

CONTRACT REQUESTS FORM (CRF)

CEC-94 (Revised 5/11)

CALIFORNIA ENERGY COMMISSION


 New Contract 500-11-007 Amendment to Existing Contract: _____ Amendment Number: _____

Division	Contract Manager:	MS-	Phone	CM Training Date
Energy Research and Development	Jamie Patterson	43	916-327-2342	1/21/1998

Contractor's Legal Name	Federal ID Number
San Diego Gas & Electric Company	95-1184800

Title of Project
Electric Vehicle Charging Simulator for Distribution Grid Feeder Modeling

Term	Start Date	End Date	Amount
New/Original Contract	11/7/2011	5/16/2014	\$ 680,000

Line up the Amendment information as best as possible within the following table.

Amendment #	End Date (mm/dd/yy)	Amount

Business Meeting Information

Proposed Business Meeting Date	9/21/2011	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Jamie Patterson	Time Needed:	5 minutes

Agenda Item Subject and Description

Possible approval of Contract 500-11-007 for \$680,000.00 with San Diego Gas & Electric Company to assess the grid impact of Plug-in Electric Vehicles charging. This project is to develop an Electric Vehicle Charging Simulator for Distribution Feeder Modeling. (PIER Electric Funding.) Contact: Jamie Patterson (5 minutes)

Business Meeting approval is not required for the following types of contracts: *Executive Director's signature is required in all cases.*

- Contracts less than \$10k (*Policy Committee's signature is also required*)
- Amendment for a no-cost time extension. Must be first extension, less than one year and original contract less than \$100k.
- Contracts less than \$25k for Expert Witness in Energy Facility licensing cases and amendments.

Purpose of Contract or Purpose of Amendment, if applicable

The purpose of this Agreement is to simulate load and power quality effects of multiple PEV's charging to determine the impact on grid performance and operation. The Agreement will also demonstrate an integrated approach to PEV charging that incorporates renewable generation, battery energy storage and smart charging. The San Diego Gas and Electric Company is a good candidate for this research as their service area has a high number of electric vehicles being purchased by consumers. Stakeholder coordination is provided by a technical advisory group that will meet regularly to discuss the research. There is interest by the other utilities in California and the information from this research will be made available to them.

California Environmental Quality Act (CEQA) Compliance

- Is Contract considered a "Project" under CEQA?
 - Yes: skip to question 2
 - No: complete the following (PRC 21065 and 14 CCR 15378):

Explain why contract is not considered a "Project":
- If contract is considered a "Project" under CEQA:
 - a) Contract **IS** exempt. (Draft NOE required)
 - Statutory Exemption. List PRC and/or CCR section number: _____
 - Categorical Exemption. List CCR section number: 14 CCR 15301
 - Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why contract is exempt under the above section:

The contract will not cause a direct physical or indirect physical change in the environment because it involves simulating and measuring the electrical load effects of charging vehicle batteries.
 - b) Contract **IS NOT** exempt. The Contract Manager needs to consult with the Energy Commission attorney assigned to their division and the Siting Office regarding a possible Initial Study.

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CALIFORNIA ENERGY COMMISSION



Budgets Information								
Contract Amount Funded		Breakdown by FY			Funding Sources			
Funding Source	Amount	FY	Amount	Approved?	Funding Source	FY	Budget List No.	Amount
ARFVTF	\$	11-12	\$680,000	Yes	PIER-E	10-11	501.0271	\$680,000
ECAA	\$		\$					\$
State- ERPA	\$		\$					\$
Federal	\$		\$					\$
PIER - E	\$680,000		\$					\$
PIER - NG	\$		\$					\$
Reimbursement	\$		\$					\$
Other	\$		\$					\$
TOTAL:	\$680,000	TOTAL:	\$680,000		TOTAL:			\$680,000
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		Contractor's Project Manager	
Name:	Anne Brandon	Name:	William Torre
Address:	8326 Century Park Ct	Address:	8316 Century Park Ct
City, State, Zip:	San Diego, CA 92123-1530	City, State, Zip:	San Diego, CA 92123-1582
Phone/ Fax:	619-654-1113 / 619-654-1117	Phone/ Fax:	858-654-8349 / 858-654-8643
E-Mail:	abrandon@sdge.com	E-Mail:	wtorre@sdge.com

