

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-17-031 (To be completed by CGL Office)

ERDD	Kenneth Schumann	43	916-327-1556
City of Long Beach Harbor Department (Port of Long Beach)			95-6000733
Port of Long Beach Microgrid – Resilience for Critical Facilities			
4/23/2018	3/31/2023	\$ 5,000,000	

☐ ARFVTP agreements under \$75K delegated to Executive Director.Proposed Business Meeting Date 3/21/2018 ☐ Consent ☒ DiscussionBusiness Meeting Presenter Mike Gravely Time Needed: 10 minutes

Please select one list serve. Research (Energy RDD / PIER program)

Agenda Item Subject and Description

CITY OF LONG BEACH HARBOR DEPARTMENT (PORT OF LONG BEACH). Proposed resolution approving Agreement EPC-17-031 with City of Long Beach Harbor Department (Port of Long Beach) for a \$5,000,000 grant to fund the technology demonstration of a microgrid at the Port of Long Beach that will create an integrated system of distributed energy resources and microgrid controls to achieve long-term islanding at the Port's critical response facility, the Joint Command and Control Center. The Port of Long Beach is providing \$2,120,000 in match funding.

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, 15303, 15306☐ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

This project will develop and install a number of components in order to demonstrate a microgrid on the grounds of the Port of Long Beach, an industrial facility. All microgrid components will be installed either within existing buildings or on already developed land. The components include: a 300 kW solar carport photovoltaic system and associated electrical conduit, a stationary battery energy storage system, a mobile battery energy storage system and an energy control system. The solar carport photovoltaic system will be installed over an existing parking lot and will require some trenching in order to accommodate the electrical conduit run. The stationary battery energy storage system will be installed inside an existing building and will require slight modifications to existing electrical components within the building. The stationary battery energy storage system and the energy control system will be placed in a container on a concrete slab that will be poured in a corner of an existing parking lot.. The mobile battery energy storage system will be tested at a stormwater pump station and a refrigerated container yard which are both on the grounds of the Port of Long Beach. Electrical receptacles will be installed at the pump station and container yard in order to take power from the mobile battery energy storage system. The energy control system will be installed inside an existing building and will require slight modifications to existing electrical components within the building.

Installation and operation of the microgrid components will not create noise or odors, will not require the removal of any trees or shrubs, will not increase traffic to the project site in any significant way and will not expand any existing use of the Port of Long Beach facilities. This project is therefore categorically exempt under CEQA Guidelines sections 15301 as a minor alteration to an existing facility, categorically exempt under CEQA Guidelines section 15303 as construction of new, small structures and categorically exempt under CEQA Guidelines section 15306 as basic data collection and research activities which do not result in a serious or major disturbance to an environmental resource.

☐ b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)

Check all that apply

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- ☐ Initial Study
☐ Negative Declaration
☐ Mitigated Negative Declaration

- ☐ Environmental Impact Report
☐ Statement of Overriding Considerations

Legal Company Name:		Budget
Schneider Electric USA Inc.		\$1,055,000 (CEC funds), \$550,000 (match funds)
The Grant Farm, Inc		\$ 95,000 (CEC funds), \$ 0 (match funds)
Electric Power Research Institute, Inc.		\$ 95,000 (CEC funds), \$ 80,000 (match funds)
The Regents of the University of California on behalf of the Irvine campus		\$ 95,000 (CEC funds), \$ 80,000 (match funds)
Long Beach Community College District		\$ 95,000 (CEC funds), \$ 0 (match funds)
Advanced Transportation and Renewables Energy		\$ 65,000 (CEC funds), \$ 50,000 (match funds)
National Renewable Energy Laboratory (NREL)		\$ 00 (CEC funds), \$240,000 (match funds)

Legal Company Name:

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	17-18	301.001E	\$5,000,000
			\$
			\$
			\$
			\$
			\$
R&D Program Area:	ESRO: ETSI		\$5,000,000
Explanation for "Other" selection			
Reimbursement Contract #:	Federal Agreement #:		

Name:	Aimee Castillo	Name:	Christine Houston
Address:	4801 Airport Plaza Dr	Address:	4801 Airport Plaza Dr
City, State, Zip:	Long Beach, CA 90815-1263	City, State, Zip:	Long Beach, CA 90815-1263
Phone:	562-283-7111 /	Fax:	- -
E-Mail:	aimee.castillo@polb.com	E-Mail:	christine.houston@polb.com

<input checked="" type="checkbox"/> Competitive Solicitation <input type="checkbox"/> First Come First Served Solicitation	Solicitation #: GFO-17-302
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1. Exhibit A, Scope of Work	<input checked="" type="checkbox"/> Attached
2. Exhibit B, Budget Detail	<input checked="" type="checkbox"/> Attached
3. CEC 105, Questionnaire for Identifying Conflicts	<input checked="" type="checkbox"/> Attached
4. Recipient Resolution	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Attached
5. CEQA Documentation	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Attached

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

EXHIBIT A Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Design and Engineering
3		Installation and Integration
4		Data Collection and Evaluation
5		Workforce Development, Training, and Education
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DER	Distributed Energy Resource
DR	Demand Response
JCCC	Joint Command and Control Center
POLB	City of Long Beach Harbor Department (Port of Long Beach)
PV	Photovoltaic
SCE	Southern California Edison
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

The purpose of this Agreement is for the City of Long Beach Harbor Department (Port of Long Beach, Recipient) to develop a new permanent microgrid installation that manages high distributed energy resource (DER) penetration to meet the load of the Joint Command and Control Center (JCCC) at the Port of Long Beach (POLB).

B. Problem/ Solution Statement

Problem

Conventional backup power at port facilities are diesel powered generators. These generators do not align with POLB's zero-emissions goals, nor do they provide power during a potential catastrophic outage. POLB's most critical power control center, the JCCC, must continue operations to ensure that multi-agency response activities can proceed with a high degree of

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.

