

**GRANT REQUEST FORM (GRF)**

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-17-032 (To be completed by CGL Office)

ERDD	Kiel Pratt	43	916-327-1412
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The Regents of the University of California, on behalf of the San Diego campus	95-6006144
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Miramar Microgrid - Flight Line Resilience through Landfill Gas and Energy Storage
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4/23/2018	1/31/2023	\$ 5,000,000
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 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:	5 minutes

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

**Agenda Item Subject and Description**

UNIVERSITY OF CALIFORNIA, SAN DIEGO. Proposed resolution approving Agreement EPC-17-032 with The Regents of the University of California, on behalf of the San Diego campus for a \$5,000,000 grant to develop a permanent microgrid at Marine Corps Air Station Miramar that incorporates five distributed energy resources, including renewable generation and energy storage. This microgrid allows critical flight line facilities and military operations to be maintained during grid outages. The Marine Corps Air Station Miramar and the University of California, San Diego are providing \$6,002,320 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, 153066 Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

This project will develop microgrid components as Phase 2 of a larger microgrid demonstration on the grounds of Marine Corps Air Station in Miramar. Microgrid components funded by this Agreement are a battery energy storage system and controls to integrate and operate the microgrid. These components will be integrated with existing components installed previously during Phase 1, which include a solar photovoltaic system, 18 electric vehicle charging stations, and controls to integrate existing renewable landfill gas power generators. The battery energy storage system will be constructed and placed in an outdoor area where an existing electrical switchgear facility and power plant for the microgrid currently reside. Minor trenching will occur to accommodate an electrical conduit run of approximately 20 feet. The control system will be installed inside an existing building and will not involve physical construction. No other physical alterations to buildings or land will be made to accommodate the battery energy storage system or the control system.

Installation and operation of the microgrid components funded by this Agreement adds only zero-emission sources to the microgrid, will not create noise or odors, will not increase traffic to the project site in any significant way, and will not expand any existing use of the Marine Corps Air Station 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)



<input type="checkbox"/> Initial Study	<input type="checkbox"/> Environmental Impact Report
<input type="checkbox"/> Negative Declaration	<input type="checkbox"/> Statement of Overriding Considerations
<input type="checkbox"/> Mitigated Negative Declaration	

Legal Company Name:	Budget
Schneider Electric USA Inc.	\$ 665,592
Johnson Controls, Inc.	\$ 419,810
National Renewable Energy Laboratory (NREL)	\$ 99,999
Marine Corps Air Station Miramar	\$ 0
GC Green Incorporated	\$ 50,000
Electronic & Telecom Systems, Inc.	\$ 6,700
	\$
	\$
	\$



# EXHIBIT A Scope of Work

## I. TASK ACRONYM/TERM LISTS

### A. Task List

Task #	CPR <sup>1</sup>	Task Name
1		General Project Tasks
2		Microgrid Planning, Design, and Engineering
3	X	Procure and Install Energy Storage System and Microgrid Controls
4		Implement Demand Limiting Capabilities
5		Data Collection and Evaluation
6		Microgrid Training to Operators and Disadvantaged Communities
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities

### B. Acronym/Term List

Acronym/Term	Meaning
BDL	Building HVAC Demand Limiting
BESS	Battery Energy Storage System
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DER	Distributed Energy Resources
HVAC	Heating, Ventilation, and Air Conditioning
LFG	Landfill Gas
LOLE	Loss of Load Expectation
MCAS	Marine Corps Air Station
RMF	Risk Management Framework
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 Regents of the University of California, on behalf of the San Diego Campus (Recipient) to develop a permanent microgrid incorporating five distributed energy resources (DER) including renewable generation and energy storage. When operational, the microgrid will help maintain critical flight line facilities during grid outages and facilitate higher renewables penetration from landfill gas (LFG) generators.

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<sup>1</sup> 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

### B. Problem/ Solution Statement

#### Problem

Conventional microgrids often target high-reliability applications for critical infrastructure such as hospitals, university campuses, waste management infrastructure, and military bases. Because renewable generation is not yet reliable enough for use in these applications, microgrid owners often resort to natural gas engines and diesel gensets, abandoning existing renewable generation assets during islanded operations. Natural gas generators are often powered by non-renewable natural gas. For the investment to return a profit, natural gas engines must run 24/7, which prevents the owners from decarbonizing their microgrid energy mix.