Contractor Is
<input checked="" type="checkbox"/> Private Company (including non-profits) <input type="checkbox"/> CA State Agency (including UC and CSU) <input type="checkbox"/> Government Entity (i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)

Selection Process Used
<input type="checkbox"/> Solicitation <u>Select Type</u> Solicitation #: _____ # of Bids: _____ Low Bid? <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Non Competitive Bid (Attach CEC 96) <input type="checkbox"/> Exempt <u>Select Exemption</u>

Civil Service Considerations
<input type="checkbox"/> Not Applicable (Contract is with a CA State Entity or a membership/co-sponsorship) <input checked="" type="checkbox"/> Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER) <input type="checkbox"/> The Services Contracted: <input type="checkbox"/> are not available within civil service <input type="checkbox"/> cannot be performed satisfactorily by civil service employees <input type="checkbox"/> are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system. <input type="checkbox"/> The Services are of such an: <input type="checkbox"/> urgent <input type="checkbox"/> temporary, or <input type="checkbox"/> occasional nature that the delay to implement under civil service would frustrate their very purpose. Justification:

CONTRACT REQUESTS FORM (CRF)



Payment Method			
<input checked="" type="checkbox"/> A. Reimbursement in arrears based on:			
<input checked="" type="checkbox"/> Itemized Monthly	<input type="checkbox"/> Itemized Quarterly	<input type="checkbox"/> Flat Rate	<input type="checkbox"/> One-time
<input type="checkbox"/> B. Advanced Payment			
<input type="checkbox"/> C. Other, explain:			

Retention	
1. Is contract subject to retention?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
If Yes, Do you plan to release retention prior to contract termination?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes

Justification of Rates
San Diego Gas and Electric is regulated by the CPUC. Rates are reviewed and are in keeping with industry practice, the wages are prevailing wages.

Disabled Veteran Business Enterprise Program (DVBE)	
1. <input type="checkbox"/> Not Applicable	
2. <input checked="" type="checkbox"/> Meets DVBE Requirements	DVBE Amount:\$ <u>21,420</u> DVBE %: <u>3</u>
<input type="checkbox"/> Contractor is Certified DVBE	
<input checked="" type="checkbox"/> Contractor is Subcontracting with a DVBE:	<u>Phazer Electric Inc.</u>
3. <input type="checkbox"/> Requesting DVBE Exemption (attach CEC 95)	

Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
If yes, check appropriate box:	<input type="checkbox"/> SB <input type="checkbox"/> MB <input type="checkbox"/> DVBE

Is Contractor subcontracting any services?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE:	
Electric Power Research Institute (EPRI)	<input checked="" type="checkbox"/> No <input type="checkbox"/> SB <input type="checkbox"/> MB <input type="checkbox"/> DVBE
Horizon Energy Group	<input checked="" type="checkbox"/> No <input type="checkbox"/> SB <input type="checkbox"/> MB <input type="checkbox"/> DVBE
Phazer Electric Inc.	<input type="checkbox"/> No <input type="checkbox"/> SB <input checked="" type="checkbox"/> MB <input checked="" type="checkbox"/> DVBE
	<input type="checkbox"/> No <input type="checkbox"/> SB <input type="checkbox"/> MB <input type="checkbox"/> DVBE
	<input type="checkbox"/> No <input type="checkbox"/> SB <input type="checkbox"/> MB <input type="checkbox"/> DVBE
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	<input type="checkbox"/> No <input type="checkbox"/> SB <input type="checkbox"/> MB <input type="checkbox"/> DVBE

Miscellaneous Contract Information	
1. Will there be Work Authorizations?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
2. Is the Contractor providing confidential information?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
3. Is the contractor going to purchase equipment?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
4. Check frequency of progress reports	
<input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Quarterly <input type="checkbox"/>	
5. Will a final report be required?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
6. Is the contract, with amendments, longer than a year? If yes, why?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
The Department of General Services has agreed to give the Commission blanket authority to execute multi-year contracts to support the Commission's RD&D Programs.	