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reliability. Furthermore, microgrid systems with renewable and resilient DERs will be necessary to ensure business continuity at all of POLB's marine terminals, as they transition to zero-emission operations and increased reliance on electricity.

Solution

The proposed project will develop and demonstrate a robust microgrid that will add zero-emission DERs with grid services capabilities to the JCCC. The microgrid's DERs include new solar photovoltaic (PV), stationary battery storage, mobile battery storage, and peak shaving and demand response. The use of mobile battery storage will allow for the JCCC to extend the "range" of the renewable microgrid to a variety of distributed assets that would otherwise be cost-prohibitive to hardwire into a microgrid. Knowledge gained from this microgrid demonstration help develop a standardized microgrid package for critical facilities across California with one central headquarters and multiple geographically dispersed assets.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Goal 1: Increase grid and facility resiliency
- Goal 2: Increase penetration of renewable electricity
- Goal 3: Operate with renewable energy in island mode
- Goal 4: Reduce greenhouse gas emissions
- Goal 5: Reduce electricity costs
- Goal 6: Demonstrate a standardized commercial microgrid system

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety.

- Greater Electricity Reliability: The proposed project will add stationary energy storage and demand response capabilities allowing the JCCC to respond to utility signals and reduce demand during peak periods. Strategic load shaving in response to utility signals improves the reliability of utility grid services, particularly during times of peak demand.
- Lower Costs: Smart load management reduces the demand on the utility grid, specifically of peaking power, which provides important but high-cost electricity. This microgrid installation will also integrate new solar PV capacity, reducing the net demand on Southern California Edison's (SCE) system. These two factors will lower costs to electricity ratepayers by reducing expensive peak power needs and increasing the longevity of existing grid infrastructure through the production of onsite power.
- Increased Safety: The microgrid will incorporate advanced cybersecurity software and will detect and react to external cyber threats to the JCCC and to the larger SCE network. As a critical facility, the Port is a target for attacks the likes of which would impact all SCE customers. Enhancing the Port's electrical cyber security increases the safety of all SCE ratepayers. Additionally, the microgrid will allow for improved Port operations during a power outage caused by an emergency (e.g. earthquake, terrorist attack) and allow for

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).

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the arrival of humanitarian aid, including food and medical supplies. The JCCC monitors all terminals via camera and the continued operation of this physical security system helps prevent theft. Since 40% of the goods at the Port remain in Southern California, the enhanced JCCC operations will help support local ratepayer businesses and their customers.

Technological Advancement and Breakthroughs:³ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by demonstrating an innovative means of creating a microgrid across POLBs five square miles of operations. The proposed project will demonstrate an innovative approach to secure the energy needs of California's critical facilities that can be quickly and commercially replicated across the Port, as well as the state. Technology advancement will focus on the microgrid controls. This first-of-its-kind installation will require new and advanced control systems to manage two electricity customers behind the meter, demonstrate innovative designs for direct current energy transfer, and demonstrate the viability of dispatchable mobile zero-emissions energy storage that can be charged with renewable energy.

Agreement Objectives

The objectives of this Agreement are to:

- Objective 1: Install a 300 kW array of PV
- Objective 2: Install a 330 kW/670 kWh stationary battery
- Objective 3: Integrate a 250 kW/220 kWh microgrid-extending mobile battery energy storage system (MBESS)
- Objective 4: Install microgrid controls to allow demand response, peaking shaving, and islanded operations
- Objective 5: Obtain at least 12 months of performance data to evaluate actual benefits
- Objective 6: Strengthen local workforce development/training initiatives to include curriculum about storage and microgrid operations and provide on-the-job apprentice training during project construction
- Objective 7: Educate critical facility operators (e.g. ports, wastewater treatment plants, hospitals) about the benefits of a microgrid
- Objective 8: Develop an approach and lessons learned to support replicability at other facilities.

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.

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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.

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:

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- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
 - Text documents will be in MS Word file format, version 2007 or later.
 - Documents intended for public distribution will be in PDF file format.
 - The Recipient must also provide the native Microsoft file format.
 - Project management documents will be in Microsoft Project file format, version 2007 or later.
- **Software Application Development**
- Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:
- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
 - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
 - Visual Studio.NET (version 2008 and up). Recommend 2010.
 - C# Programming Language with Presentation (UI), Business Object and Data Layers.
 - SQL (Structured Query Language).
 - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
 - Microsoft SQL Reporting Services. Recommend 2008 R2.
 - XML (external interfaces).

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

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

- Terms and conditions of the Agreement;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);

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- 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);
 - Technology/Knowledge Transfer (Task 8); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:

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

Recipient Products:

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

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

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

The Recipient shall:

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations

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and conclusions regarding continued work on the project.

- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

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

Recipient Products:

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

CAM Products:

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

Subtask 1.4 Final Meeting

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

The Recipient shall:

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

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

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:

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- Disposition of any state-owned equipment.
- Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
- The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
- Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
- "Surviving" Agreement provisions such as repayment provisions and confidential products.
- Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

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

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

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

The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
 - Summarize 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.

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_ 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
- Approval of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:
 - 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.

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- 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

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.

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

Products:

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

Subtask 1.8 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

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

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.

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

Products:

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

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Subtask 1.9 Subcontracts

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

The Recipient shall:

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

Products:

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

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

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

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

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;

EXHIBIT A

Scope of Work

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

Products:

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

Subtask 1.11 TAC Meetings

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

The Recipient shall:

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

Products:

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

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IV. TECHNICAL TASKS

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

TASK 2 DESIGN AND ENGINEERING

The goals of this task are to develop a detailed design basis for the microgrid and the detailed engineering documentation needed for the microgrid to become build-ready.

