

GRANT REQUEST FORM (GRF)



New Agreement EPC-17-048 (To be completed by CGL Office)

ERDD	Susan Wilhelm	43	916-327-1545
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The Regents of the University of California, Berkeley	94-6002123
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Engaging Communities in the Design of Sustainable Energy and Localized Futures (SELF) Models in California's

4/16/2018	6/30/2022	\$ 1,100,000
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ARFVTP agreements under \$75K delegated to Executive Director.

Proposed Business Meeting Date 4/11/2018 Consent Discussion

Business Meeting Presenter Katharina Snyder Time Needed: 5 minutes

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

Agenda Item Subject and Description

UNIVERSITY OF CALIFORNIA, BERKELEY. Proposed resolution approving Agreement EPC-17-048 with The Regents of the University of California, on behalf of the Berkeley campus, for a \$1.1 million grant to advance the engagement of communities in the design of Sustainable Energy and Localized Futures Models in California's San Joaquin Valley Research. Critical "urban-agriculture interface zones" will be identified through the analysis of energy demands, retrofit potentials, and systems integration opportunities and challenges. (EPIC funding) Staff contact: Susan Wilhelm

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 this research project is a paper- and computer-based study and will not cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.

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: _____
 - Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

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

- Check all that apply
- Initial Study Environmental Impact Report
 - Negative Declaration Statement of Overriding Considerations
 - Mitigated Negative Declaration

Legal Company Name:	Budget
Self-Help Enterprises	\$ 157,029
	\$
	\$
	\$
	\$

Legal Company Name:

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Budget Information			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
EPIC	16-17	301.001D	\$1,100,000
			\$
			\$
			\$
R&D Program Area:	EGRO: EA		\$1,100,000
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Name:	Cora Basada	Name:	Daniel Kammen
Address:	2150 Shattuck Ave, suite 300	Address:	310 Barrows Hall Spc 3050
City, State, Zip:	Berkeley, CA	City, State, Zip:	Berkeley, CA 94720-1103
Phone:	510-642-2783 /	Fax:	510-642-8236-
Phone:		Phone:	510-642-1139 /
Phone:		Fax:	- -
E-Mail:	cbasada@berkeley.edu	E-Mail:	kammen@berkeley.edu

<input checked="" type="checkbox"/> Competitive Solicitation	Solicitation #: GFO-16-311
<input type="checkbox"/> First Come First Served Solicitation	

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

_____ Agreement Manager _____ Date _____ Office Manager _____ Date _____ Deputy Director _____ Date

Exhibit A Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Identifying Load Areas, Distributed Generation (DG) and GIS Layers
3		Hot Spot and Scenario Analysis in Urban-Agriculture Interface Zones
4	X	Engaging Disadvantaged Communities or “SELF Communities” to prioritize Model Inputs
5		Integrated “SELF-SWITCH” Design Approach for Participatory Systems
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CalEnviroScreen	A mapping tool developed by CalEPA to help identify California communities most affected by a variety of forms of environmental pollution and where people may be particularly vulnerable to effects of pollution.
CalEPA	California Environmental Protection Agency
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
DG	Distributed Generation
EE	Energy Efficiency
GIS	Geographic Information System
IOU	Investor Owned Utilities
OpenStreetMap	A collaborative project to create a free map of the world that leverages the proliferation of inexpensive, portable satellite navigation devices to crowdsource data.
TAC	Technical Advisory Committee
SELF-SWITCH	Sustainable Energy Localized Futures – (based on) Solar, Wind, Investment in Technology, Hydropower Model
SELF	Sustainable Energy and Localized Futures
SWITCH	Solar, Wind, Investment in Technology, Hydropower Model

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

A. Purpose of Proposed Project

The purpose of this research is to fund the development of models and scenarios to determine synergies between energy efficiency (EE) in building retrofits for disadvantaged communities in

¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

Exhibit A Scope of Work

the Southern San Joaquin Valley and the integration of renewable and distributed generation (DG).

B. Problem/ Solution Statement

Problem

Interdisciplinary analysis of California's energy futures, in particular in the Southern San Joaquin Valley, is critical to the question of the potential for development and energy transformation in dense urban environments at the interface of California's agriculture lands, communities, and natural resources. This research will specifically address the people and communities most affected by development in these areas. Their vulnerability derives in part from living in "urban-agriculture interface zones". This project aims to advance the engagement of communities in the design of Sustainable Energy and Localized Futures (SELF) Models in California's San Joaquin Valley.

