

**ATTACHMENT 6**  
**Scope of Work Template**  
**Name of Applicant/Recipient**

**I. TASK ACRONYM/TERM LISTS**

**A. Task List**

<b>Task #</b>	<b>CPR<sup>1</sup></b>	<b>Task Name</b>
1		General Project Tasks
2		Baseline Measurement and Submetering
3		Microgrid Modeling and Engineering
4		Electrical and Hardware Engineering
5		Procurement and Installation
6		Microgrid Testing, Analysis and Reporting
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities

**B. Acronym/Term List**

<b>Acronym/Term</b>	<b>Meaning</b>
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DER	Distributed Energy Resource
GHG	Greenhouse Gas
SRJC	Santa Rosa Junior College
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 to fund a microgrid demonstration project at Sonoma County Junior College District/ Santa Rosa Junior College (SRJC) campus in Santa Rosa, California. This project will integrate three types of Distributed Energy Resource (DER) elements: PV generation, electrical energy storage, and load reduction devices and load control systems, all managed by a single microgrid controller. Realization of this project will lead to technological advancement and innovation, uncovering hidden value opportunities in the SRJC power system by optimizing generation and load flexibility, enhancing power quality of the surrounding grid using renewable resources, creating disaster-tolerant power resources for SRJC and its community, and opening new value stream capabilities for the Sonoma County Junior College District (SRJC).

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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.

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**B. Problem/ Solution Statement**

**Problem**

The value microgrids will provide to the grid, customers, or ratepayers through increased resiliency, clean energy, or grid stabilization is yet to be quantified. Additionally, it is not clearly understood how microgrids can tap into all existing value streams in order to recover the costs of the microgrid infrastructure. There are also issues relating to interconnection arrangements with utilities that need to be worked through and resolved, as well as new component technologies that must be proven in the field, allowing performance data to be gathered over time in the real-world context.

**Solution**

The proposed project plans to overcome these barriers by demonstrating and quantifying the value that advanced microgrids provide to the grid, customer, and ratepayers by testing innovative technologies that coordinate and manage energy usage on the microgrid and provide capacity relief and voltage support to the local distribution grid. Beyond customer energy and demand management, the project will explore and, where appropriate, participate in additional value streams to demonstrate where microgrids can currently receive value and to illustrate what future programs or payment structures could exist to compensate microgrids for services provided. By better understanding and quantifying the monetizable and non-monetizable benefits that microgrids provide, as well as current and potential future value streams, this project will inform State and local-level regulators, utilities, project developers, and customers how to overcome existing barriers to microgrid development. This project will be closely coordinated in collaboration with PG&E to improve interconnection protocols and will employ several advanced technologies, contributing to the body of data collected on these systems.

**C. Goals and Objectives of the Agreement**

**Agreement Goals**

The goals of this Agreement are to:

- Meet 40% of the campus electricity requirement with emissions-free PV solar power;
- Reduce the campus' peak load;
- Optimize energy use;
- Provide support services to the surrounding grid;
- Create a highly resilient power system benefitting the campus and the community;
- Demonstrate a campus microgrid strategy that provides enhanced economic value for DER assets, increased system reliability inside and surrounding the microgrid, reduced energy consumption and greenhouse gas (GHG) emissions; and
- Create a highly flexible, highly resilient power system capable of isolating and reconfiguring itself to provide maximum support to critical facilities during contingency operations.

**Ratepayer Benefits:**<sup>2</sup> This Agreement will result in the ratepayer benefits of:

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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,

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Greater Reliability: The project will improve power quality on both the college campus and local distribution system through demonstration of dynamic frequency regulation and voltage control technologies. With the ability to provide both real and reactive power and to respond autonomously to changing grid needs, the project will be capable of providing grid stabilization to the local distribution feeder the campus is located in part of area. Additionally, the project will provide back-up to the Junior College in the event of an outage and could potentially provide black-start services for the grid. The project will provide unlimited renewable-based 100% reliability to certain critical loads on the campus in the event of grid outages of any duration, by matching local PV generation, battery energy storage, and loads to ensure an indefinite energy supply to these loads, while providing limited reliability over a range of time periods to other, less important loads within the microgrid.

