

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 02/13)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-14-054 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
ERDD	Eli Harland	43	916-327-1463

Recipient's Legal Name	Federal ID Number
Humboldt State University Sponsored Programs Foundation	94-6050071

Title of Project
Demonstrating a Community Microgrid at the Blue Lake Rancheria

Term and Amount	Start Date	End Date	Amount
	7/6/2015	3/30/2018	\$ 5,000,000

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

Proposed Business Meeting Date	6/10/2015	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Discussion
Business Meeting Presenter	Eli Harland	Time Needed:	5 minutes

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

Agenda Item Subject and Description

HUMBOLDT STATE UNIVERSITY. Proposed resolution adopting a Negative Declaration and approving Agreement EPC-14-054 with Humboldt State University Sponsored Programs Foundation for a \$5,000,000 grant to demonstrate a renewable-based community microgrid at the Blue Lake Rancheria located in Humboldt County, California. This microgrid will incorporate an existing biomass gasifier/fuel cell with a new solar photovoltaic array and battery energy storage to provide uninterrupted power for a nationally designated American Red Cross emergency center.

California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
 Yes (skip to question 2) No (complete the following (PRC 21065 and 14 CCR 15378)):
 Explain why Agreement is not considered a "Project":
 Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because
2. If Agreement is considered a "Project" under CEQA:
 a) Agreement **IS** exempt. (Attach draft NOE)
 Statutory Exemption. List PRC and/or CCR section number: _____
 Categorical Exemption. List CCR section number: _____
 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

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

Legal Company Name:	Budget
Blue Lake Rancheria, California	\$ 2,547,103
Idaho National Laboratory	\$ 400,208
GHD, Inc.	\$ 193,124
Kernen	\$ 118,827
Colburn	\$ 694,250
	\$
	\$
	\$
	\$

EXHIBIT A Scope of Work

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Design and Install the Blue Lake Rancheria Microgrid
3		Evaluation of Project Benefits
4		Technology/Knowledge Transfer Activities
5		Production Readiness Plan

B. Acronym/Term List

Acronym/Term	Meaning
BLR	Blue Lake Rancheria
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CHIL	Controller-Hardware-in-the-Loop
CPR	Critical Project Review
INL	Idaho National Laboratories
KW	Kilowatt
KWH	Kilowatt hour
MGMS	Microgrid Management System
PG&E	Pacific Gas & Electric Company
PV	Photovoltaic
RTDS	Real Time Digital Simulator
SCADA	Supervisory Control and Data Acquisition
SERC	Schatz Energy Research Center
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

The purpose of this Agreement is to fund a project by Humboldt State University Sponsored Programs Foundation/Schatz Energy Research Center to build a microgrid for Blue Lake Rancheria (BLR), a Native American Tribe located in Northwestern California. The project will integrate three sources of energy generation with grid-scale energy storage and controllable loads into a microgrid capable of indefinitely islanding and providing power during a disaster or prolonged grid outage.

B. Problem/ Solution Statement

Problem

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

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Humboldt County is a natural disaster-prone region of California with a majority of power generation assets in the coastal tsunami zone and constrained transmission from the greater California electric grid. Energy resiliency is a serious concern to the local community and has been a focus in recent community-wide energy and hazard mitigation planning efforts (Zoellick et al., 2011; County of Humboldt, 2014). In these planning efforts, the community has emphasized the need to expand sources of backup energy generation at critical facilities like hospitals, disaster shelters, and police and fire stations.

Microgrids with integrated renewable energy and energy storage are an alternative to stand alone diesel generation for providing emergency power. Fuel supplies can be cut off in a disaster, but most renewable energy resources remain viable. Microgrids capable of reliably integrating intermittent renewables are an emerging technology and require sophisticated control systems. While microgrid controllers have made it past the research and development phase, they need to be demonstrated at scale to prove their capabilities and move toward commercialization.