Solution

Through the analysis of "big data" comprising remotely sensed images (e.g. agriculture lands, road networks, built environment) and Geographic Information System (GIS) layers (e.g. energy consumption, distribution networks, new build construction, reserve areas and planning documents), the project team will develop an analysis that isolates specific dense urban areas with both high potential for retrofits and energy system synergies while meeting the needs of disadvantaged communities. Through the identification of critical "Urban-Agriculture Interface Zones" using a GIS based hot spot analysis across the Southern San Joaquin Valley, the project will identify and engage with SELF communities. Contact with SELF communities will be through community-based organizations. This project will identify opportunities in the SELF communities for efficiency and energy system improvements based on analysis of energy optimization tools such as the Solar, Wind, Investment in Technology, Hydropower (SWITCH) model. An optimization model will be developed for these densely populated zones to design "SELF-SWITCH" systems (SELF-SWITCH model).

C. Goals and Objectives of the Proposed Project

Proposed Project Goals

The goals of this research are to illuminate synergies between increasing efficiency of homes and buildings, urban distributed generation, and community renewable microgrids and how these synergies can be leveraged, leading to improved air quality and substantially reduced greenhouse gas emissions. Specifically, the research will:

- engagement with disadvantaged communities in the development of synergistic and geospatially resolved energy system models and planning scenarios;
- Quantify environmental and energy system costs/benefits to ratepayers of these energy system scenarios;
- Develop web-based GIS tools that may be used by community stakeholders, energy planners, and/or local/state policy makers to support identification and implementation of projects and initiatives that leverage synergies between increasing efficiency of buildings (including homes) and urban distributed generation.

Exhibit A Scope of Work

Ratepayer Benefits:² This Proposed Project will result in the ratepayer benefits of greater reliability by identifying environmental and system risks of meeting transformational and system upgrades in the Southern San Joaquin Valley region and lower long-term costs through identification of energy efficient and system benefits in dense urban zones. By identifying electricity distribution network information and mapping load areas based on night light imagery/cross referenced with remote sensing imagery (e.g. NASA Night lights imagery, zoning census data and others), the research team will build from existing publicly available and open source “big data” to develop multiple GIS layers that may be used in “hot spot analysis” to identify high retrofit areas with high load demand. These maps will be developed for areas throughout the Southern San Joaquin Valley. GIS based maps will consider parcel and zoning information for San Joaquin Valley jurisdictions in Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare Counties. These GIS layers will be used to identify multifamily housing units, duplexes, condominiums and single-family homes as well as commercial zones in high, mid and low-density areas. The study will focus on high-density areas, but will include other zones in agriculture interface zones that are adjacent to rural or natural lands.

Technological Advancement and Breakthroughs:³ This Proposed Project will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California’s statutory energy goals by developing a new SELF-SWITCH model that can explore the cost and feasibility of generation, transmission, and storage options for the future electricity system in a sub-regional environment. The model identifies cost-effective investment decisions for meeting electricity demand, taking into account the existing grid as well as projections of future technological developments, renewable energy potential, fuel costs, and public policy. The existing SWITCH model uses time-synchronized load and renewable generation data to evaluate future capacity investments while ensuring that load is met and policy goals are reached at minimum cost. The optimization is formulated as a deterministic linear program, which is solved by standard commercial software. Integrating this model with updated GIS and geographically relevant data and algorithms for a sub-regional development will assist California’s energy system planners.

Proposed Project Objectives

The research team will develop models and scenarios that identify and quantify synergies between EE in building retrofits for disadvantaged communities in the Southern San Joaquin Valley and the integration of renewable and distributed generation. Specifically, the research team will:

- Adapt and develop an energy system modeling tool and planning scenarios that may be used by agencies and community stakeholders to identify geographically explicit EE and DG solutions to multi-faceted energy challenges.

² California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC “Phase 2” Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

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

Exhibit A Scope of Work

- Develop a survey and process of stakeholder engagement to clarify community preferences and options for communities linked to these planning scenarios relevant to California and beyond.
- Create multiple GIS datasets and layers that may be adapted to support planning for energy systems explored in this research as well as other regional energy systems in the Southern San Joaquin Valley.

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**

Exhibit A Scope of Work

- Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the Energy Commission's software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick or CD-ROM.

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

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
 - Text documents will be in MS Word file format, version 2007 or later.
 - Documents intended for public distribution will be in PDF file format.
 - The Recipient must also provide the native Microsoft file format.
 - Project management documents will be in Microsoft Project file format, version 2007 or later.
- **Software Application Development**

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

 - Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
 - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
 - Visual Studio.NET (version 2008 and up). Recommend 2010.
 - C# Programming Language with Presentation (UI), Business Object and Data Layers.
 - SQL (Structured Query Language).
 - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
 - Microsoft SQL Reporting Services. Recommend 2008 R2.
 - XML (external interfaces).

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

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.

Exhibit A Scope of Work

The Recipient shall:

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

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

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

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

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

The CAM shall:

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

Recipient Products:

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

CAM Product:

- Kick-off Meeting Agenda

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).