Lower Costs: The project will lower customer costs by providing demand and energy mitigation and by providing other monetizable benefits, such as demand response participation. The microgrid would lower costs of lost operation for the Junior College by allowing the campus to remain operational in the event of an outage of the surrounding grid, and would lower peak demand charges and energy costs through on-site generation and storage even when the larger grid is operating normally. The successful demonstration of this project will both help project developers refine products and customers better understand and utilize microgrid technologies, thus reducing costs of microgrid deployment. Additionally, the project will reduce costs for the utility and ratepayers by providing local voltage support and frequency regulation, allowing the distribution grid to rely less on centralized local power electronics to provide these services; the microgrid will also reduce peak demand, in turn reducing the stress to substations, transformers and wires, and thereby extending the life of the associated grid equipment.

Increased Safety: The project will provide back-up to the Junior College in the event of grid outages, improving the safety of staff, students, and potentially local residents. Additionally, as the project will provide improved grid reliability through voltage and frequency regulation, the microgrid will reduce the likelihood of the local distribution grid suffering an outage, improving the safety of local residents.

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 and quantifying the value that advanced microgrids provide to the grid, customer, and ratepayers by testing innovative technologies that coordinate and manage energy usage on the microgrid and provide capacity relief and voltage support to the local distribution grid. Beyond customer energy and demand management, the project will explore and, where appropriate, participate in additional value streams to demonstrate where microgrids can currently receive value and to illustrate what future programs or payment structures could exist to compensate microgrids for services provided. By better understanding and quantifying the monetizable and non-monetizable benefits that microgrids provide, as well as current and potential future value streams, this project will inform State and local-level regulators,

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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.

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utilities, project developers, and customers how to overcome existing barriers to microgrid development. This project will be closely coordinated in collaboration with PG&E to improve interconnection protocols and will employ several advanced technologies, contributing to the body of data collected on these systems.

**Agreement Objectives**

The primary objectives of this agreement are to demonstrate the environmental, economic, and resiliency benefits of a highly flexible campus microgrid. Operational objectives encompass demonstration of power flow, load control, and energy storage in a large multi-building campus, operating at appropriate scale and in actual operating conditions.

Specific objectives for this project include:

- Assessment of individual building and feeder loads
- Design of load shedding controls and hardware
- Integration of distributed PV power generation across multiple feeders
- Implementation of two varieties of energy storage, optimizing energy capacity and power capabilities
- Demonstration of the unique capabilities of the PXiSE microgrid controller to provide real-time localized frequency support to the utility distribution grid
- Demonstrate economic value streams for the microgrid, such as demand response program participation
- Demonstration of advanced microgrid capabilities, such as adaptive load shedding and feeder reconfiguration, load management through integration with building energy systems, and “blinkless” transitioning to islanded operation and back to grid interconnected operation
- Validation of a microgrid business model, which can be replicated to similar campuses with viable funding sources and investment recovery strategies

The proposed project is further described in two variants, which are termed the Primary Application and Option 1.

- The Primary Application will achieve all of the above objectives as a single microgrid with distributed resources and flexible load shedding
- Option 1 adds increased flexibility, resiliency, and functionality by creating a microgrid of microgrids, allowing individual campus 12.47kV distribution feeders to isolate themselves from each other as independent microgrids or to combine into variable aggregations of resources and loads.
- Option 1 will demonstrate the value of isolating sections of the microgrid which may be damaged or require service during critical events such as fires on the campus or earthquakes and allow selective power diversion into critical loads and to multiple storage locations for maximum adaptability during rapidly changing crisis situations.

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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.

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

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

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

## **MEETINGS**

### **Subtask 1.2 Kick-off Meeting**

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

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

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

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

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

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

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

**The CAM shall:**

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

**Recipient Products:**

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

**CAM Product:**

- Kick-off Meeting Agenda

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

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

CPR meetings generally take place at key, predetermined points in the Agreement, as determined by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may schedule additional CPR meetings as necessary. The budget will be reallocated to cover the

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additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR meetings generally take place at the Energy Commission, but they may take place at another location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the CAM.

