

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-15-074 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	David Hungerford	51	916-327-2341

Recipient's Legal Name	Federal ID Number
Center for Sustainable Energy	33-0936366

Title of Project
Meeting Customer and Supply-side Market Needs with Electrical and Thermal Storage, Solar, Energy Efficiency and

Term and Amount	Start Date	End Date	Amount
	5/18/2016	12/31/2019	\$ 3,960,805

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

Proposed Business Meeting Date	5/17/2016	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
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Business Meeting Presenter	David Hungerford	Time Needed:	5 minutes
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Please select one list serve. Select

Agenda Item Subject and Description

CENTER FOR SUSTAINABLE ENERGY. Proposed resolution approving agreement EPC-15-074 with Center for Sustainable Energy for a \$3,960,805 grant to develop co-optimization strategies for distributed energy resources to maximize customer and system value under existing and future retail and wholesale tariff structures, and transactive energy pricing signals.



California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
 Yes (skip to question 2) No (complete the following (PRC 21065 and 14 CCR 15378)):
 Explain why Agreement is not considered a "Project":
 Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because

2. If Agreement is considered a "Project" under CEQA:
 a) Agreement **IS** exempt. (Attach draft NOE)
 Statutory Exemption. List PRC and/or CCR section number: _____
 Categorical Exemption. List CCR section number: Cal. Code Regs., tit 14, § 15301 -- Cal. Code Regs., tit 14, § 15306

Common Sense Exemption. 14 CCR 15061 (b) (3)
 Explain reason why Agreement is exempt under the above section:
 Cal. Code Regs., tit. 14, sec. 15301 provides that projects which consist of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, and which involve negligible or no expansion of use beyond that existing at the time of the lead agency's determination, are categorically exempt from the provisions of the California Environmental Quality Act. This project will install thermal energy storage tanks at two supermarkets. The tanks are approximately the size of shipping containers and will be installed in a fenced, paved dumpster area behind the supermarkets. The tanks will be installed on a concrete pad or permanently mounted skids; they will not be underground. They will be connected to existing electrical panels, not involving trenching. In addition, this project may identify energy efficient improvements and replace existing refrigeration and lighting at the two supermarkets with more efficient refrigeration and lighting. For lighting, this may involve substituting LED for incandescent or fluorescent lighting, or installing lighting control switches, panels, or ballasts smaller than a deck of cards in each lighting fixture. For refrigeration, this may involve replacing all or components of existing refrigerators and display cases. The efficiency improvements will result in negligible or no expansion of existing capacity. Additional data sharing will occur, with no equipment installed, at large retail stores and schools. Therefore, the project will not have a significant effect on the environment and falls within section 15301.

Cal. Code Regs., tit. 14, sec. 15306 provides that projects which consist of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. This project will install software at existing retail locations to monitor electricity loads, and feedback real-time energy consumption data, such as ramp rates, state of charge, and load condition, to analyze the efficacy of load management. The monitoring software will reside in a computer already owned by the participant or provided under this project. Therefore, the project will not have a significant effect on the environment and falls within section 15306.

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
Solar City Corporation	\$ 1,127,025
Olivine Systems	\$ 309,772
Emerging Infrastructure Capital Partners	\$ 799,750
DNV GL	\$ 99,000
Axiom Exergy, Inc.	\$ 99,000
Acuity Brands Lighting, Inc.	\$ 50,000
Hill-Phoenix Corporation	\$ 99,000
	\$
	\$

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

Legal Company Name:

Budget Information			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	14-15	301.001B	\$3,960,805
			\$
			\$
			\$
			\$
			\$
R&D Program Area:	EERO: Buildings	TOTAL:	\$3,960,805
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer		Recipient's Project Manager	
Name:	Jack Clark	Name:	Mike Ferry
Address:	9325 Sky Park Ct Ste 100	Address:	9325 Sky Park Ct Ste 100
City, State, Zip:	San Diego, CA 92123-4380	City, State, Zip:	San Diego, CA 92123-4380
Phone:	858-244-1187 / Fax: - -	Phone:	858-244-7287 / Fax: - -
E-Mail:	Jack.Clark@energycenter.org	E-Mail:	mike.ferry@energycenter.org