Exhibit A Scope of Work

Participants will include the CAM and the Recipient, and may include the CAO and any other individuals selected by the CAM to provide support to the Energy Commission.

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

The Recipient shall:

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

The CAM shall:

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

Recipient Products:

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

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.

Exhibit A Scope of Work

The Recipient shall:

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

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

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

Products:

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

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.

Exhibit A Scope of Work

- 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)
 - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
 - Bibliography (if applicable)

Exhibit A Scope of Work

- 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 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

Exhibit A Scope of Work

awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:

- A list of the match funds that identifies:
 - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
 - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
 - A copy of a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

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

Subtask 1.8 Permits

The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. 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.

Exhibit A Scope of Work

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:

- 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:

Exhibit A Scope of Work

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

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

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

The Recipient shall:

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

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.

Exhibit A Scope of Work

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

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: IDENTIFYING LOAD AREAS, DISTRIBUTED GENERATION (DG), AND GIS LAYERS

The goal of this task is to identify where power is generated and used in specific sub-regions, specifically in the Southern San Joaquin Valley. By identifying electricity distribution network information and mapping load areas based on night light imagery cross-referenced with other remotely sensed imagery (e.g. NASA night lights imagery, zoning census data and others), the research team will build from existing publicly available and open source big data sources to develop multiple GIS layers that may be used in initial runs of the SWITCH model customized to San Joaquin Valley.

The Recipient shall:

- Develop initial parameters for SELF-SWITCH model.
- Develop an environmental impact (e.g. air pollution) and water stress dataset for SWITCH model overlay.
- Develop a built environment geospatial dataset (*GIS Layers*) of DG and load areas across the Southern San Joaquin Valley. This dataset will be used to identify multifamily housing units, duplexes, condominiums and single-family homes as well as commercial zones in high-, mid-, and low-density areas.
- Using night lights imagery cross-referenced with other remotely sensed imagery, develop a San Joaquin Valley dataset to compare results with above built environment data.
- Prepare an *Initial Parameters and GIS Layers Memo* detailing initial parameters developed for the SELF-SWITCH model customized for the Southern San Joaquin Valley.

Exhibit A Scope of Work

- Perform initial SWITCH runs to identify capacity expansion, micro-grid scenarios for the sub-region, and identification of region specific baseline.
- Summarize findings of initial SWITCH runs in an *Initial Application of SWITCH for Southern San Joaquin Valley SELF Memo*.

Products:

- Initial Parameters and GIS Layers Memo
- Initial Application of SWITCH for Southern San Joaquin Valley SELF Memo

TASK 3: HOT SPOT AND SCENARIO ANALYSIS IN URBAN-AGRICULTURE INTERFACE ZONES

The goal of this task is to develop a weighted GIS analysis for scenarios including “livable cities” and “eco-industrial cities,” including data regarding residents’ access to merchants, services, public transportation, transit corridors, schools, and food systems. This analysis will consider evolving GIS data resources, including resources such as MapAble, OpenStreetMap, Google Earth Engine, and a range of publicly available resources that can provide greater data availability that may be incorporated in the study site through weighted “hot spot” analysis of GIS layers.

The Recipient shall:

- Develop a geospatial dataset for the Southern San Joaquin Valley to integrate initial GIS Layers from Task 2 to identify, using CalEnviroScreen and other resources to identify disadvantaged communities to be considered for “SELF” study. This geospatial dataset will focus on high-density areas, though with inclusion of other areas in agriculture interface zones adjacent to rural or natural lands
- Based on this Geospatial dataset, create *Maps Identifying Regions of Interest* that incorporate multiple criteria to identify high potential benefits for disadvantaged communities. These benefits will reflect parameters related to cost, efficiency, environmental quality, and reliability.
- Develop scenario criteria that characterize different possible futures that relate to cost-effectiveness, reliability, performance, and/or penetration. For example, different tiered pricing structures, carbon price/tax adjustments across tiered and block pricing systems, and other factors. Summarize rationale for these criteria in a *Scenario Criteria Memo*.
- Based on scenario criteria, develop multiple maps depicting draft scenarios and regions in a weighted site suitability analysis
- Perform a hot spot analysis using data vectors to identify locations of statistically significant hot spots and cold spots in data. These hot (or cold) spots indicate GIS-identified areas where energy demands, retrofit potentials, and system integration opportunities (or challenges) are high.
- Draft a *GIS Hot Spot and Site-Suitability Analysis Report* that includes the results of the hot spot and site suitability analyses and includes maps identifying weighted site suitability analysis for multiple scenarios

Products:

- Maps Identifying Regions of Interest
- Scenario Criteria Memo
- GIS Hot Spot and Site-Suitability Analysis Report

Exhibit A

Scope of Work

TASK 4: ENGAGING DISADVANTAGED OR “SELF” COMMUNITIES TO PRIORITIZE MODEL INPUTS

The goal of this task is the development and implementation of a community-wide survey, including door-to-door surveys across two or three communities. These surveys would target approximately 1000 households, and the organization of stakeholder meetings to solicit community perspectives for modeling and scenario inputs.