The Recipient shall:

- Prepare a Design Basis that describes how the microgrid will be designed and documents a comprehensive list of all systems that will be integrated into the microgrid. The Design Basis will include, but is not limited to:
 - Identification of critical loads
 - Identification of non-critical loads, load prioritization, and means to shed load
 - Schematics of existing electrical infrastructure
 - Identification of onsite power generation
- Prepare *Design Basis Presentation Materials* that summarize the Design Basis. Presentation materials must be approved by the CAM in writing prior to public use.
- Prepare final engineering documents for the microgrid based on the identified design basis. Final engineering documents include all necessary calculations and drawings needed to secure applicable building permits.
- Prepare a *Design and Engineering Review Plan* that will ensure that the design meets the project objectives and comments from each version are adequately captured or resolved in the next design submittal. The *Design and Engineering Review Plan* will include, but is not limited to:
 - Identification of design review points, including:
 - 30% schematic design
 - 60% design development
 - 90% pre-final
 - 100% construction documents
 - Description of the review process
 - Assessment of equipment and battery sized to confirm adherence including
 - Energy storage system inverter rating
 - Cooling equipment
 - Protective device ratings/settings
 - Battery power and energy
 - Control sequence description
 - Identification of evaluation metrics
- Implement *Design and Engineering Review Plan*.
- Prepare *Design and Engineering Review Presentation Materials* summarizing the findings from the implementation of the *Design and Engineering Review Plan*. Presentation materials must be approved by the CAM in writing prior to public use.
- Prepare a *Non-confidential Cyber Security Test Plan* that will include a detailed, non-confidential plan that defines how the microgrid owner/operator will address cyber security over the long-term operation of the microgrid.
- Obtain all *Permits* required by law to install all components of the microgrid from the City of Long Beach or other entities, as applicable, thereby demonstrating

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acceptance of final engineering document by the City's engineers and provide copies to the CAM (consistent with Task 1.8).

- Prepare a *CPR Report* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- Design Basis Presentation Materials
- Design and Engineering Review Plan
- Design and Engineering Review Presentation Materials
- Non-confidential Cyber Security Test Plan (draft and final)
- Copies of Permits (consistent with Task 1.8)
- CPR Report

TASK 3 INSTALLATION AND INTEGRATION

The goal of this task is to install and commission the microgrid.

The Recipient shall:

- Install the microgrid per the final engineering documentation. The microgrid installation will include, but is not limited to:
 - Solar PV
 - Stationary battery storage
 - Mobile battery storage
 - Microgrid controller
- Provide CAM *Pictures of Installed Microgrid Equipment* with name plate capacities in Progress Report.
- Acquire *Building Inspection Approval* documenting the City of Long Beach's approval that the installation is appropriate for the system that was permitted and provide a copy to the CAM (in Task 2).
- Prepare a *Microgrid Commissioning Plan* that outlines in detail the testing that will be conducted during system commissioning to validate operational performance. The *Microgrid Commissioning Plan* will include, but is not limited to:
 - Acceptance tests (application of external power to equipment to prove integrity) for power transformers, switchboard, protective relays and controls, instrument transformers, grounding, power metering, and network devices and software.
 - Functional tests (complete operational check of installed assemblies) for protective relays and controls, control circuits, power metering devices, and lighting systems.
 - Coordination study for circuit breakers
 - Visual inspection for physical damage, clean equipment, insulation resistance and continuity tests, and verify proper equipment connection and conductor connection torque values.
 - Data network testing.
 - PV panel inspection and testing.
 - Automatic transfer switch testing for dielectric test, mechanical test, electrical operation, control wiring test, and polarity test.

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- Test/Commission the microgrid in accordance with the *Microgrid Commissioning Plan*.
- Prepare *Microgrid Commissioning Presentation Materials* to summarize the results from testing per the *Microgrid Commissioning Plan*. Presentation materials must be approved by the CAM in writing prior to public use.
- Implement the *Cyber Security Test Plan*.
- Prepare *Cyber Security Test Presentation Materials* summarizing the results of the implementation of the *Cyber Security Test Plan*. Presentation materials must be approved by the CAM in writing prior to public use.
- Obtain *Rule 21 Permit to Operate* from SCE to demonstrate interconnection approval and provide a copy to the CAM

Products:

- Pictures of Installed Microgrid Equipment (to be included in Progress Report)
- Copy of Building Inspection Approval
- Microgrid Commissioning Plan
- Microgrid Commissioning Presentation Materials
- Cyber Security Test Presentation Materials
- Copy of Rule 21 Permit to Operate

TASK 4 DATA COLLECTION AND EVALUATION

The goal of this task is to collect at least 12 months of operating data and evaluate the performance and benefits associated with the operation of the microgrid.

The Recipient shall:

- Prepare a *Data Collection Plan* that includes, but is not limited to:
 - Description of the systems to be tested
 - Description of the data collection methodology, including:
 - Data collection protocols
 - Data collection schedule
 - Field demonstration of islanded operations, including:
 - Duration of simulated islanded operation
 - Environmental conditions
 - Target operational loads
 - Justification for the tests
 - Information storage and retention plan
 - Expected performance
 - Plans for documentation of technical, environmental and economic data, including, but not limited to:
 - Installation issues
 - Operational constraints
 - Operational performance, including duration of islanded mode capability
 - Response to grid emergencies.
 - Parameters that will measure and document successes, lessons learned, and best practices for the above.