Selection Process Used

Competitive Solicitation Solicitation #: GFO-15-311

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 checked="" type="checkbox"/> N/A	<input type="checkbox"/> Attached

 Agreement Manager Date Office Manager Date Deputy Director Date

Exhibit A Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Distributed Energy Resource Portfolio Characterization & Selection
3		Integrate DER Portfolio in CAISO Demand Response Markets
4	X	Develop and Pilot Test Technologies and/or Strategies to Lower Costs of Metering and Telemetry
5		Test and Evaluate Customer-Sited DER Responsiveness to Price Signals
6		Develop Operational Strategies for Customer Participation in Retail and Wholesale Tariffs
7		Pilot/Test Integration of Load Management Systems in CAISO Wholesale Market
8		Supermarket Distributed Energy Resource System Development
9		Supermarket Distributed Energy Resource Grid Integration
10		Identify Strategies to Maximize Customer and System Value
11		Quantify Project, Grid, Ratepayer Benefits
12		Evaluation of Project Benefits
13		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AGD	Automatic Generation Control
CAISO	California Independent Systems Operator
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DR	Demand Response
DER	Distributed Energy Resource
Energy Commission	California Energy Commission
GHG	Greenhouse Gas
MW	Megawatt
MWh	Megawatt hours
PDR	Proxy Demand Response
Recipient	Center for Sustainable Energy
RIM	Ratepayer Impact Measure
TAC	Technical Advisory Committee

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.

Exhibit A Scope of Work

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

A. Purpose of Agreement

The purpose of this Agreement is to inform and develop strategies for overcoming technical and regulatory barriers to distributed energy resource (DER) participation as load reduction and load-modifying resources, and in evaluating optimal operational strategies, to maximize customer and electricity system value.

B. Problem/ Solution Statement

Problem

The State of California has established aggressive goals for incorporating behind-the-meter, customer-sited DERs into California wholesale energy markets, managed by the California Independent System Operator (CAISO). However, with only limited testing performed to date, the ability of DERs to simultaneously and cost-effectively meet onsite customer electrical needs while providing energy services into the CAISO market is largely unproven. The California Public Utilities Commission (CPUC) is currently reviewing the rules for the 2017 Demand Response Auction Mechanism (DRAM) pilot, with full implementation scheduled for 2018. In order for these and other efforts to be successful, both the CPUC and CAISO must be informed, through strategic, targeted demonstration projects, of the technical; institutional; and regulatory barriers to facilitating DER participation in supply-side markets.

Solution

The Recipient will develop co-optimization strategies for DERs to maximize customer and system value under existing CPUC-approved retail and CAISO wholesale tariff structures as well as future market structures and pricing, including transactive energy pricing signals developed by the Group 3 awardee. The project will test and configure the two DER portfolios detailed below to respond to price signals as well as develop operational strategies that provide best practices for wholesale integration subject to retail and wholesale tariffs to be identified in Task 2 and operational constraints.

DER Portfolio #1 (Large retail and schools) 16.4% of commercial electricity use	DER Portfolio #2 (Grocery/Supermarket) 12.9% of commercial electricity use
<ul style="list-style-type: none">• Battery energy storage• Solar photovoltaic (PV)• Integrated load management	<ul style="list-style-type: none">• Thermal energy storage• Energy efficiency (refrigeration, lighting)• Integrated load management

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Identify, inform, and develop strategies for overcoming technical, institutional, and regulatory barriers to expanding the use of DERs to provide optimal customer and system benefits while achieving reductions in GHG emissions.
- Establish, analyze, and publicize operational strategies for DERs.
- Demonstrate the ability of Proxy Demand Resources (PDRs) to provide frequency regulation in the CAISO market.