**The Recipient shall:**

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

**The CAM shall:**

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

**Recipient Products:**

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

**CAM Products:**

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

**Subtask 1.4 Final Meeting**

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

**The Recipient shall:**

- Meet with Energy Commission staff to present project findings, conclusions, and



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recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

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

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

#### **Products:**

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

### **REPORTS AND INVOICES**

#### **Subtask 1.5 Progress Reports and Invoices**

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

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

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

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- Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds” section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

**Products:**

- Progress Reports
- Invoices

**Subtask 1.6 Final Report**

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

**Subtask 1.6.1 Final Report Outline**

**The Recipient shall:**

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

**Recipient Products:**

- Final Report Outline (draft and final)

**CAM Product:**

- Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

**Subtask 1.6.2 Final Report**

**The Recipient shall:**

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

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

#### **Products:**

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

#### **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

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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.
  - 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.

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**The Recipient shall:**

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

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

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

**Products:**

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

**Subtask 1.9 Subcontracts**

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

**The Recipient shall:**

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

**Products:**

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

**TECHNICAL ADVISORY COMMITTEE**

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

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

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

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

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

**The Recipient shall:**

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

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- 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 BASELINE, MEASUREMENT, & SUBMETERING**

The goal of this task is to install metering throughout the microgrid to create a baseline of site electrical demand, generation, and load shift. The metering and baselines will be used to assist microgrid project design and in determining the project impacts to customers, the grid, and the environment.

**The Recipient shall:**

- Determine the appropriate metering to be used
- Design power connections, installations, and installations of meters for the microgrid
- Install metering to the following:
  - Each of the 27 buildings within the microgrid
  - The five 12.47 kV feeders
- Integrate power metering from the microgrid generation and storage assets
- Use data gathered through metering to develop baselines of onsite electrical demand, energy generated and shifted, and power quality of the microgrid and local utility grid distribution infrastructure
- Prepare a Baseline, Measurement, and Submetering Report that includes but is not limited to the following:
  - Description of the method used to determine appropriate metering for all resources
  - Descriptions of installed meter types and locations
  - Baselines of onsite electrical demand, PV generation, storage charge and discharge, and power quality of the microgrid and the local utility grid

**Product:**

- Baseline, Measurement, and Submetering Report

**TASK 3 MICROGRID MODELING AND ENGINEERING**

The goals of this task are to 1) model microgrid energy flows and power performance to determine optimum operation of the microgrid and 2) configure communication and control protocols

**The Recipient shall:**

- Model energy flows and power performance under a broad spectrum of operating conditions, and across time scales from minutes to years
  - Utilize various power system modelling tools, including Energy Toolbase, DER CAM, MATLAB, StorageVET and custom spreadsheet analysis tools
- Combine actual baseline load profiles developed in Task 2 with dynamic component models of PV generation, energy storage and load shedding effects to evaluate optimum storage utilization and load support



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- Calculated energy consumption will be used along with electricity rate information to determine energy costs and savings
- Additional value streams, such as demand response program participation revenues, will also be researched and calculated
- Configure all control communications elements
- Integrate building energy management systems into microgrid control
- Update the Cost Benefit Analysis at regular intervals, to show performance on social, environmental, and economic metrics, using a California-customized CBA tool designed by the project team explicitly for this purpose.
- Prepare a Modeling and Engineering Report that includes but is not limited to the following:
  - Results of various microgrid system modeling
  - Analysis of currently-available value streams, such as avoided energy and demand charges and demand response participation
  - Descriptions of optimum storage dispatch and microgrid operation to maximize financial return
  - Description of communication elements and controls to be used
- Prepare an Updated Cost Benefit Analysis

**Product:**

- Modeling and Engineering Report
- Updated Cost Benefit Analysis

**TASK 4 ELECTRICAL AND HARDWARE ENGINEERING**

The goal of this task is conduct the electrical, mechanical, and civil engineering necessary to purchase and install the microgrid components.