CONTRACT REQUESTS FORM (CRF)



The following items should be attached to this CRF		
1. Scope of Work, Attach as Exhibit A.	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
2. Budget Detail, Attach as Exhibit B.	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
3. CEC 96, NCB Request	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
4. CEC 30, Survey of Prior Work	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
5. CEC 95, DVBE Exemption Request	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
6. Draft CEQA Notice of Exemption (NOE)	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
7. Resumes	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
8. CEC 105, Questionnaire for Identifying Conflicts		<input type="checkbox"/> Attached
9. CEC 106, IT Component Reporting Form		<input type="checkbox"/> Attached

 Contract Manager Date Office Manager Date Deputy Director Date

The following signatures are only required when contract approval is delegated to the Executive Office and not approved at a Business Meeting. See Business Meeting Information Section.

 Presiding Policy Committee Date Associate Policy Committee Date Executive Director Date

Proposed Agreement between California Energy Commission and San Diego Gas & Electric Company

Title: Electric Vehicle Charging Simulator for Distribution Grid Feeder Modeling
Amount: \$680,000.00
Term: 30 months
Contact: Jamie Patterson
Committee Meeting: 7/28/2011

Funding

FY	Program	Area	Initiative	Budget	This Project	Remaining Balance	
10	Electric	ETSI	Smart Grid	\$6,236,303	\$680,000	\$767,379	12%

Recommendation

Approve this agreement with San Diego Gas & Electric Company to develop a Plug-in Electric Vehicle charging simulator for distribution feeder modeling in the amount of \$680,000.00. The length of this agreement is 24 months. Staff recommends placing this item on the discussion agenda of the Commission Business Meeting.

Issue

The capabilities of the distribution system need to be enhanced to accommodate electric vehicles. Plug-in Electric Vehicles (PEV) are beginning to be deployed in numbers that require utilities to understand and model how battery charging for these vehicles will affect distribution feeders. To date, only paper studies have been written to assess the impact of PEV charging and these do not supply the information needed by distribution models. The Public Interest Energy Research (PIER) program funds energy research to improve distribution capabilities and on transportation technologies that reduce air pollution and green house gases. Improving the distribution grid capabilities to accommodate electric vehicles will achieve PIER goals. Legislation provides that up to 10 percent of the PIER funds shall be awarded to electrical corporations for transmission and distribution research that meets the goals and requirements of the PIER program. This research will increase the capabilities of the distribution system to accommodate electric vehicles.

Background

Distribution models do not have data for PEV charging. PEVs include any electric or hybrid electric vehicle that can be recharged from an off-board electric power source. To date only paper studies have been done to assess the impact of PEV charging. A simulator could provide the necessary modeling information of PEV effects on service and power quality. The San Diego Gas and Electric Company is a good candidate for this research as their service area is receiving a large number of electric vehicles so their need is great. San Diego also has a good relationship with other utilities doing vehicle research and will share the results and the simulator across California.

Proposed Work

The objectives of this agreement are to design and assemble a PEV simulator that can be used to conduct testing of typical distribution grid feeder arrangements. This testing will measure the actual effects of charging vehicle batteries and provide data that can then be transferred to computational models. This agreement will also demonstrate PEV charging that integrates renewable generation, energy storage, and

smart charging to show that grid performance, reliability and power quality can be maintained, even with the introduction of a substantial PEV charging load. Stakeholder coordination is provided by a technical advisory group that will meet regularly to discuss the research. There is interest by the other utilities in California, and the information from this research will be made available to them.

Justification and Goals

This project "[has] the potential to enhance transmission and distribution capabilities" (Public Resources Code 25620.1.(c)(3)).

This project also addresses PRC 25004.3(a). Advanced transportation technologies hold the promise of conserving energy, reducing pollution, lowering traffic congestion, and promoting economic development and jobs in California.

This will be accomplished by:

- Simulating load and power quality effects of PEV charging to determine the impact on distribution feeder performance and operation.
- Demonstrating an integrated approach to PEV charging that incorporates renewable generation, battery energy storage and smart charging.