Exhibit A Scope of Work

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety. This project has the potential to lower energy costs for individual customers, as well as system costs for all ratepayers and CAISO market participants. On the distribution circuit, storage devices may defer the cost of expensive capital upgrade projects such as transformer or line upgrades. As the penetration of intermittent resources increases in California, energy balancing requirements increase as well. Behind-the-meter storage on the distribution system can increase distribution system reliability through services such as local overload relief; power quality; and ramp-rate mitigation on circuits with high penetration of PV, as well as local customer back-up. By deploying, testing, and validating system integration, metering, and telemetry, this Agreement will contribute to the safe operation of DER systems in customer-sited locations while maximizing value for these systems to both customers and wholesale markets.

Technological Advancement and Breakthroughs:³ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to DR participation by developing, validating, and testing operational strategies that maximize customer and system values. This will be accomplished by addressing issues facing customers in both DER deployment and opportunity costs, and providing comprehensive recommendations on how to overcome technical, regulatory, and institutional barriers utilizing two unique portfolios of customer-sited DER technologies with the potential to impact 29.3% of Investor Owned Utility (IOU) commercial customer energy consumption. The project will also result in advancements in managing the data necessary to perform bill management for the retail component of behind-the-meter energy storage and load management systems while simultaneously using the energy storage system capability to directly participate in the wholesale energy market.

Agreement Objectives

The objectives of this Agreement are to:

- Test and evaluate operations in CAISO markets
 - Submit economic bids, receive market awards and coordinate outages by interacting with these CAISO systems: Scheduling Infrastructure Business Rules, CAISO Market Results Interface, and Outage Management System.
 - Meter and financially settle market awards.
- Test and evaluate CAISO's proposed baseline methodologies for performance evaluation and settlements in a direct-access market.
 - Include metered generation output (MGO) and retail baseline adjustments.
- Test and evaluate CAISO's export adjustment rules for financial settlements of PDRs.
- Develop operational strategies to maximize customer and system value under CPUC-approved retail and CAISO wholesale tariff structures.
 - Develop operational strategies to co-optimize between retail and wholesale services, including marginal and opportunity costs of limited energy storage resources.

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).

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.

Exhibit A Scope of Work

- Develop operational strategies to manage uncertainty of limited energy storage resources, based on customer capabilities to manage demand and wholesale participation requirements.
- For participating customers in both portfolios, install and test communication equipment capable of responding to simulated or actual price signals.
- Evaluate resource responsiveness to price signals through real-time market operations and simulated transactive price signals.
- Evaluate ancillary service market potential by simulating contingent and non-contingent events.
- Facilitate the creation of new markets for DERs, allowing these technologies to become self-sustainable without incentives.
- Examine current and proposed future utility tariffs and rates and identify how these rates encourage or discourage efficient uses of DER technologies.

III. 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, including the Final Report Outline and Final Report

- 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.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

Exhibit A Scope of Work

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.

Exhibit A Scope of Work

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

Exhibit A Scope of Work

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)

Exhibit A Scope of Work

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

Exhibit A Scope of Work

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 progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and 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.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds” section of the terms and conditions, including a financial report on Match Fund and in-state 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 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 the 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. (See Task 1.1 for requirements for draft and final products.)

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Style Manual
- Comments on Draft Final Report Outline
- Acceptance 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, Style Manual, and Final Report Template provided by the CAM with the following considerations:

Exhibit A Scope of Work

- Ensure that the report includes the following items, in the following order:
 - Cover page (**required**)
 - Credits page on the reverse side of cover with legal disclaimer (required)
 - Acknowledgements page (optional)
 - Preface (required)
 - Abstract, keywords, and citation page (required)
 - Table of Contents (required, followed by List of Figures and List of Tables, if needed)
 - Executive summary (required)
 - Body of the report (required)
 - References (if applicable)
 - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
 - Bibliography (if applicable)
 - Appendices (if applicable) (Create a separate volume if very large.)
 - Attachments (if applicable)
- Ensure that the document is written in the third person.
- Ensure that the Executive Summary is understandable to the lay public.
 - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
 - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
 - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
- Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
- Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
- Include a brief description of the project results in the Abstract.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

Products:

- Final Report (draft and final)
- Written Responses to Comments on the Draft Final Report

Exhibit A Scope of Work

CAM Product:

- Written Comments on the 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.