Solution

The Recipient will design, build, and demonstrate a microgrid that integrates two sources of renewable generation, biomass gasifier/fuel cell and solar photovoltaic (PV), with two diesel generators and dispatchable demand. The microgrid will be capable of serving 42 percent of annual load with renewable resources and islanding for an indefinite period of time using 80-100 percent renewable power.

C. Goals and Objectives of the Agreement

Agreement Goals

The goal of this Agreement is to design, build, and demonstrate a renewable and self-sustaining microgrid at the Blue Lake Rancheria.

Ratepayer Benefits:²

This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety. The BLR Microgrid will be capable of islanding, providing greater electricity reliability to BLR and will make the overall electric grid more flexible and less constrained during peak periods. The Agreement will result in multiple forms of cost savings to the BLR: the microgrid will offset electricity purchases through renewable generation, it will engage in economic dispatch of the battery system, and BLR will convert to a primary voltage customer giving access to an electric rate schedule with more favorable pricing. Finally, the Agreement will result in increased safety by providing an indefinite power generation capability to a nationally recognized, Red Cross emergency shelter in a natural disaster-prone region of California.

Technological Advancement and Breakthroughs:³

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

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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 the technical feasibility of integrating both established and emerging sources of renewable energy generation with battery storage, conventional diesel generators, and dispatchable demand into a single microgrid at the scale of a small commercial campus.

The Schatz Energy Research Center (SERC), BLR, and Pacific Gas & Electric Company (PG&E) are partners to an existing Energy Commission-funded Agreement (#PIR-12-022) that is building a first-of-its-kind biomass energy system at the BLR. The system will consist of a biomass gasifier that produces a hydrogen rich syngas, which is purified and fuels a 175 kilowatt (kW) hydrogen fuel cell. Under this Agreement, the integration of the biomass gasifier/fuel cell system with a 409kW AC PV array, 800 kilowatt hours (kWh) of battery storage and controllable demand will be a completely original microgrid configuration. The microgrid will require solutions to unique challenges posed by the need to maintain stability and reliability under the full range of operational circumstances that could occur during islanding and grid-connected operating conditions.

Agreement Objectives

The objectives of this Agreement are to:

- Install a microgrid capable of powering the nationally recognized American Red Cross disaster shelter on BLR land in times of emergency;
- Integrate renewable PV and biomass gasifier/fuel cell, battery storage, diesel generation, and controllable demand into the microgrid;
- Achieve renewable energy generation exceeding 40 percent of annual energy production;
- Demonstrate the ability to island and supply uninterrupted electric power for at least 7 days during a real or simulated grid outage;
- Demonstrate the ability of the microgrid to participate in one or more PG&E demand response programs;
- Achieve a reduction in annual electrical energy consumption from the grid of at least 680MWh over year 1 of operation;
- Achieve at least 25 percent energy cost savings over year 1 of operation;
- Achieve a reduction in annual greenhouse gas emissions of at least 195 metric tons CO₂e over year 1 of operation;
- Make the knowledge gained from this Agreement available to a broad audience;
- Develop a plan for commercializing the microgrid technologies and strategies demonstrated under this Agreement.

II. 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

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

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

- 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.
- Submit the final product to the CAM once agreement has been reached on the draft. The CAM will provide written approval of the final product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- If the CAM determines that the final product does not sufficiently incorporate his/her comments, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.

For products that require a final version only

- Submit the product to the CAM for approval.
- If the CAM determines that the product requires revision, submit the revised product to the CAM within 10 days of notice by the CAM, unless the CAM specifies a longer time period.