Exhibit A
SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2	x	Field Measurement of Plug-In Electric Vehicle (PEV) Grid Impacts
3	x	Demonstration of Integrated Renewable Generation, Energy storage, and PEV Charging
4		Technology Transfer Activities
5		Production Readiness Plan

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Bill Torre (SDG&E)		
2	Ron Jordan (SDG&E)		
3	John Westerman (Horizon Energy Group)	Phazer Electric DVBE	
4	Bill Torre (SDG&E)/ Ron Jordan (SDG&E)	Phazer Electric DVBE	
5	Bill Torre (SDG&E), Ron Jordan (SDG&E)		

GLOSSARY

Acronym	Definition
CPR	Critical Project Review
DVBE	Disabled Veterans Business Enterprises
EPRI	Electric Power Research Institute
FAT	Factory Acceptance Testing
M&E	Mechanical and Electrical
OEM	Original Equipment Manufacturer
PEV	Plug-in Electric Vehicle
PIER	Public Interest Energy Research
PV	Photovoltaic
RFP	Request For Proposal

Acronym	Definition
SDG&E	San Diego Gas and Electric
TAC	Technical Advisory Committee
UCC.1	Uniform Commercial Code (Financing Statement)

Problem Statement

Plug-in Electric Vehicles (PEV) are being deployed in numbers that require utilities to understand and address the impact of battery charging for these vehicles. PEVs include any electric or hybrid electric vehicle that can be recharged from an off-board electric power source. Recharging an electric vehicle can represent a significant load addition and may result in a need to upgrade existing electric distribution facilities. To date only paper studies have been done to assess the grid impact of PEV charging. A rigorous field study has yet to be completed to measure actual effects and project the implications on service and reliability. Further, there has not been a demonstration of an integrated approach to PEV charging that attempts to address the aggregated demand on multiple vehicles in a way that will satisfy the charging need while protecting the grid from over load and deleterious effects on service and power quality.

Goals of the Agreement

The goal is to simulate load and power quality effects of multiple PEVs charging to determine the impact on grid performance and operation. This will also demonstrate an integrated approach to PEV charging that incorporates renewable generation, battery energy storage and smart charging.

Objectives of the Agreement

The objectives are to design and assemble a PEV simulator that can be used to conduct on site testing of typical distribution grid arrangements. Testing will be performed at San Diego Gas and Electric (SDG&E). This testing will measure the actual effects of charging vehicle batteries and provide data that can then be transferred to computational models. This agreement will also demonstrate PEV charging that integrates renewable generation, energy storage, and smart charging to show that grid performance, reliability and power quality can be maintained, even with the introduction of a substantial PEV charging load.

TASK 1.0 ADMINISTRATION

MEETINGS

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 Contractor shall:

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

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

- Terms and conditions of the Agreement
- CPRs (Task 1.2)
- Match fund documentation (Task 1.7)
- Permit documentation (Task 1.8)

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

- The Commission Contract Manager’s expectations for accomplishing tasks described in the Scope of Work;
- An updated Schedule of Deliverables
- Progress Reports (Task 1.4)
- Technical Deliverables (Task 1.5)
- Final Report (Task 1.6)

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

Contractor Deliverables:

- An Updated Schedule of Deliverables
- An Updated List of Match Funds
- An Updated List of Permits

Commission Contract Manager Deliverables:

- Final Report Instructions

Task 1.2 CPR Meetings

The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and if it should, are there any modifications that need to be made to the tasks, deliverables, schedule or budget.

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

Participants include the Commission Contract Manager and the Contractor, and may include the Commission Contracts Officer, the PIER Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Contract Manager to provide support to the Energy Commission.

The Commission Contract Manager shall:

- Determine the location, date and time of each CPR meeting with the Contractor. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Contractor the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not to modify the tasks, schedule, deliverables and budget for the remainder of the Agreement, including not proceeding with one or more tasks. If the Commission Contract Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Energy Commission's Research, Development and Demonstration Policy Committee for its concurrence.
- Provide the Contractor with a written determination in accordance with the schedule. The written response may include a requirement for the Contractor to revise one or more deliverable(s) that were included in the CPR.