Exhibit A Scope of Work

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).

Exhibit A Scope of Work

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.

Exhibit A Scope of Work

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

Exhibit A Scope of Work

IV. TECHNICAL TASKS

TASK 2: DISTRIBUTED ENERGY RESOURCE PORTFOLIO CHARACTERIZATION & SELECTION

The goal of this task is to identify projects to participate in two demand response (DR) aggregation portfolios of clean DER composed of participants with different combinations of behind-the-meter solar and energy storage systems that will be used as test cases for Tasks 3 through 7. Portfolio 1 will consist of at least two SolarCity customers with solar PV generation and energy storage. Portfolio 2 will consist of at least two supermarket sites.

The Recipient shall:

- Select commercial projects with behind-the-meter solar and energy storage systems with a storage size between 1 and 2 MWhs from among SolarCity's customers.
- Demonstrate technical capabilities of the selected projects.
- Identify potential technical barriers in expanding DR to portfolio of aggregated DERs.
- Prepare a *Portfolio Report* that includes but is not limited to the following:
 - A description of DER portfolio including technical capability and operating constraints;
 - A discussion of commercial and technical barriers in aggregating DER portfolio for use cases of DR.

Product:

- Portfolio Report

TASK 3: INTEGRATE DER IN CAISO DEMAND RESPONSE MARKETS

The goal of this task is to integrate the DER portfolio of projects selected under Task 2 into the CAISO PDR market model.

The Recipient shall:

- Evaluate participation options that involve individual and aggregated customer participation as DR.
- Evaluate participation options for wholesale market integration in California.
 - Participation options could include Investor Owned Utility (IOU) DR programs that integrate into CAISO markets such as Demand Response Auction Mechanism or direct participation under newly devised California Public Utility Commission Rule 24 provisions.
- Identify strategies to overcome institutional, technical, and regulatory barriers for wholesale market participation.
- Prepare a *Wholesale Integration Report* that includes but is not limited to the following:
 - Description of participation scenarios for wholesale market integration of DER portfolio as DR.
 - Description of participation options for wholesale market integration of DER portfolio as DR.
 - Description of best practices and strategies to overcome institutional, technical and regulatory barriers for wholesale market participation.

Products:

- Wholesale Integration Report

Exhibit A Scope of Work

TASK 4: DEVELOP AND PILOT TEST TECHNOLOGIES AND/OR STRATEGIES TO LOWER COST OF METERING AND TELEMETRY

The goal of this task is to pilot test and evaluate technologies and strategies to lower the cost of metering and telemetry for wholesale integration.

The Recipient shall:

- Evaluate communication, metering and telemetry requirements for wholesale market participation.
- Develop minimal cost strategies for communication, metering and telemetry requirements for different CAISO products and customer aggregation models.
 - Strategies could be different depending on the customer aggregation model and the underlying market and products the customer participates in, such as:
 - Dispatch notification for day-ahead and real-time energy products
 - Open ADR
 - PAP 19
 - Telemetry for ancillary service products
 - Automatic generation control (AGC) for frequency regulation service
- Evaluate baseline and metering configuration options for PDR for individual or aggregated DR, including:
 - Baseline and metering options that would be set in place by the CAISO's Energy Storage and Distributed Energy Resources initiative by 2016.⁴
 - These options include, but are not limited to, metered generation output with retail load adjustments for behind the meter DERs.
- Evaluate customer value for different baseline and metering configuration options that meet CAISO participation requirements.
- Prepare *Metering and Telemetry Report* that includes, but is not limited to, the following:
 - Description of communication, metering, telemetry and baseline options;
 - Estimation of customer value for different metering configuration and telemetry options;
 - Identification of best strategies for metering and telemetry that provide valuable grid services while minimizing customer costs.
- Prepare a *Test Plan* that details how technology capabilities will be matched to specific wholesale market requirements to validate capability to qualify, integrate and respond to price signals.
- Prepare *CPR Report #1* and participate in a CPR Meeting per subtask 1.3.