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- Description of a measurement and verification plan specific to this proposed Demand Response (DR) that includes, but is not limited to:
 - kW/kWh provided when DR is used
 - Definition of how the DR is used; the services provided by the microgrid; and the proposed value provided for these microgrid load services
 - The values of integrated services and how the services can be verified, measured and valued
 - DR event performance information from the IOU or CA ISO for any DR services provided
 - Other areas as determined by the CAM
- Collect at least 12 months of data per the *Data Collection Plan*. The number of months of data collection may be reduced with prior CAM written approval.
- Provide monthly *Microgrid Data Reports* to the CAM on field data collected for the one-year testing and evaluation period, or the term approved by the CAM, that includes, but is not limited to:
 - Technical data
 - Operational data
 - Economic data
 - Environmental data
 - Other areas as determined by the CAM
- Prepare a *Microgrid Performance Report* that includes, but is not limited to:
 - Documentation of data collected
 - Assessment of performance
 - Identification of any challenges or barriers encountered and solutions developed to respond to challenges or barriers
- For 3 years beyond the term end date of this Agreement, deliver the following to the CEC annually:
 - A confirmation that the microgrid system is operating
 - Any available summary performance data, benefits, or other relevant summary data reports that can be easily provided based on the data collecting systems installed.

Products:

- Data Collection Plan (draft and final)
- Microgrid Data Reports
- Microgrid Performance Report (draft and final)

TASK 5 WORKFORCE DEVELOPMENT, TRAINING, AND EDUCATION

The goals of this task are train applicable Port workforce to operate and maintain the microgrid and to educate interested stakeholders in the microgrid.

The Recipient shall:

Workforce Development and Onsite Training

- Execute a *Memorandum of Understanding* with applicable labor union for a goal of 20% paid apprentice hours for every journeyman hour during microgrid installation.
- Implement *Memorandum of Understanding*.
- Prepare an *Apprenticeship Report* documenting apprentice hours utilized

EXHIBIT A

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- Prepare a *Microgrid Training Plan* for microgrid operators that includes, but is not limited to:
 - Training schedule
 - Training materials
 - Target audience
- Conduct training in accordance with the *Microgrid Training Plan*.
- Provide *Written Notification of Training Events*, which includes, but is not limited to:
 - Date of training
 - List of participants
 - Copy of materials distributed

Stakeholder Education

- Develop Port Microgrid Workshop tailored to be a one-day workshop that will include, but is not limited to:
 - Benefits & Markets
 - California Policies
 - Storage Technologies
 - Microgrid Applications
 - Economic Analysis
- Conduct up to five workshops. Workshops will be conducted in multiple locations and will be available to the public. The location of each workshop must be approved by the CAM in writing prior to the workshop.
- Provide *Written Notification of Port Microgrid Workshops*, which includes, but is not limited to:
 - Date of workshop
 - Copy of workshop agenda
 - Copy of material distributed
 - Summary of presentation highlights
 - Comments made by attendees
 - List of presenters and attendees

Workforce Development

- Conduct an evaluation of relevant area workforce development and training programs.
- Prepare a *Workforce Assessment Report* that includes, but is not limited to:
 - The skills of the existing area workforce as they relate to energy storage and microgrid technology.
 - The related skills gaps in existing workforce, as well as in existing workforce development and training programs.
 - Recommendations for augmenting existing workforce development and training programs to better support the development of a local workforce with the requisite skills to operate and maintain new energy resiliency technology and equipment.
- Develop *Zero-Emissions Curriculum* for incumbent and entry level workers that includes energy storage and microgrid technologies based on recommendations from the *Workforce Assessment* and Zero-Emission Port Equipment Workforce Development Group.
- Work with faculty to update credit courses to include identified *Zero-Emissions Curriculum*.

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Products:

- Memorandum of Understanding
- Apprenticeship Report
- Microgrid Training Plan
- Written Notification of Training Events
- Written Notification of Port Microgrid Workshops
- Workforce Assessment Report (draft and final)
- Zero-Emissions Curriculum

TASK 6 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete four Project Benefits Questionnaires that correspond to four main intervals in the Agreement: (1) Kick-off Meeting Benefits Questionnaire; (2) Mid-term Benefits Questionnaire; (3) Final Meeting Benefits Questionnaire; and (4) Three Years Beyond the Term End Date 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, but not limited to:
 - Reliability, resiliency and sustainability improvements as provided by the microgrid.
 - Net impacts on the larger grid's load and load shape as provided by the microgrid.
 - GHG reductions as provided by the microgrid, compared to using the utility grid for the electricity and also GHG reductions as provided by any new energy efficiency capabilities of the microgrid project.
 - The dollar value of energy savings as provided by the microgrid, each year.
 - The dollar value of any co-benefits that may accrue to the project, each year.
 - Cost savings or increments compared to business as usual, as provided by the microgrid, including but not limited to technology and installation costs, operations and maintenance, and energy use.
 - Benefit metrics for each of the different DER separated by the specific DER element (e.g., the value energy storage provides to the microgrid owner/operator, the value renewables provide to the microgrid owner/operator, the value demand response services provide to the microgrid owner/operator).
 - Benefit of services as provided by the microgrid to the utility grid.
- 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.

EXHIBIT A

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

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

- Prepare a Business Case Report. As appropriate, the report will discuss the following:
 - How the microgrid system meets the critical needs of the intended end user/operator.
 - Define why the specific configuration has a high probability of being replicated in the future without EPIC funds.
 - Other areas as determined by the CAM.