The Contractor 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 deliverables identified in this Scope of Work. Submit these documents to the Commission Contract Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

Contractor Deliverables:

- CPR Report(s)
- CPR deliverables identified in the Scope of Work

Commission Contract Manager Deliverables:

- Agenda and a List of Expected Participants
- Schedule for Written Determination
- Written Determination

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Contractor shall:

- Meet with the Energy Commission 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 Contractor, the Commission Contracts Officer, and the Commission Contract 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 Contract Manager.

The technical portion of the meeting shall present findings, conclusions, and recommended next steps (if any) for the Agreement. The Commission Contract Manager will determine the appropriate meeting participants.

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

- What to do with any state-owned equipment (Options)
 - Need to file UCC.1 form re: Energy Commission's interest in patented technology
 - Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables)
 - Need to document Contractor's disclosure of "subject inventions" developed under the Agreement
 - "Surviving" Agreement provisions, such as repayment provisions and confidential deliverables
 - Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.

Deliverables:

- Written documentation of meeting agreements and all pertinent information
- Schedule for completing closeout activities

REPORTING

See Exhibit D, Reports/Deliverables/Records.

Task 1.4 Monthly Progress Reports

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

The Contractor shall:

- Prepare progress reports which summarize all Agreement activities conducted by the Contractor 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 Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

Deliverables:

- Monthly Progress Reports

Task 1.5 Test Plans, Technical Reports and Interim Deliverables

The goal of this task is to set forth the general requirements for submitting test plans, technical reports and other interim deliverables, unless described differently in the Technical Tasks. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

<http://www.energy.ca.gov/contracts/pier/contractors/index.html>

The Contractor shall:

- Unless otherwise directed in this Scope of Work, submit a draft of each deliverable listed in the Technical Tasks to the Commission Contract Manager for review and comment in accordance with the approved Schedule of Deliverables. The Commission Contract Manager will provide written comments back to the Contractor on the draft deliverable within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final deliverable to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final deliverable within 5 working days of receipt. Key elements from this deliverable shall be included in the Final Report for this project.

Task 1.6 Final Report

The goal of this task is to prepare a comprehensive written Final Report that describes the original purpose, approach, results and conclusions of the work done under this Agreement. The Commission Contract Manager will review and approve the Final Report. The Final Report must be completed on or before the termination date of the Agreement. When creating these deliverables, the Contractor shall use and follow,

unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

<http://www.energy.ca.gov/contracts/pier/contractors/index.html>

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

Task 1.6.1 Final Report Outline

The Contractor shall:

- Prepare a draft outline of the Final Report.
- Submit the draft outline of Final Report to the Commission Contract Manager for review and approval. The Commission Contract Manager will provide written comments back to the Contractor on the draft outline within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final outline to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final outline within 5 working days of receipt.

Deliverables:

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

Task 1.6.2 Final Report

The Contractor shall:

- Prepare the draft Final Report for this Agreement in accordance with the approved outline.
- Submit the draft Final Report to the Commission Contract Manager for review and comment. The Commission Contract Manager will provide written comments within 10 working days of receipt.

Once agreement on the draft Final Report has been reached, the Commission Contract Manager shall forward the electronic version of this report for Energy Commission internal approval. Once the approval is given, the Commission Contract Manager shall provide written approval to the Contractor within 5 working days.

- Submit one bound copy of the Final Report with the final invoice.

Deliverables:

- Draft Final Report
- Final Report

MATCH FUNDS, PERMITS, AND ELECTRONIC FILE FORMAT

Task 1.7 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. While the PIER budget for this task will be zero dollars, the Contractor may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds during the term of this Agreement. Match funds must be identified in writing, and the associated commitments obtained before the Contractor can incur any costs for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
 1. 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.
 2. 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 Contractor shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
 - 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.

- Discuss match funds and the implications to the Agreement if they are significantly 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 Contract Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Contract Manager within 10 working days if during the course of the Agreement existing match funds are reduced. Reduction in match funds may trigger an additional CPR.