The Recipient shall:

- UC Berkeley will lead the development of a *Literature Review Report* of the environmental justice, land use, housing, and energy system challenges faced across communities in the Southern San Joaquin Valley. Subcontractor will review the report, support the effort, and provide input to ensure that it reflects concerns of communities they represent in Southern San Joaquin Valley
- UC Berkeley will develop GIS layers including features addressing concerns identified in the literature review process. Subcontractor will support this effort, providing input and guidance as appropriate
- Coordinate with the Subcontractor to develop and conduct community based organization interviews and fieldwork
- Draft and develop a bilingual *Household Survey* with input and review from subcontractor and community-based organizations and research partners
- Participate in a CPR Meeting #1 in accordance with subtask 1.3. This CPR will be held after the *Household Survey* is drafted and prior to survey implementation, so that the CAM can offer meaningful input to the survey effort.
- Implement household door-to-door survey across two to three communities identified in GIS hot spot analysis and draft a *Survey Report* describing the methodology and results of the survey
- Organize stakeholder consultation workshops in two to three communities and draft a *Workshop Report* for each workshop describing the date, time, and location of the workshop, attendees, topics covered, and the discussion, including areas of consent and areas of disagreement
- UC Berkeley will develop *Findings Reports*, including GIS hot spot results and analysis with community based data layers highlighting findings from survey. Subcontractor will support and provide input to ensure that the Findings Reports reflect the perspectives of the communities in Southern San Joaquin Valley that they represent
- Prepare a CPR Report #1 in accordance with subtask 1.3.

Products:

- Literature Review Report
- Household Survey
- CPR Report #1
- Survey Report
- Workshop Reports
- Findings Reports

TASK 5: INTEGRATED “SELF-SWITCH” DESIGN APPROACH FOR PARTICIPATORY SYSTEMS

The goal of this task is to integrate the participatory process to inform the objectives and design of both the data selection and the model development used in the Final GIS and Energy System

Exhibit A Scope of Work

model (e.g. “SELF-SWITCH”). This participatory approach will engage local community based organizations working with Subcontractor in Task 4 in the development of a localized experience and expertise informed process. These measures will be taken by integrating the products of Task 2, 3, and 4 into the initial SWITCH model. Through stakeholder surveys, interviews outreach and two to three stakeholder workshops we will share findings through the process and solicit information from stakeholder groups to inform and provide observational data for validation of the model development. These stakeholder engagement efforts will ultimately be used to adjust model inputs according to responses regarding technology preferences as well as specific feedback on user adoption.

The Recipient shall:

- Review and integration of Tasks 2, 3, and 4 into model parameters consistent with SWITCH and other model specifications
- Rerun the SWITCH and other energy model adapted with results from Tasks 2, 3, and 4 to develop model parameters of the Southern San Joaquin SELF-SWITCH Model and detailed model runs for two to three SELF-SWITCH Communities. Integrate the results into a web-based SELF-SWITCH Tool to explore scenarios used by community stakeholders and local planners, and develop a *SELF-SWITCH Tool Presentation* to brief Energy Commission staff
- Develop *Community SELF-SWITCH Hot Spot Case Studies* for these two to three case study communities, integrating results from all tasks
- Develop a *report and policy and demonstration recommendations* relevant to study findings

Products:

- Community SELF-SWITCH Hot Spot Case Studies
- Report and Policy Demonstration Recommendations
- SELF-SWITCH Tool Presentation

TASK 6: 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 Proposed Project: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
 - For Product Development Projects and Project Demonstrations:
 - Published documents, including date, title, and periodical name.
 - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
 - Greenhouse gas and criteria emissions reductions.

Exhibit A Scope of Work

- 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 Proposed Project 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 Proposed Project.
 - 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 Proposed Project.
- 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 Proposed Project 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 Proposed Project term ends. Responses to these questionnaires will be voluntary.

Products:

Exhibit A Scope of Work

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

TASK 7: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

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

The Recipient shall:

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

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-17-048 from GFO-16-311 with University of California, Berkeley for \$1,100,000, to advance the engagement of communities in the design of Sustainable Energy and Localized Futures Models in California's San Joaquin Valley Research. Critical "urban-agriculture interface zones" will be identified through the analysis of energy demands, retrofit potentials, and systems integration opportunities and challenges; 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 April 11, 2018.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Cody Goldthrite,
Secretariat