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Scope of Work

Products:

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire
- Business Case Report (draft and final)

TASK 7 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

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

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
 - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
 - A description of the intended use(s) for and users of the project results.
 - Published documents, including date, title, and periodical name.
 - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
 - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
 - The number of website downloads or public requests for project results.
 - Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project. Presentation materials must be approved by the CAM in writing prior to the conference/workshop(s).
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- 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

EXHIBIT A

Scope of Work

- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-17-031 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Kenneth Schumann	43	916-327-1556

Recipient's Legal Name	Federal ID Number
City of Long Beach Harbor Department (Port of Long Beach)	95-6000733

Title of Project
Port of Long Beach Microgrid – Resilience for Critical Facilities

Term and Amount	Start Date	End Date	Amount
	4/23/2018	3/31/2023	\$ 5,000,000

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

Proposed Business Meeting Date	3/21/2018	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Mike Gravely	Time Needed:	10 minutes

Please select one list serve. Research (Energy RDD / PIER program)

Agenda Item Subject and Description

CITY OF LONG BEACH HARBOR DEPARTMENT (PORT OF LONG BEACH). Proposed resolution approving Agreement EPC-17-031 with City of Long Beach Harbor Department (Port of Long Beach) for a \$5,000,000 grant to fund the technology demonstration of a microgrid at the Port of Long Beach that will create an integrated system of distributed energy resources and microgrid controls to achieve long-term islanding at the Port's critical response facility, the Joint Command and Control Center. The Port of Long Beach is providing \$2,120,000 in match funding.

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, 15303, 15306
☐ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

This project will develop and install a number of components in order to demonstrate a microgrid on the grounds of the Port of Long Beach, an industrial facility. All microgrid components will be installed either within existing buildings or on already developed land. The components include: a 300 kW solar carport photovoltaic system and associated electrical conduit, a stationary battery energy storage system, a mobile battery energy storage system and an energy control system. The solar carport photovoltaic system will be installed over an existing parking lot and will require some trenching in order to accommodate the electrical conduit run. The stationary battery energy storage system will be installed inside an existing building and will require slight modifications to existing electrical components within the building. The stationary battery energy storage system and the energy control system will be placed in a container on a concrete slab that will be poured in a corner of an existing parking lot.. The mobile battery energy storage system will be tested at a stormwater pump station and a refrigerated container yard which are both on the grounds of the Port of Long Beach. Electrical receptacles will be installed at the pump station and container yard in order to take power from the mobile battery energy storage system. The energy control system will be installed inside an existing building and will require slight modifications to existing electrical components within the building.

Installation and operation of the microgrid components will not create noise or odors, will not require the removal of any trees or shrubs, will not increase traffic to the project site in any significant way and will not expand any existing use of the Port of Long Beach facilities. This project is therefore categorically exempt under CEQA Guidelines sections 15301 as a minor alteration to an existing facility, categorically exempt under CEQA Guidelines section 15303 as construction of new, small structures and categorically exempt under CEQA Guidelines section 15306 as basic data collection and research activities which do not result in a serious or major disturbance to an environmental resource.

- ☐ b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)

Check all that apply

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION



- ☐ Initial Study
☐ Negative Declaration
☐ Mitigated Negative Declaration

- ☐ Environmental Impact Report
☐ Statement of Overriding Considerations

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

Legal Company Name:	Budget
Schneider Electric USA Inc.	\$1,055,000 (CEC funds), \$550,000 (match funds)
The Grant Farm, Inc	\$ 95,000 (CEC funds), \$ 0 (match funds)
Electric Power Research Institute, Inc.	\$ 95,000 (CEC funds), \$ 80,000 (match funds)
The Regents of the University of California on behalf of the Irvine campus	\$ 95,000 (CEC funds), \$ 80,000 (match funds)
Long Beach Community College District	\$ 95,000 (CEC funds), \$ 0 (match funds)
Advanced Transportation and Renewables Energy	\$ 65,000 (CEC funds), \$ 50,000 (match funds)
National Renewable Energy Laboratory (NREL)	\$ 00 (CEC funds), \$240,000 (match funds)

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	17-18	301.001E	\$5,000,000
			\$
			\$
			\$
			\$
			\$
R&D Program Area:	ESRO: ETSI	TOTAL:	\$5,000,000
Explanation for "Other" selection			
Reimbursement Contract #:	Federal Agreement #:		

Recipient's Administrator/ Officer

Name:	Aimee Castillo	Name:	Christine Houston
Address:	4801 Airport Plaza Dr	Address:	4801 Airport Plaza Dr
City, State, Zip:	Long Beach, CA 90815-1263	City, State, Zip:	Long Beach, CA 90815-1263
Phone:	562-283-7111 /	Fax:	- -
E-Mail:	aimee.castillo@polb.com	E-Mail:	christine.houston@polb.com

Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-17-302
☐ First Come First Served Solicitation

The following items should be attached to this GRF

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

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

EXHIBIT A

Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR¹	Task Name
1		General Project Tasks
2	X	Design and Engineering
3		Installation and Integration
4		Data Collection and Evaluation
5		Workforce Development, Training, and Education
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DER	Distributed Energy Resource
DR	Demand Response
JCCC	Joint Command and Control Center
POLB	City of Long Beach Harbor Department (Port of Long Beach)
PV	Photovoltaic
SCE	Southern California Edison
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

The purpose of this Agreement is for the City of Long Beach Harbor Department (Port of Long Beach, Recipient) to develop a new permanent microgrid installation that manages high distributed energy resource (DER) penetration to meet the load of the Joint Command and Control Center (JCCC) at the Port of Long Beach (POLB).

B. Problem/ Solution Statement

Problem

Conventional backup power at port facilities are diesel powered generators. These generators do not align with POLB's zero-emissions goals, nor do they provide power during a potential catastrophic outage. POLB's most critical power control center, the JCCC, must continue operations to ensure that multi-agency response activities can proceed with a high degree of

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

reliability. Furthermore, microgrid systems with renewable and resilient DERs will be necessary to ensure business continuity at all of POLB's marine terminals, as they transition to zero-emission operations and increased reliance on electricity.