Products:

- Metering and Telemetry Report
- Test Plan
- CPR Report #1

⁴ <https://www.caiso.com/Documents/RevisedDraftFinalProposal-EnergyStorageDistributedEnergyResources.pdf>

Exhibit A Scope of Work

TASK 5: TEST AND EVALUATE CUSTOMER-SITED DER RESPONSIVENESS TO PRICE SIGNALS

The goal of this task is to develop cost-efficient technologies that allow customer-sited DERs to respond to simulated or actual CAISO price signals and identify operational constraints.

The Recipient shall:

- Evaluate technology and data requirements for price responsiveness capability of DERs.
- Develop infrastructure for two-way communication of DERs and price signal provider.
- Prepare *Price Responsive Report* that includes but is not limited to the following:
 - Description of technology and data requirements for price responsiveness.
 - Identification of cost-effective technologies that could be used to enable DERs to respond to price signals.

Products:

- Price Responsive Report

TASK 6: DEVELOP OPERATIONAL STRATEGIES FOR CUSTOMER PARTICIPATION IN RETAIL AND WHOLESALE TARIFFS

The goal of this task is to develop operational strategies that minimize the customer cost of DR participation based on existing or soon-to-be-available retail and wholesale tariffs.

The Recipient shall:

- Identify data points as input for developing optimal operational strategies. These data points may include:
 - Wholesale tariffs
 - Wholesale price signals
 - Retail tariffs including TOU rates
 - Operational parameters such as
 - Ramp rates
 - State of charge
 - Load condition
- Collect data on data points identified.
- Analyze data to develop operational strategies that optimize energy and opportunity cost of wholesale market participation based on data points identified above.
- Design operational strategies to respond to a simulated price signal or automated notification from a grid operator, distribution utility, demand response aggregator or other entity.
 - Transactive price signals developed by EPRI, the recipient funded under Group 3 of GFO-15-311, must be used if made available.
- Test capability of frequently changing operating levels in response to price signals under different load regimes.
- Prepare *Operational Strategy Report* that includes but is not limited to the following:
 - Optimal operational strategy that minimizes customer cost of DR participation subject to existing and soon to be available wholesale and retail tariffs.
 - Assessment and recommendation(s) for potential changes to existing institutional and regulatory structures that would facilitate greater resource optimization by aligning customer capabilities with system operational needs.

Exhibit A Scope of Work

Products:

- Operational Strategy Report

TASK 7: PILOT TEST INTEGRATION OF LOAD MANAGEMENT SYSTEMS IN CAISO WHOLESALE MARKET

The goals of this task are to pilot test integration of behind-the-meter energy storage systems in the CAISO wholesale market as supply-side resources under the Proxy Demand Resource (PDR) model and to develop an operational strategy to maximize asset value by providing feasible grid services.

The Recipient shall:

- Install and integrate communication equipment capable of responding to simulated or actual market awards and dispatches as forwarded by the DER Platform and prepare a *Communication Equipment Report* that includes:
 - Evaluation of technologies that can minimize cost of integration and telemetry.
 - Discussion of dispatch system's capability of responding to energy dispatch signals every five minutes.
 - Discussion of necessary control systems for responding to four-second frequency control signals
- Register a commercial battery energy storage system as a PDR in the CAISO market facilitated by a DER platform and standing as a CAISO Demand Response Provider (DRP) and Scheduling Coordinator under the existing CAISO Tariff.
- Test and evaluate energy storage market operations in the CAISO day-ahead (DA) market and prepare a *Proxy Demand Response Operations Report*. Testing and evaluation shall include:
 - Submit economic bids, receive market awards, and coordinate aggregated storage system performance by interacting with all necessary CAISO systems.
 - Acquire revenue-quality meter data from UDC, and convert and submit settlement-quality meter data to the CAISO per CAISO participation requirements,
- Operate battery energy storage systems in a frequency-regulation mode based on four-second simulated AGC signal from the DER platform.
- Capture real-time battery energy storage system performance data.
- Prepare a *Frequency Regulation Operations Report* to include a discussion of:
 - Frequency regulation signal from the DER platform
 - How battery energy storage system operates across a range of charge and discharge scenarios based on AGC signaling.