**The Recipient shall:**

- Specify the electrical power interconnection devices, such as switchgear, contactors, and other isolation devices, needed for the microgrid
- Design the integration of the electrical power interconnection devices into the existing distribution infrastructure
- Design the electrical and controls interconnection for the energy storage systems
- Design the physical interconnection of the energy storage, which may require engineering of concrete pads, trenching for cabling, and all other placement and installation concerns
- Prepare a Microgrid Engineering Report that includes the following:
  - Description of the electrical power interconnection devices to be used
  - Integration design of interconnection devices into the existing distribution infrastructure
  - Design of electrical and physical interconnection of the energy storage system(s)

**Product:**

- Microgrid Engineering Report

**TASK 5 PROCUREMENT AND INSTALLATION**

The goal of this task is to procure and install the microgrid generation and storage assets.

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**The Recipient shall:**

- Procure the microgrid control, load shedding devices and storage assets
- Install the microgrid control, load shedding devices and storage assets according to the engineering analysis completed in Task 4
  - Work schedules will be coordinated with SRJC to minimize impacts to daily campus operations
- Prepare a Procurement and Installation Report that includes the following:
  - Description of the microgrid control, load shedding devices and storage equipment installed
  - Description of public procurement process and developed RFP and Qs.
  - Description of the installation process, including best practices and recommendations for streamlining future microgrid generation and storage interconnection
  - Description of deviations, if any, to the original engineering analysis conducted in Task 4

**Products:**

- Procurement and Installation Report

**TASK 6 MICROGRID TESTING, ANALYSIS AND REPORTING**

The goal of this task is to test the generation, storage, and microgrid control components and develop a standardized reporting method to determine the value of the microgrid to the campus and the local community.

**The Recipient shall:**

- Provide testing functions described in the Measurement and Verification Plan
  - This will include a baseline of measurement of individual campus building loads, analyses of energy savings, and greenhouse gas (GHG) reductions from daily operation
- Test frequency and voltage control techniques to balance power quality for both the microgrid and local utility distribution system
- Monitor microgrid operation under test conditions and in islanded mode, in the event of a power outage
- If an available demand response or other monetizable program is identified as part of Task 3, enroll and participate in the program
- Prepare a Microgrid Test and Analysis Report which includes the following:
  - Comparison of electrical load profiles of the entire campus before and after installation of generation, storage, and microgrid control assets
  - Analysis of energy and demand savings to the customer
  - Analysis of GHG and other environmental impacts of microgrid operation
  - Description of frequency and voltage regulation tests and analysis of their power quality impacts on the microgrid and local utility distribution systems
  - Description of microgrid operation in islanded mode in the event of a power outage
  - If participating in a demand response or other monetizable program, description of program participation and energy and financial impacts

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- Compile the cost benefit analysis conducted throughout the project to show all value provided by the microgrid to the campus and local community
- Develop a standardized reporting method to easily determine and report the performance of the microgrid to the Energy Commission
- Create template and materials lists to enable easy replication of the reporting method
- Create an RFQ outline to be available to the California Community College system for easy determination and replication of microgrid value
- Prepare a Microgrid Value Report which includes the following:
  - Template and materials lists to enable easy replication of the reporting method
  - A standard RFQ/P outline to be made available to the California Community College system
- Prepare a business case based on actual costs and realized values

**Products:**

- Microgrid Test and Analysis Report
- Microgrid Value Report
- Standard RFQ Outline
- Business Case Report

**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 emission reduction calculations. Examples of information that may be requested in the questionnaires include:
  - For Product Development Projects and Project Demonstrations:
    - Published documents, including date, title, and periodical name.
    - Estimated or actual energy and cost savings, and estimated statewide energy savings once market penetration 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.

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

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

**Products:**

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

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**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, 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.
- 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 that includes:
  - Technical Trade knowledge workshop coordinated with the California Community College's Chancellor's Office Workforce Development Program.
  - Developed specific micro-grid curriculum and lesson plan coordinated with Santa Rosa Junior College for Environmental Studies and Engineering Studies Classes.

**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)

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Technology/Knowledge Transfer Report (draft and final)

**V. PROJECT SCHEDULE**

Please see the attached Excel spreadsheet.