#### Solution

This project will demonstrate the use of existing renewable LFG generators in conjunction with energy storage to create a firm, reliable, and carbon-neutral grid resource. The success of this project could help dramatically reduce future investments in legacy fossil infrastructure and lead the way to increased renewable generation. The project will encourage other interested customers in California to confidently adopt such microgrids as a means to achieve their operational and sustainability goals.

### C. Goals and Objectives of the Agreement

#### Agreement Goals

The goals of this Agreement are to:

- Support increased renewable energy penetration
- Reduce greenhouse gas emissions
- Demonstrate energy self-sufficiency
- Increase energy security, resiliency, and reliability
- Reduce energy costs

Ratepayer Benefits:<sup>2</sup> This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety. Greater electric reliability is a result of using the battery energy storage system (BESS) and building HVAC demand limiting (BDL) for demand response. Lower costs are a result of the BESS and BDL decreasing the Loss of Load Expectation (LOLE) and reducing CAISO peak load. Increased safety is a result of local emissions avoidance from reduced operation of the 1.8 MW diesel generator. Microgrids also provide emergency preparedness as a safety benefit since DER controls allow islanded microgrid operation in the case of a grid failure.

Technological Advancement and Breakthroughs:<sup>3</sup> 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 a replicable and scalable solution for critical facilities across California to advance energy security and resilience through the use of onsite

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<sup>2</sup> 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](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF)).

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

## **EXHIBIT A**

### **Scope of Work**

generation in a microgrid.

The project will address critical challenges associated with reacting to instantaneous loss of renewable power while maintaining sufficient power quality to safely manage an islanded electrical network. The results will directly apply to many of California's most vulnerable and critical facilities that must remain operational in the event of a grid failure. Specifically, the technical approach and business case will be relevant to landfills with LFG generating capacity, wastewater treatment plants with biogas generation capacity, as well as hospitals, ports, and military bases.

While LFG generation is commonly regarded as baseload renewable generation, analysis of LFG at Marine Corps Air Station (MCAS) Miramar tells a very different story. Exemplar metered data shows that at least one of the two existing LFG turbines is inoperative over 9% of the time primarily due to issues with landfill gas quality. This downtime not only causes LFG to be non-firm for islanding, but also results in demand spikes and associated demand charges.

In response, conventionally planners might specify a diesel generator. Through this project, MCAS Miramar will demonstrate cost- and resource-effective smart control of BESS to firm the LFG resources and sustain reliable renewable-powered operations.

#### **Agreement Objectives**

The objectives of this Agreement are to:

- Quantify the fuel and criteria pollutant savings for operations through 1.5 MW / 2.5 MWh BESS to displace diesel generators as the primary source of backup power for LFG.
- Reduce demand charges when SDG&E is utilized as backup power for LFG.
- Allow for increased renewable penetration to expand the onsite portfolio to 75% renewables by 2020.
- Assess value of providing ride-through capabilities during transition to islanded operations in the event of a SDG&E outage, eliminating the need for diesel generation for black-start of the microgrid during an outage.
- Analyze measurable improvements in power reliability and quality by deploying new renewable generation and storage to complement the LFG generation, making total renewable generation sufficiently firm such that both existing LFG generators can be integrated into islanded mode operation, in contrast to only one LFG generator currently allowed for islanded operation by the microgrid controller. .
- Quantify benefits of advanced microgrid control features, including demand limiting with building controls, automated generation control, and unit commitment using load and renewables forecasting.
- Develop an approach and lessons learned to support replicability at other facilities.

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## Scope of Work

### 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:

## **EXHIBIT A**

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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);
- Permit documentation (subtask 1.8);

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- Subcontracts (subtask 1.9);
- Technology/Knowledge Transfer (Task 8); and
- Any other relevant topics.

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

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

#### **The CAM shall:**

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

#### **Recipient Products:**

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

#### **CAM Product:**

- Kick-off Meeting Agenda

#### **Subtask 1.3 Critical Project Review (CPR) Meetings**

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

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

#### **The Recipient shall:**

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

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

#### **The CAM shall:**

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

#### **Recipient Products:**

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

#### **CAM Products:**

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

#### **Subtask 1.4 Final Meeting**

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

#### **The Recipient shall:**

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

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

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

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- 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

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end date. When creating the Final Report Outline and the Final Report, the Recipient must use the Style Manual provided by the CAM.