Solution

The proposed project will develop and demonstrate a robust microgrid that will add zero-emission DERs with grid services capabilities to the JCCC. The microgrid's DERs include new solar photovoltaic (PV), stationary battery storage, mobile battery storage, and peak shaving and demand response. The use of mobile battery storage will allow for the JCCC to extend the "range" of the renewable microgrid to a variety of distributed assets that would otherwise be cost-prohibitive to hardwire into a microgrid. Knowledge gained from this microgrid demonstration help develop a standardized microgrid package for critical facilities across California with one central headquarters and multiple geographically dispersed assets.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Goal 1: Increase grid and facility resiliency
- Goal 2: Increase penetration of renewable electricity
- Goal 3: Operate with renewable energy in island mode
- Goal 4: Reduce greenhouse gas emissions
- Goal 5: Reduce electricity costs
- Goal 6: Demonstrate a standardized commercial microgrid system

Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety.

- Greater Electricity Reliability: The proposed project will add stationary energy storage and demand response capabilities allowing the JCCC to respond to utility signals and reduce demand during peak periods. Strategic load shaving in response to utility signals improves the reliability of utility grid services, particularly during times of peak demand.
- Lower Costs: Smart load management reduces the demand on the utility grid, specifically of peaking power, which provides important but high-cost electricity. This microgrid installation will also integrate new solar PV capacity, reducing the net demand on Southern California Edison's (SCE) system. These two factors will lower costs to electricity ratepayers by reducing expensive peak power needs and increasing the longevity of existing grid infrastructure through the production of onsite power.
- Increased Safety: The microgrid will incorporate advanced cybersecurity software and will detect and react to external cyber threats to the JCCC and to the larger SCE network. As a critical facility, the Port is a target for attacks the likes of which would impact all SCE customers. Enhancing the Port's electrical cyber security increases the safety of all SCE ratepayers. Additionally, the microgrid will allow for improved Port operations during a power outage caused by an emergency (e.g. earthquake, terrorist attack) and allow for

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).

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the arrival of humanitarian aid, including food and medical supplies. The JCCC monitors all terminals via camera and the continued operation of this physical security system helps prevent theft. Since 40% of the goods at the Port remain in Southern California, the enhanced JCCC operations will help support local ratepayer businesses and their customers.

Technological Advancement and Breakthroughs:³ This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by demonstrating an innovative means of creating a microgrid across POLBs five square miles of operations. The proposed project will demonstrate an innovative approach to secure the energy needs of California's critical facilities that can be quickly and commercially replicated across the Port, as well as the state. Technology advancement will focus on the microgrid controls. This first-of-its-kind installation will require new and advanced control systems to manage two electricity customers behind the meter, demonstrate innovative designs for direct current energy transfer, and demonstrate the viability of dispatchable mobile zero-emissions energy storage that can be charged with renewable energy.

Agreement Objectives

The objectives of this Agreement are to:

- Objective 1: Install a 300 kW array of PV
- Objective 2: Install a 330 kW/670 kWh stationary battery
- Objective 3: Integrate a 250 kW/220 kWh microgrid-extending mobile battery energy storage system (MBESS)
- Objective 4: Install microgrid controls to allow demand response, peaking shaving, and islanded operations
- Objective 5: Obtain at least 12 months of performance data to evaluate actual benefits
- Objective 6: Strengthen local workforce development/training initiatives to include curriculum about storage and microgrid operations and provide on-the-job apprentice training during project construction
- Objective 7: Educate critical facility operators (e.g. ports, wastewater treatment plants, hospitals) about the benefits of a microgrid
- Objective 8: Develop an approach and lessons learned to support replicability at other facilities.

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.

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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.

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:

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- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
 - Text documents will be in MS Word file format, version 2007 or later.
 - Documents intended for public distribution will be in PDF file format.
 - The Recipient must also provide the native Microsoft file format.
 - Project management documents will be in Microsoft Project file format, version 2007 or later.
- **Software Application Development**
- Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:
- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
 - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
 - Visual Studio.NET (version 2008 and up). Recommend 2010.
 - C# Programming Language with Presentation (UI), Business Object and Data Layers.
 - SQL (Structured Query Language).
 - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
 - Microsoft SQL Reporting Services. Recommend 2008 R2.
 - XML (external interfaces).

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

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

- Terms and conditions of the Agreement;
- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);

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- 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);
 - Technology/Knowledge Transfer (Task 8); and
 - Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, as needed to reflect any changes in the documents.

The CAM shall:

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

Recipient Products:

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

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

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

The Recipient shall:

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations

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and conclusions regarding continued work on the project.

- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

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

Recipient Products:

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

CAM Products:

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

Subtask 1.4 Final Meeting

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

The Recipient shall:

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

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

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:

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- Disposition of any state-owned equipment.
- Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
- The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
- Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
- "Surviving" Agreement provisions such as repayment provisions and confidential products.
- Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

Products:

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

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

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

The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
 - Summarize 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.

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_ 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
- Approval of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:
 - 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.

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- 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

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.

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

Products:

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

Subtask 1.8 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

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

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.

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

Products:

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

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Subtask 1.9 Subcontracts

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

The Recipient shall:

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

Products:

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

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

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

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

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;

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

Products:

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

Subtask 1.11 TAC Meetings

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

The Recipient shall:

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

Products:

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

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IV. TECHNICAL TASKS

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

TASK 2 DESIGN AND ENGINEERING

The goals of this task are to develop a detailed design basis for the microgrid and the detailed engineering documentation needed for the microgrid to become build-ready.