For all products

- Submit all data and documents required as products in accordance with the following Instructions for Submitting Electronic Files and Developing Software:

- **Electronic File Format**

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

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

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

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- **Software Application Development**

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

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

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

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

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

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

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

The CAM shall:

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

Recipient Products:

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

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

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

The Recipient shall:

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

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- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

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

Recipient Products:

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

CAM Products:

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

Subtask 1.4 Final Meeting

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

The Recipient shall:

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

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

- The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
- The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
 - Disposition of any state-owned equipment.
 - Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented

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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 all Agreement activities conducted by the Recipient for the preceding month, including 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.
 - Provide a synopsis of the project progress, including accomplishments, problems, milestones, products, schedule, fiscal status, and any evidence of progress such as photographs.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions. In addition, each invoice must document and verify:
 - Energy Commission funds received by California-based entities;
 - Energy Commission funds spent in California (*if applicable*); and
 - Match fund expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

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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 and approve 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 a 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.
- Submit a draft of the outline to the CAM for review and comment.
- Once agreement has been reached on the draft, submit the final outline to the CAM. The CAM will provide written approval of the final outline within 10 days of receipt.

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Style Manual

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline and the Style Manual provided by the CAM.
- Submit a draft of the report to the CAM for review and comment. Once agreement on the draft report has been reached, the CAM will forward the electronic version for Energy Commission internal approval. Once the CAM receives approval, he/she will provide written approval to the Recipient.
- Submit one bound copy of the Final Report to the CAM.

Products:

- Final Report (draft and final)

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:

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- Prepare a *Match Funds Status Letter* that documents the match funds committed to this Agreement. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

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

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

Products:

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

Subtask 1.8 Permits

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

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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:

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

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

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

The Recipient shall:

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

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.

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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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III. TECHNICAL TASKS

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

TASK 2 DESIGN AND INSTALL THE BLUE LAKE RANCHERIA MICROGRID

The goal of this task is to design, install, and commission the microgrid, as well as monitor its performance for the first year of operation.

SUBTASK 2.1 Design, Engineering, and Planning

The goal of this subtask is to conduct all design, engineering, and planning activities necessary to finalize the microgrid design and prepare for construction.

The Recipient shall:

- Design and adapt the Supervisory Control and Data Acquisition (SCADA)/Microgrid controller to the specific project circumstances.
- Conduct an electrical study and design the power systems and protection scheme for the following subsystems:
 - grid storage battery system,
 - biomass gasifier/fuel cell power system,
 - contactors,
 - reclosers,
 - switchgear,
 - distribution circuits,
 - transformers,
 - and PV array.
- Conduct an electrical study to assess system stability and dynamic response during islanding circumstances.
- Design and engineer the integration of the 400kW/800kWh battery storage system (siting and interconnection).
- Design and engineer the interconnection of the 409kW AC PV array.
- Design and engineer the smart inverters (sizing and interconnection of inverters for battery and PV systems).
- Design and engineer other power electronics (switchgear, contactors, and reclosers).
- Design and engineer the civil works.
- Design and engineer structural works (anchors, foundations, etc.).
- Integrate engineering designs into an *Engineering Plan Set* (50%, 90% and 100% iterations) of the full system, including SCADA/Microgrid controller systems, power electronics systems, civil works, and structural works and provide to CAM.
- Develop and provide *Engineering Specifications* (50%, 90% and 100% iterations) for the full microgrid system.
- Develop and provide *Engineering Cost Estimates* (50%, 90% and 100% iterations) for the full microgrid system.
- Conduct a cyber security assessment.
- Conduct an environmental study for use in permitting (see Task 1 for permitting).

EXHIBIT A

Scope of Work

- Prepare and provide a *System Ownership Application* and apply to the California Public Utilities Commission for BLR to take ownership of PG&E transformers and a small amount of the local 12kV distribution circuit.
- Engage with PG&E in an interconnection study for the microgrid.
- Complete *Design and Engineering Memo* that summarizes the steps taken and lessons learned to finalize the microgrid design and prepare for construction, including final design, engineering, and planning activities.

Products

The Recipient shall provide the following:

- Design and Engineering Memo
- Engineering Plan Set
- Engineering Specifications
- Engineering Cost Estimates
- System Ownership Application

SUBTASK 2.2 System Procurement and Testing

The goal of this subtask is to procure all equipment needed for the microgrid and conduct testing on the Microgrid Management System (MGMS).