Product:

- Proxy Demand Response Operations Report
- Communication Equipment Report
- Frequency Regulation Operations Report

Exhibit A Scope of Work

TASK 8: SUPERMARKET DER SYSTEM DEVELOPMENT

The goal of this task is to develop, install, integrate, characterize, and commission a suite of efficiency and load control measures in two supermarket sites, such that a maximum amount of load under management is predictable and dispatchable.

The Recipient shall:

- Analyze the historical energy consumption data from two host supermarket sites to develop and energy efficiency and load control measure optimization strategies which may include:
 - Thermal energy storage;
 - Energy efficiency (retro-commissioning, lighting, refrigeration, heating, ventilation, and air conditioning) measures;
 - Control retrofits to increase dispatchable load.
- Prepare and submit an *Energy Efficiency and Load Control Measures Report* describing the analysis above.
- Install and commission the optimized suite of load reduction and load control measures.
- Integrate load control measures via a software application program interface such that they are able to function cohesively, modifying the supermarket load in a predictable fashion with minimal impact to customer experience.
- Prepare a *Performance Envelope Report* that discusses the performance of the integrated DER under a range of conditions (weather, customer count, etc.).
- Utilize the integrated resource and performance envelope characterization to demonstrate customer benefits for each site (e.g. demand charge mitigation) and develop a *Customer Benefits Report* to include, but not be limited to, site energy consumption data before and after the DER is engaged; and documentation of economic and technical customer benefits.

Products:

- Energy Efficiency and Load Control Measures Report
- Performance Envelope Report
- Customer Benefits Report

TASK 9: SUPERMARKET DER GRID INTEGRATION

The goal of this task is to utilize the aggregated two-site supermarket DER to provide grid services while continuing to meet supermarket operational needs and cost criteria..

The Recipient shall:

- Provide a *Net Performance Envelope Report* of the aggregated two-site supermarket DER, describing capabilities available to perform grid services after customer benefits have been satisfied.
- Develop a mechanism for estimating available DER energy and capacity for a forward period (e.g. 24 or 48 hours) sufficient to respond to existing and proposed market signals without compromising customer benefits or supermarket customer experience.
- Utilize this mechanism to bid aggregated DER into the CAISO wholesale market and summarize in a *CAISO Market Performance Report*.
- Develop a performance envelope and prediction mechanism for use in modeling DER performance in other, emerging grid services and transactive energy markets.

Exhibit A Scope of Work

Products:

- Net Performance Envelope Report
- CAISO Market Performance Report

TASK 10: IDENTIFY STRATEGIES TO MAXIMIZE CUSTOMER AND SYSTEM VALUE

The goal of this task is to address specific barriers to CAISO market participation identified in Tasks 2 through 9, and comprehensively prioritize development of strategies that maximize customer and system value under CPUC-approved retail and CAISO wholesale tariff structures, in addition to identifying tariff structures that could produce higher value.

The Recipient shall:

- Identify and characterize critical differences between customer load management capabilities and supply-side market participation requirements.
- Identify and evaluate best practices and data requirements for supply-side market participation; and ways to reduce data verification costs for aggregators, grid operators, and system owners to manage customer-sited DERs.
- Analyze performance characteristics under existing program incentive structures, including time-of-use (TOU) pilots and other tariffs as a result of CPUC R.12-06-113.
- Document variation in customer-sited DER availability for participation in supply-side markets informed by CPUC D.14-12-024 and the 2015 California Demand Response Potential Study being conducted under CPUC Rulemaking 13-09-011.
- Coordinate with Group 3 awardee to provide data and analysis on implementation and economic modeling of transactive energy pricing systems for the DER portfolios listed in Task 2.
- Prepare *Customer and System Co-Optimization Value Report* that discusses all the items in this task.

Products:

- Customer and System Co-Optimization Value Report

TASK 11: QUANTIFY PROJECT, GRID, RATEPAYER BENEFITS

The goal of this task is to quantify the overall project benefits achieved by integrating DER into CAISO wholesale markets.