The Recipient shall:

- Prepare a Design Basis that describes how the microgrid will be designed and documents a comprehensive list of all systems that will be integrated into the microgrid. The Design Basis will include, but is not limited to:
 - Identification of critical loads
 - Identification of non-critical loads, load prioritization, and means to shed load
 - Schematics of existing electrical infrastructure
 - Identification of onsite power generation
- Prepare *Design Basis Presentation Materials* that summarize the Design Basis. Presentation materials must be approved by the CAM in writing prior to public use.
- Prepare final engineering documents for the microgrid based on the identified design basis. Final engineering documents include all necessary calculations and drawings needed to secure applicable building permits.
- Prepare a *Design and Engineering Review Plan* that will ensure that the design meets the project objectives and comments from each version are adequately captured or resolved in the next design submittal. The *Design and Engineering Review Plan* will include, but is not limited to:
 - Identification of design review points, including:
 - 30% schematic design
 - 60% design development
 - 90% pre-final
 - 100% construction documents
 - Description of the review process
 - Assessment of equipment and battery sized to confirm adherence including
 - Energy storage system inverter rating
 - Cooling equipment
 - Protective device ratings/settings
 - Battery power and energy
 - Control sequence description
 - Identification of evaluation metrics
- Implement *Design and Engineering Review Plan*.
- Prepare *Design and Engineering Review Presentation Materials* summarizing the findings from the implementation of the *Design and Engineering Review Plan*. Presentation materials must be approved by the CAM in writing prior to public use.
- Prepare a *Non-confidential Cyber Security Test Plan* that will include a detailed, non-confidential plan that defines how the microgrid owner/operator will address cyber security over the long-term operation of the microgrid.
- Obtain all *Permits* required by law to install all components of the microgrid from the City of Long Beach or other entities, as applicable, thereby demonstrating

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acceptance of final engineering document by the City's engineers and provide copies to the CAM (consistent with Task 1.8).

- Prepare a *CPR Report* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- Design Basis Presentation Materials
- Design and Engineering Review Plan
- Design and Engineering Review Presentation Materials
- Non-confidential Cyber Security Test Plan (draft and final)
- Copies of Permits (consistent with Task 1.8)
- CPR Report

TASK 3 INSTALLATION AND INTEGRATION

The goal of this task is to install and commission the microgrid.

The Recipient shall:

- Install the microgrid per the final engineering documentation. The microgrid installation will include, but is not limited to:
 - Solar PV
 - Stationary battery storage
 - Mobile battery storage
 - Microgrid controller
- Provide CAM *Pictures of Installed Microgrid Equipment* with name plate capacities in Progress Report.
- Acquire *Building Inspection Approval* documenting the City of Long Beach's approval that the installation is appropriate for the system that was permitted and provide a copy to the CAM (in Task 2).
- Prepare a *Microgrid Commissioning Plan* that outlines in detail the testing that will be conducted during system commissioning to validate operational performance. The *Microgrid Commissioning Plan* will include, but is not limited to:
 - Acceptance tests (application of external power to equipment to prove integrity) for power transformers, switchboard, protective relays and controls, instrument transformers, grounding, power metering, and network devices and software.
 - Functional tests (complete operational check of installed assemblies) for protective relays and controls, control circuits, power metering devices, and lighting systems.
 - Coordination study for circuit breakers
 - Visual inspection for physical damage, clean equipment, insulation resistance and continuity tests, and verify proper equipment connection and conductor connection torque values.
 - Data network testing.
 - PV panel inspection and testing.
 - Automatic transfer switch testing for dielectric test, mechanical test, electrical operation, control wiring test, and polarity test.

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- Test/Commission the microgrid in accordance with the *Microgrid Commissioning Plan*.
- Prepare *Microgrid Commissioning Presentation Materials* to summarize the results from testing per the *Microgrid Commissioning Plan*. Presentation materials must be approved by the CAM in writing prior to public use.
- Implement the *Cyber Security Test Plan*.
- Prepare *Cyber Security Test Presentation Materials* summarizing the results of the implementation of the *Cyber Security Test Plan*. Presentation materials must be approved by the CAM in writing prior to public use.
- Obtain *Rule 21 Permit to Operate* from SCE to demonstrate interconnection approval and provide a copy to the CAM

Products:

- Pictures of Installed Microgrid Equipment (to be included in Progress Report)
- Copy of Building Inspection Approval
- Microgrid Commissioning Plan
- Microgrid Commissioning Presentation Materials
- Cyber Security Test Presentation Materials
- Copy of Rule 21 Permit to Operate

TASK 4 DATA COLLECTION AND EVALUATION

The goal of this task is to collect at least 12 months of operating data and evaluate the performance and benefits associated with the operation of the microgrid.

The Recipient shall:

- Prepare a *Data Collection Plan* that includes, but is not limited to:
 - Description of the systems to be tested
 - Description of the data collection methodology, including:
 - Data collection protocols
 - Data collection schedule
 - Field demonstration of islanded operations, including:
 - Duration of simulated islanded operation
 - Environmental conditions
 - Target operational loads
 - Justification for the tests
 - Information storage and retention plan
 - Expected performance
 - Plans for documentation of technical, environmental and economic data, including, but not limited to:
 - Installation issues
 - Operational constraints
 - Operational performance, including duration of islanded mode capability
 - Response to grid emergencies.
 - Parameters that will measure and document successes, lessons learned, and best practices for the above.

EXHIBIT A

Scope of Work

- Description of a measurement and verification plan specific to this proposed Demand Response (DR) that includes, but is not limited to:
 - kW/kWh provided when DR is used
 - Definition of how the DR is used; the services provided by the microgrid; and the proposed value provided for these microgrid load services
 - The values of integrated services and how the services can be verified, measured and valued
 - DR event performance information from the IOU or CA ISO for any DR services provided
 - Other areas as determined by the CAM
- Collect at least 12 months of data per the *Data Collection Plan*. The number of months of data collection may be reduced with prior CAM written approval.
- Provide monthly *Microgrid Data Reports* to the CAM on field data collected for the one-year testing and evaluation period, or the term approved by the CAM, that includes, but is not limited to:
 - Technical data
 - Operational data
 - Economic data
 - Environmental data
 - Other areas as determined by the CAM
- Prepare a *Microgrid Performance Report* that includes, but is not limited to:
 - Documentation of data collected
 - Assessment of performance
 - Identification of any challenges or barriers encountered and solutions developed to respond to challenges or barriers
- For 3 years beyond the term end date of this Agreement, deliver the following to the CEC annually:
 - A confirmation that the microgrid system is operating
 - Any available summary performance data, benefits, or other relevant summary data reports that can be easily provided based on the data collecting systems installed.