Deliverables:

- A letter regarding Match Funds or stating that no Match Funds are provided
- Letter(s) for New Match Funds
- A copy of each Match Fund commitment letter
- Letter that Match Funds were Reduced (if applicable)

Task 1.8 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. While the PIER budget for this task will be zero dollars, the Contractor shall show match funds for this task. Permits must be identified in writing and obtained before the Contractor can incur any costs related to the use of the permits for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
 1. If there are no permits required at the start of this Agreement, then state such in the letter.
 2. 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
- Schedule the Contractor will follow in applying for and obtaining these permits.
- The list of permits and the schedule for obtaining them will be discussed at the kick-off meeting, and a timetable for submitting the updated list, schedule and the copies of the permits will be developed. 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, then provide the appropriate information on each permit and an updated schedule to the Commission Contract Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Contract Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Contract Manager within 5 working days. Either of these events may trigger an additional CPR.

Deliverables:

- A letter documenting the Permits or stating that no Permits are required
- Updated list of Permits as they change during the Term of the Agreement
- Updated schedule for acquiring Permits as it changes during the Term of the Agreement
- A copy of each approved Permit

Task 1.9 Electronic File Format

The goal of this task is to unify the formats of electronic data and documents provided to the Energy Commission as contract deliverables. Another goal is to establish the computer platforms, operating systems and software that will be required to review and approve all software deliverables.

The Contractor shall:

- Deliver documents to the Commission Contract Manager in the following formats:
 - Data sets shall be in Microsoft (MS) Access or MS Excel file format.
 - PC-based text documents shall be in MS Word file format.
 - Documents intended for public distribution shall be in PDF file format, with the native file format provided as well.
 - Project management documents shall be in MS Project file format.

- Request exemptions to the electronic file format in writing at least 90 days before the deliverable is submitted.

Deliverables:

- A letter requesting exemption from the Electronic File Format (if applicable)
-

TAC

Task 1.10 Establish the TAC (*The Contract Team will finalize this task and task 1.11*)

The goal of this task is to create an advisory committee for this Agreement.

The TAC should be composed of diverse professionals. The number can vary depending on potential interest and time availability. The exact composition of the TAC may change as the need warrants. TAC members serve at the discretion of the Commission Contract Manager.

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

- Researchers knowledgeable about the project subject matter
- Members of the trades who 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 project subject matter
- U.S. Department of Energy Research Manager
- Public Interest Environmental Groups
- Utility Representatives
- Members of the relevant technical society committees

The purpose of the TAC is to:

- Provide guidance in research direction. The guidance may include scope of research; research methodologies; timing; coordination with other research. The guidance may be based on:
 - technical area expertise
 - knowledge of market applications
 - linkages between the agreement work and other past, present or future research (both public and private sectors) they are aware of in a particular area.
- Review deliverables. Provide specific suggestions and recommendations for needed adjustments, refinements, or enhancement of the deliverables.

- Evaluate tangible benefits to California of this research and provide recommendations, as needed, to enhance tangible benefits.
- Provide recommendations regarding information dissemination, market pathways or commercialization strategies relevant to the research products.

The Contractor shall:

- Prepare a draft list of potential TAC members that includes name, company, physical and electronic address, and phone number and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting. This 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 and ensure that each individual understands the member obligations described above, as well as the meeting schedule outlined in Task 1.11.
- Prepare the final list of TAC members.
- Submit letters of acceptance or other comparable documentation of commitment for each TAC member.

Deliverables:

- Draft List of TAC Members
- Final List of TAC Members
- Letters of acceptance, or other comparable documentation of commitment for each TAC Member

Task 1.11 Conduct TAC Meetings *(The Contract Team will finalize this task and task 1.10)*

The goal of this task is for the TAC to provide strategic guidance to this project by participating in regular meetings or teleconferences.

