projected to be sold in California and outside of California.
 - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.

- Investment dollars/follow-on private funding as a result of Energy Commission funding.
- Patent numbers and applications, along with dates and brief descriptions.
- Additional Information for Product Demonstrations:
 - Outcome of demonstrations and status of technology.
 - Number of similar installations.
 - Jobs created/retained as a result of the Agreement.
- For Information/Tools and Other Research Studies:
 - Outcome of project.
 - Published documents, including date, title, and periodical name.
 - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
 - The number of website downloads.
 - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
 - An estimate of energy and non-energy benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

The Energy Commission may send the Recipient similar questionnaires after the Agreement term ends. Responses to these questionnaires will be voluntary.

Products:

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire

TASK 6: Technology/Knowledge Transfer Activities

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to the public and key decision makers.

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
 - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
 - A description of the intended use(s) for and users of the project results.
 - Published documents, including date, title, and periodical name.

- Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
- A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
- The number of website downloads or public requests for project results.
- Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop on the results of the project.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: LAWRENCE BERKELEY NATIONAL LABORATORY

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 EPC-14-057 from PON-14-301 with the **Department of Energy's Lawrence Berkeley National Laboratory** for a **\$1,993,355** grant to demonstrate a smart charging control system for electric vehicle supply equipment that will minimize utility costs through managed charging of fleet vehicles; 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