Products:

- Data Collection Plan (draft and final)
- Microgrid Data Reports
- Microgrid Performance Report (draft and final)

TASK 5 WORKFORCE DEVELOPMENT, TRAINING, AND EDUCATION

The goals of this task are train applicable Port workforce to operate and maintain the microgrid and to educate interested stakeholders in the microgrid.

The Recipient shall:

Workforce Development and Onsite Training

- Execute a *Memorandum of Understanding* with applicable labor union for a goal of 20% paid apprentice hours for every journeyman hour during microgrid installation.
- Implement *Memorandum of Understanding*.
- Prepare an *Apprenticeship Report* documenting apprentice hours utilized

EXHIBIT A

Scope of Work

- Prepare a *Microgrid Training Plan* for microgrid operators that includes, but is not limited to:
 - Training schedule
 - Training materials
 - Target audience
- Conduct training in accordance with the *Microgrid Training Plan*.
- Provide *Written Notification of Training Events*, which includes, but is not limited to:
 - Date of training
 - List of participants
 - Copy of materials distributed

Stakeholder Education

- Develop Port Microgrid Workshop tailored to be a one-day workshop that will include, but is not limited to:
 - Benefits & Markets
 - California Policies
 - Storage Technologies
 - Microgrid Applications
 - Economic Analysis
- Conduct up to five workshops. Workshops will be conducted in multiple locations and will be available to the public. The location of each workshop must be approved by the CAM in writing prior to the workshop.
- Provide *Written Notification of Port Microgrid Workshops*, which includes, but is not limited to:
 - Date of workshop
 - Copy of workshop agenda
 - Copy of material distributed
 - Summary of presentation highlights
 - Comments made by attendees
 - List of presenters and attendees

Workforce Development

- Conduct an evaluation of relevant area workforce development and training programs.
- Prepare a *Workforce Assessment Report* that includes, but is not limited to:
 - The skills of the existing area workforce as they relate to energy storage and microgrid technology.
 - The related skills gaps in existing workforce, as well as in existing workforce development and training programs.
 - Recommendations for augmenting existing workforce development and training programs to better support the development of a local workforce with the requisite skills to operate and maintain new energy resiliency technology and equipment.
- Develop *Zero-Emissions Curriculum* for incumbent and entry level workers that includes energy storage and microgrid technologies based on recommendations from the *Workforce Assessment* and Zero-Emission Port Equipment Workforce Development Group.
- Work with faculty to update credit courses to include identified *Zero-Emissions Curriculum*.

EXHIBIT A

Scope of Work

Products:

- Memorandum of Understanding
- Apprenticeship Report
- Microgrid Training Plan
- Written Notification of Training Events
- Written Notification of Port Microgrid Workshops
- Workforce Assessment Report (draft and final)
- Zero-Emissions Curriculum

TASK 6 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete four Project Benefits Questionnaires that correspond to four main intervals in the Agreement: (1) Kick-off Meeting Benefits Questionnaire; (2) Mid-term Benefits Questionnaire; (3) Final Meeting Benefits Questionnaire; and (4) Three Years Beyond the Term End Date 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, but not limited to:
 - Reliability, resiliency and sustainability improvements as provided by the microgrid.
 - Net impacts on the larger grid's load and load shape as provided by the microgrid.
 - GHG reductions as provided by the microgrid, compared to using the utility grid for the electricity and also GHG reductions as provided by any new energy efficiency capabilities of the microgrid project.
 - The dollar value of energy savings as provided by the microgrid, each year.
 - The dollar value of any co-benefits that may accrue to the project, each year.
 - Cost savings or increments compared to business as usual, as provided by the microgrid, including but not limited to technology and installation costs, operations and maintenance, and energy use.
 - Benefit metrics for each of the different DER separated by the specific DER element (e.g., the value energy storage provides to the microgrid owner/operator, the value renewables provide to the microgrid owner/operator, the value demand response services provide to the microgrid owner/operator).
 - Benefit of services as provided by the microgrid to the utility grid.
- 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.

EXHIBIT A

Scope of Work

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

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

- Prepare a Business Case Report. As appropriate, the report will discuss the following:
 - How the microgrid system meets the critical needs of the intended end user/operator.
 - Define why the specific configuration has a high probability of being replicated in the future without EPIC funds.
 - Other areas as determined by the CAM.

EXHIBIT A

Scope of Work

Products:

- Kick-off Meeting Benefits Questionnaire
- Mid-term Benefits Questionnaire
- Final Meeting Benefits Questionnaire
- Business Case Report (draft and final)

TASK 7 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

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

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
 - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
 - A description of the intended use(s) for and users of the project results.
 - Published documents, including date, title, and periodical name.
 - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
 - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
 - The number of website downloads or public requests for project results.
 - Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project. Presentation materials must be approved by the CAM in writing prior to the conference/workshop(s).
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- 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

EXHIBIT A

Scope of Work

- 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: CITY OF LONG BEACH HARBOR DEPARTMENT (PORT OF LONG BEACH)

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-17-031 from GFO-17-302 with City of Long Beach Harbor Department (Port of Long Beach) for a \$5,000,000 grant to fund the technology demonstration of a microgrid at the Port of Long Beach that will create an integrated system of distributed energy resources and microgrid controls to achieve long-term islanding at the Port's critical response facility, the Joint Command and Control Center. The Port of Long Beach is providing \$2,120,000 in match funding; 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 March 21, 2018.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Cody Goldthrite,
Secretariat