The Contractor shall:

- Discuss the TAC meeting schedule at the kick-off meeting. The number of face-to-face meetings and teleconferences and the location of TAC meetings shall be determined in consultation with the Commission Contract Manager. This draft schedule shall be presented to the TAC members during recruiting and finalized at the first TAC meeting.
- Organize and lead TAC meetings in accordance with the schedule. Changes to the schedule must be pre-approved in writing by the Commission Contract Manager.
- Prepare TAC meeting agenda(s) with back-up materials for agenda items.
- Prepare TAC meeting summaries, including recommended resolution of major TAC issues.

Deliverables:

- Draft TAC Meeting Schedule
- Final TAC Meeting Schedule
- TAC Meeting Agenda(s) with Back-up Materials for Agenda Items

- Written TAC meeting summaries, including recommended resolution of major TAC issues

TECHNICAL TASKS

The Contractor shall prepare all deliverables in accordance with the requirements in Task 1.5. Deliverables not requiring a draft version are indicated by marking “(no draft)” after the deliverable name.

Task 2 - Field Measurement of PEV Grid Impacts

The goal of this task is to design and conduct testing on the distribution grid to determine the effect and impact of PEVs charging. To do this work, a PEV battery simulator will be designed and assembled, using commercially available battery/charger systems designed to replicate systems used by automobile original equipment manufacturers (OEM) and retrofitters. Experiments will be designed to test the impact of PEV charging on SDG&E distribution infrastructure. Using technical analysis to identify the most sensitive areas of our grid, these experiments will provide data that will allow better advanced planning, rate and service design, and more timely upgrades to the most adversely affected areas of the SDG&E grid, thus preventing service disruption and improving reliability and customer service. The results of this testing will also improve computational models that will be needed for wider analysis.

Task 2.1- Mechanical and Electrical Design for PEV Simulator

The Contractor shall:

- Design and fabricate simulator hardware
- Shop test PEV simulator
- Prepare a report on the PEV simulator design and the results of the shop test

Deliverables:

- PEV Simulator Design and Shop Test Report (no draft)

Task 2.2 - Distribution System Survey, Prioritization for Testing, Test Bed Design

The Contractor shall:

- Survey the existing SDG&E system and conduct studies to locate areas where significant impact is most likely
- Design a test bed to replicate impacted areas identified in the system survey
- Prepare a Distribution Impacts Survey and Test Bed Design Report that includes a distribution impacts survey and describes test bed design

Deliverables:

- Distribution Impacts Survey and Test Bed Design Report (no draft)

Task 2.3 - Experimental Design and Test Bed Assembly

The Contractor shall:

- Requisition equipment, materials, and supplies from SDG&E inventory, to include but not limited to:
 - PEV batteries
 - Transformers
 - Poles and pads
 - Cabling
 - Connectors
- Locate and procure (lease or borrow) a load bank capable of replicating distribution feeder conditions where PEVs are likely to be charged
- Conduct an RFQ for services of a qualified monitoring and evaluation (M&E) subcontractor under the State of California contracting laws, which require a minimum of three bids
- Submit written notification to the Energy Commission Contract Manager of the selected contractor and obtain the Contract Manager's approval of the subcontractor
- Design experimental procedures and measurement protocols for the PEV simulator
- Prepare a PEV simulator experimental test plan

Deliverables:

- Notification of Subcontractor (no draft)
- PEV Simulator Experimental Test Plan (no draft)

Task 2.4 - Deploy PEV simulator and Commission simulator

The Contractor shall:

Prepare a test bed and install the equipment, materials, and supplies identified in Task 2.3 at SDG&E training facility

- Transport the PEV simulator to SDG&E facility and install for commissioning
- Conduct commissioning to ensure proper operation of the simulator, test bed and measurement instrumentation
- Prepare a PEV Simulator Commissioning Report
- Participate in a CPR and prepare a CPR Report as per Task 1.2

Deliverables:

- PEV Simulator Commissioning Report (no draft)
- CPR Report

Task 2.5 Grid Impact Testing and Data Collection

The Contractor shall:

- Conduct testing on the highest priority grid situations as determined by SDG&E researchers and collect data according to the Test Plan designed in Task 2.3
- Prepare detailed monthly Test Reports that summarize testing activities and results

Deliverables:

- Testing Reports (submitted monthly in the monthly progress reports, no draft)