The Recipient shall:

- Procure the battery storage system.
- Procure the smart inverters.
- Procure the power electronic equipment (contactors, reclosers, and switchgear).
- Procure the PV Array.
- Procure the MGMS and related communications and monitoring equipment.
- Prepare and provide an *Equipment Procurement Memo* which will describe steps to acquire and select equipment.
- Conduct MGMS unit testing.
- Conduct MGMS simulation in the Real Time Digital Simulator (RTDS[®]).
- Develop microgrid simulation system and interface for use in functionality and integration testing of the MGMS.
- Identify critical interfaces of MGMS and site controllers and perform controller hardware in the loop (CHIL) testing as a de-risking procedure using RTDS[®].
- Conduct functionality testing of MGMS using RTDS[®].
- Conduct integration testing of MGMS using RTDS[®].
- Conduct performance assessment of MGMS deployment.
- Prepare and provide a *Microgrid Controller Testing and Compliance Assurance Report*, which will detail the testing of the MGMS and results of the performance assessment of the device when deployed at the Blue Lake Rancheria.
- Participate in CPR per Subtask 1.3.

Products:

- Equipment Procurement Memo
- Microgrid Controller Testing and Compliance Assurance Report
- CPR Report

EXHIBIT A

Scope of Work

SUBTASK 2.3 System Interfacing

The goal of this subtask is to coordinate and specify the communications and control protocols for all microgrid sub-systems.

The Recipient shall:

- Communicate protocols and coordinate interfacing between all microgrid systems and the MGMS. Systems included in this activity are:
 - battery storage system
 - PV array
 - biomass gasifier/fuel cell power system
 - 1 MW Diesel backup generator
 - controllable loads
 - power electronic equipment (switchgears and reclosers)
- Prepare and provide the *Microgrid System Interfacing Memo*, which will provide a description of each interface in the microgrid and describe how the MGMS coordinates between all sub-systems

Products:

- Microgrid System Interfacing Memo

SUBTASK 2.4 Construction / Installation

The goal of this subtask is to construct and install the microgrid.

The Recipient shall:

- Manage construction of the microgrid.
- Coordinate work between vendors.
- Coordinate access to the facility.
- Conduct site work: grading, drainage, trenching, earthwork, concrete work.
- Construct addition to casino electrical room.
- Install PV array.
- Install battery storage system.
- Install smart inverters.
- Install power electronic equipment (switchgears, contactors, and reclosers).
- Install SCADA equipment at generators, battery storage system, and controllable load panels.
- Install electric panel near control room for communications wiring, network switches, routers, and other peripherals.
- Install main supervisory and control computers in control room.
- Install front-end processors.
- Prepare and provide *Construction Activity Memo*, which will document challenges encountered and variations adopted during the construction process.

Products:

- Construction Activity Memo

SUBTASK 2.5 Commissioning

The goal of this subtask is to commission the microgrid.

EXHIBIT A

Scope of Work

The Recipient shall:

- Conduct site acceptance testing of the PV array.
- Conduct site acceptance testing of the battery storage system.
- Conduct site acceptance testing of the controllable demand systems.
- Conduct site acceptance testing of the MGMS and related SCADA sub-systems.
- Prepare and provide *Commissioning Memo*, which will report on the results of the site acceptance testing and confirm that the system has been successfully put into operation.

Products:

- Commissioning Memo

SUBTASK 2.6 Data Collection & Analysis

The goal of this subtask is to monitor the operation of the microgrid for one (1) year and assess its performance.

The Recipient shall:

- Operate the microgrid system for one (1) year.
- Periodically download operational data from the microgrid system. Data downloads will occur, at a minimum, once at commissioning and quarterly thereafter as well as immediately after any islanding event.
- Analyze the data to ensure that the system is functioning correctly.
- Prepare and provide *System Observation Memo*, which will report on the results of monitoring system over the first year of operation.
- Participate in CPR per Subtask 1.3.