### Subtask 1.6.1 Final Report Outline

#### The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM. (See *Task 1.1* for requirements for draft and final products.)

#### Recipient Products:

- Final Report Outline (draft and final)

#### CAM Product:

- Style Manual
- Comments on Draft Final Report Outline
- 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.

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- Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
- Include a brief description of the project results in the Abstract.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

### Products:

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

### 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,

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address, telephone number, and the address where the property is located.

- 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*)

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

#### **Subtask 1.9 Subcontracts**

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

#### **The Recipient shall:**

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

#### **Products:**

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

### **TECHNICAL ADVISORY COMMITTEE**

#### **Subtask 1.10 Technical Advisory Committee (TAC)**

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

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

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

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

## **EXHIBIT A**

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- Public interest market transformation implementers;
- Product developers relevant to the project;
- U.S. Department of Energy research managers, or experts from other federal or state agencies relevant to the project;
- Public interest environmental groups;
- Utility representatives;
- Air district staff; and
- Members of relevant technical society committees.

#### **The Recipient shall:**

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, phone numbers, summaries of relevant experience, and descriptions of potential value added to the project for each potential member. 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)

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- TAC Meeting Back-up Materials
- TAC Meeting Summaries

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### IV. TECHNICAL TASKS

#### TASK 2 MICROGRID PLANNING, DESIGN, AND ENGINEERING

The goal of this task is to develop the design and supporting engineering to integrate new energy storage capacity and controls into the existing MCAS Miramar microgrid to allow for increased renewable energy penetration during island mode, manage solar energy generation, and enable demand response.

##### The Recipient shall:

- Prepare a *Microgrid Design Report* that will include, but is not limited to:
  - Analysis of load and generation data to assess outage frequency and duration for landfill gas turbines.
  - Determination of acceptable LOLE.
  - Determination of size of energy storage system to meet loss of load expectation under business-as-usual.
  - Outline of microgrid use cases for reliability and economics.
  - Detailed, non-confidential plan that defines how cyber security will be addressed over the long term.
- Produce engineering documents for the microgrid system consistent with the *Microgrid Design Report*.
- Submit engineering documents for permit approval (consistent with the deliverables outlined in Task 1.8).
- Provide *Written Notification of Engineering Completion* indicating readiness to proceed to procurement and installation and completion of all applicable permits identified in Task 1.8.

##### Products:

- Microgrid Design Report
- Written Notification of Engineering Completion

#### TASK 3 PROCURE AND INSTALL ENERGY STORAGE SYSTEM AND MICROGRID CONTROLS

The goal of this task is to physically install the new energy storage system and integrate the microgrid controls necessary to meet the performance specification identified in the design identified in Task 2.

##### The Recipient shall:

- Develop procurement documents for the BESS.
- Create a *Procurement Lessons Learned Summary*, a document serving as a template or repository for lessons learned during procurement that can assist in microgrid deployments at other bases and facilities.
- Install energy storage system.
- Acquire building inspection approval documentation supporting that the installation was conducted consistent with the engineering documentation and building permit.
- Integrate microgrid controls for energy storage.
- Acquire the necessary risk management framework (RMF) accreditations for the BESS connection to the grid.

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- Prepare a *Commissioning Plan* that outlines in detail the testing that will be conducted during system commissioning. The *Commissioning Plan* includes, but is not limited to:
  - Description of the systems to be tested, including but not limited to:
    - Acceptance tests (application of external power to equipment to prove integrity) for equipment such as 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
    - Automatic transfer switch testing for dielectric test, mechanical test, electrical operation, control wiring test, and polarity test
  - Justification for the tests
  - Information storage and retention plan
  - Expected performance
- Implement the *Commissioning Plan*.
- Obtain appropriate building permits as identified in Task 1.8.
- Prepare a *Commissioning Report* detailing the results from the testing conducted as identified in the *Commissioning Plan*.
- Prepare a *CPR Report* and participate in a CPR meeting per Subtask 1.3.

#### **Products:**

- Procurement Lessons Learned Summary
- Commissioning Plan (draft and final)
- Commissioning Report (draft and final)
- CPR Report

#### **TASK 4 IMPLEMENT DEMAND LIMITING CAPABILITY**

The goal of this task is to implement demand limiting and demand response capability in the building automation system. Demand limiting will reduce the required size of the energy storage system to achieve reliability objectives.