Task 2.6 Data Analysis

The Contractor shall:

- Analyze the data collected according to the protocols developed in Task 2.3
- Prepare a detailed report on the data analysis

Deliverables:

- Data Analysis Results Report (no draft)

Task 3 - Demonstration of Integrated Renewable Generation, Energy storage, and PEV Charging

The goal is to successfully demonstrate an integrated PEV charging system incorporating grid connected battery energy storage with Photovoltaic (PV). This station will include level three rapid charging stations. The SDG&E system will test the concept experiencing intermittency of PV in a coastal environment. The energy storage/PV solar charge port demonstration will integrate an energy storage system, heretofore referred to as a Distributed Energy Storage System (DESS), with an existing 80 kilowatt (kW) solar array to provide support and firming capabilities when EV charging is taking place. This system will test the PV and storage systems abilities to serve 20 6.6kW (level two) chargers and one 50kW (level three) charger. The proposed DESS will be in the range of 50kW/150 kilowatt hour (kWh) – 100kW/300kWh.

Task 3.1 –Procure Energy Storage System

The Contractor shall:

- Prepare full Request for Proposal (RFP) for an energy storage system. The RFP will include final DESS Technical Specification and a Commissioning Test Plan
- Review and issue a final RFP (no CCM approval required)
- Perform technical analysis of bids for vendor selection

- Include solicitation results that describe the number of applications, and the successful bidder in the Monthly Progress Report

Deliverables:

- RFP, including DESS Technical Specifications and Commissioning Test Plan (no draft)

Task 3.2 – Material Procurement, Factory Acceptance Testing, and Site Installation

The Contractor shall:

- Select an energy storage device
- Arrange and witness the factory acceptance testing (FAT) for the device selected
- Perform detailed functional testing at a subcontractor’s test facility for determining compliance with the DESS Technical Specification
- Perform a system commissions test
- Manage the delivery and installation logistics for the energy storage system
- Perform a commissioning test at the project site and provide a Commissioning Test Report that contains test results
- Include installation completion notification in the Monthly Progress Report
- Participate in CPR as per Task 1.2

Deliverables:

- Commissioning Test Report (no draft)
- Installation Completion Notification (to be included in the Monthly Progress Reports)
- CPR Report

Task 3.3– Data Collection, Analysis, and Reporting

The Contractor shall:

- Collect operational data to monitor the ability of the DESS to integrate and support the existing PV system when serving PEV and PHEV charging loads in accordance with the Technical Specification
- Perform scenario testing to simulate various charging situations and mixtures of charging loads on the PV array
- Demonstrate the level to which DESS can firm and support PEV and PHEV charging loads during variable output conditions from the existing PV array
- Prepare a DESS Performance Report

Deliverables:

- DESS Performance Report (no draft)

Task 4 Technology Transfer Activities

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

The Contractor shall:

- Prepare a Technology Transfer Plan. The plan shall explain how the knowledge gained in this project will be made available to the public. The level of detail expected is least for research-related projects and highest for demonstration projects. Key elements from this report shall be included in the Final Report for this project.
- Conduct technology transfer activities in accordance with the Technology Transfer Plan. These activities shall be reported in the Monthly Progress Reports.

Deliverables:

- Technology Transfer Plan

Task 5 Production Readiness Plan

The goal of the plan is to determine the steps that will lead to the manufacturing of the technologies developed in this project or to the commercialization of the project's results.

The Contractor shall:

- Prepare a Production Readiness Plan. The degree of detail in the Production Readiness Plan discussion should be proportional to the complexity of producing or commercializing the proposed product and its state of development. The plan shall include, as appropriate, but not be limited to:
 - Identification of critical production processes, equipment, facilities, personnel resources, and support systems that will be needed to produce a commercially viable product;
 - Internal manufacturing facilities, as well as supplier technologies, capacity constraints imposed by the design under consideration, identification of design critical elements and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes;"
 - A projected "should cost" for the product when in production;
 - The expected investment threshold to launch the commercial product;
 - An implementation plan to ramp up to full production.

Deliverables:

- Production Readiness Plan