Products:

- System Observation Memo
- CPR Report

TASK 3 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

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

EXHIBIT A

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- Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
 - A discussion of project product downloads from websites, and publications in technical journals.
 - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
 - Additional Information for Product Development Projects:
 - Outcome of product development efforts, such copyrights and license agreements.
 - Units sold or projected to be sold in California and outside of California.
 - Total annual sales or projected annual sales (in dollars) of products developed under the Agreement.
 - Investment dollars/follow-on private funding as a result of Energy Commission funding.
 - Patent numbers and applications, along with dates and brief descriptions.
 - Additional Information for Product Demonstrations:
 - Outcome of demonstrations and status of technology.
 - Number of similar installations.
 - Jobs created/retained as a result of the Agreement.
-
- Respond to CAM questions regarding responses to the questionnaires.

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

Products:

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

TASK 4 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

EXHIBIT A

Scope of Work

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)

TASK 5 PRODUCTION READINESS PLAN

The goal of this task is to determine the steps that will lead to the manufacturing of technologies developed in this project or to the commercialization of the project's results.

The Recipient shall:

- Prepare a *Production Readiness Plan*. The degree of detail in the plan should be proportional to the complexity of producing or commercializing the proposed product, and to its state of development. As appropriate, the plan will discuss the following:
 - Critical production processes, equipment, facilities, personnel resources, and support systems needed to produce a commercially viable product.
 - Internal manufacturing facilities, supplier technologies, capacity constraints imposed by the design under consideration, design-critical elements, and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes."
 - The estimated cost of production.
 - The expected investment threshold needed to launch the commercial product.
 - An implementation plan to ramp up to full production.
 - The outcome of product development efforts, such as copyrights and license agreements.
 - Patent numbers and applications, along with dates and brief descriptions.
 - Other areas as determined by the CAM.

EXHIBIT A Scope of Work

Products:

- Production Readiness Plan (draft and final)

IV. PROJECT SCHEDULE

See the attached Excel spreadsheet.

V. REFERENCES

County of Humboldt (2014). "Local Hazard Mitigation Plan."

URL: <http://www.humboldt.gov/506/Local-Hazard-Mitigation>

Redwood Coast Energy Authority (RCEA), Schatz Energy Research Center. (2013). "RePower Humboldt: A Strategic Plan for Renewable Energy Security and Prosperity."

URL: http://www.redwoodenergy.org/images/RESCO/RePower_Humboldt_Strategic_Plan_FINAL_2013-04-17.pdf

STATE OF CALIFORNIA
STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: HUMBOLDT STATE UNIVERSITY

WHEREAS, California Energy Commission staff proposes that the Energy Commission enter into a \$5,000,000 Electric Program Investment Charge (EPIC) grant agreement with the Humboldt State University Sponsored Programs Foundation, Schatz Energy Research Center to build a microgrid at the Blue Lake Rancheria (BLR) at 428 Chartin Road, Blue Lake, CA 95525; and

WHEREAS, BLR is a federally recognized Native-American Tribe located in Blue Lake, Humboldt County, California; and the project would be constructed on land that is self-governed by BLR; and pursuant to BLR's Tribal Ordinance, BLR completed an environmental assessment of the possible impacts from the project; and

WHEREAS, Energy Commission staff completed an Initial Study and Negative Declaration regarding potential off-site environmental impacts from the project; Energy Commission staff incorporated BLR's environmental assessment into the Initial Study and Negative Declaration; therefore

RESOLVED, that the Energy Commission adopts the Negative Declaration for the project entitled "Demonstrating a Secure, Reliable, Low-Carbon Community Microgrid at the Blue Lake Rancheria"; and

RESOLVED, that the Energy Commission approves Agreement EPC-14-054 from PON-14-301 with Humboldt State University Sponsored Programs Foundation for a \$5,000,000 grant to demonstrate a renewable and self-sustaining community microgrid at the Blue Lake Rancheria located in northwestern California. This microgrid will provide support for a designated American Red Cross emergency center; 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 June 10, 2015.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

Harriet Kallemeyn
Secretariat