The Recipient shall:

- Establish evaluation metrics appropriate for DERs and the Agreement Objectives. The metrics may include some or all of the following:
 - Actual demand and energy measured;
 - Ex ante estimates of demand and energy for the resource;
 - Realization rate of measured demand and energy with respect to ex ante estimates;
 - Cost of procuring and operationalizing the resource;
 - Actual revenue achieved from participating in the CAISO wholesale market;
 - Achievable revenue.
- Define the evaluation methodology that will be used to measure participant and ratepayer benefits using relevant evaluation metrics.
- Carry out the evaluation to measure the project benefits.
- Produce a *Project Report Documenting Evaluation* to discuss the activities in this task.

Exhibit A Scope of Work

Products:

- Project Report Documenting Evaluation

Subtask 11.1: Quantify Grid Benefits

The goal of this subtask is to quantify grid benefits by leveraging data collected under this agreement and extrapolating results to CAISO-wide impacts via scenarios of hypothetical storage capacity penetration in the CAISO market.

The Recipient shall:

- Develop scenarios of storage adoption. The scenarios may include:
 - Base scenario that describes status quo;
 - Idealistic scenario that place storage capacity in the CAISO locations with higher curtailments.
- Develop storage use cases based on optimization strategies demonstrated in the above tasks.
- Model distribution grid impacts of storage use cases. Metrics may include savings from peak load reductions and associated upgrade deferrals.
- Model storage impacts on CAISO market. Metrics may include:
 - Evaluate changes in production costs (energy market), and potentially changes in capacity value and ancillary service markets;
 - Changes in GHG emissions;
 - Potential transmission investment deferral.
- Prepare a *Ratepayer Benefits Memo* that describes the benefit estimation methodology, and summarizes distribution grid impacts and net value of the storage in the CAISO balancing area and compares metrics such as curtailment and GHG emission impacts.

Products:

- Ratepayer Benefits Memo

Subtask 11.2: Quantify Ratepayer Benefits

The goal of this subtask is to aggregate the results from Task 10 and Task 11.1 to quantify ratepayer benefits consistent with American Public Power Association Evaluation Guidelines.

The Recipient shall:

- Perform a cost-benefit analysis using the Ratepayer Impact Measures (RIM) test that measures the impact of customer rate changes on utility revenues and operating costs as a result of increased storage penetration. Components of the RIM benefits/cost test include:
 - Avoided costs of capacity, energy (from Task 11.1)
 - Utility and CAISO direct costs (Task 4)
 - Bill Savings/Lost Revenue (from Task 10)
 - Extra Environmental Costs (from Task 11.1)
 - Benefits from deferring or eliminating distribution or transmission system upgrades (from Task 11.1)
- Prepare a *Ratepayer Impacts Report* that summarizes ratepayer impacts, including scenario assumptions, use case assumptions, and the quantification of benefits/costs components described in this subtask.

Exhibit A Scope of Work

Products:

- Ratepayer Impacts Report

TASK 12: 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.

Exhibit A Scope of Work

- 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 has 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 13: 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-

Exhibit A Scope of Work

sponsored conference/workshop on the results of the project.

- When directed by the CAM, participate in annual EPIC symposium sponsored by the California Energy Commission.
- Provide at least six *High Quality Digital Photographs* of Pre and Post Technology Installation at the Project Sites (*Minimum Resolution of 1300x500 Pixels in Landscape Ratio*).
- Provide signed photo waiver release form by the Energy Commission.
- 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)
- High Quality Digital Photographs (draft and final)
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

V. Project schedule

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: CENTER FOR SUSTAINABLE ENERGY

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

RESOLVED, that the Energy Commission approves Agreement EPC-15-074 from GFO-15-311 with Center for Sustainable Energy for a \$3,960,805 grant to develop co-optimization strategies for distributed energy resources to maximize customer and system value under existing and future retail and wholesale tariff structures, and transactive energy pricing signals; 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 May 17, 2016.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Cody Goldthrite,
Secretariat