#### **The Recipient shall:**

- Acquire the necessary RMF accreditations for demand limiting.
- Implement demand limiting controls on a single-click control surface that allows building-by-building controls of:
  - Stage 1: Adjusting MCAS Miramar building temperature setpoints
  - Stage 2: Turning off all air conditioning compressors, but continue to power fans for ventilation
  - Stage 3: Turning off all HVAC equipment
- Estimate demand limiting capacity (MW) and duration (MWh for different demand response durations) for MCAS Miramar and prepare a *Measurement and Verification Plan*. The following is required content in the *Measurement and Verification Plan*:
  - kW and kWh provided when demand limiting is used

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- Definition of how the demand limiting is used; the services provided by the microgrid; and the proposed value provided by these microgrid load services
- The values of integrated services and how the services can be verified, measured and valued
- Demand limiting event performance information from the utility or California Independent System Operator for any demand limiting services provided
- Prepare a *Demand Limiting Demonstration and Verification Report* that documents the demand limiting performance for a demand limiting event.

#### **Products:**

- Measurement and Verification Plan (draft and final)
- Demand Limiting Demonstration and Verification Report

#### **TASK 5 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
  - 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.
  - Description of the data collection methodology, including:
    - Data collection protocols
    - Data collection schedule
  - Justification for the tests
  - Information storage and retention plan
  - Expected performance
- Collect at least 12 months, or a lesser amount with prior written CAM approval, of operating data per the *Data Collection Plan*.
- Prepare a *Microgrid Performance Report* that includes, but is not limited to:
  - Documentation of data collected per the *Data Collection Plan*
  - Assessment of microgrid performance compared to performance goals listed in the Agreement Objectives section above.
  - Identification of any challenges or barrier encountered and solutions developed to respond to challenges or barriers
- Work with both the Energy Commission and the microgrid operator to negotiate the delivery of the following to the Energy Commission annually for 3 years beyond the term end date of this Agreement:
  - 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

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#### **Products:**

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

#### **TASK 6 MICROGRID TRAINING TO OPERATORS AND DISADVANTAGED COMMUNITIES**

The goals of this task are to train applicable MCAS Miramar workforce to operate and maintain the microgrid.

#### **The Recipient shall:**

- 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 and agenda of training
  - List of participants
- Conduct outreach to the Veteran workforce and business community to ensure representation of these groups in the planning, design, labor force, and implementation of this microgrid and future microgrid installations.
- Organize and conduct a “Workforce Diversity Workshop” to include project participants, technology partners, Veteran community groups and Veteran service organizations, Military, and the general public to solicit feedback on the deployment of project technologies.
- Prepare and submit a *Miramar Workforce Equity Plan* that includes, recommendations on specific ways to successfully engage disadvantaged communities / Veterans in workforce opportunities of similar micro-grid projects.
- Communicate and publicly discuss the findings of the plan.

#### **Products:**

- Microgrid Training Plan
- Written Notification of Training Events
- Miramar Workforce Equity Plan

#### **TASK 7 EVALUATION OF PROJECT BENEFITS**

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

#### **The Recipient shall:**

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and

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emission reduction calculations. Examples of information that may be requested in the questionnaires include, but are 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.
- Greenhouse gas emissions reductions as provided by the microgrid, compared to using the utility grid for the electricity, and also greenhouse gas emissions 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.
  - 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.

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- 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.
  - Cost/benefit analysis of the microgrid
  - 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.

#### **Products:**

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

#### **TASK 8 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 throughout the project and at the end, with the expectation of identifying

## **EXHIBIT A**

### **Scope of Work**

- targets for replicability, 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
- 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: UNIVERSITY OF CALIFORNIA, SAN DIEGO**

**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-17-032 from GFO-17-302 with The Regents of the University of California, on behalf of the San Diego campus for a \$5,000,000 grant to develop a permanent microgrid at Marine Corps Air Station Miramar that incorporates five distributed energy resources, including renewable generation and energy storage. This microgrid allows critical flight line facilities and military operations to be maintained during grid outages. The Marine Corps Air Station Miramar and the University of California, San Diego are providing \$6,002,320 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]

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Cody Goldthrite,  
Secretariat