

**GRANT REQUEST FORM (GRF)****A) New Agreement # EPC-20-003 (to be completed by CGL office)**

B) Division	Agreement Manager:	MS-	Phone
ERDD	Quenby Lum	43	916-327-1492

C) Recipient's Legal Name	Federal ID Number
The Pechanga Band of Luiseño Indians	95-3859626

D) Title of Project
Pechanga Tribal Microgrid Long Duration Storage Project

E) Term and Amount

Start Date	End Date	Amount
10/15/2020	3/31/2024	\$ 1,998,101

F) Business Meeting Information

☐ ARFVTP agreements \$75K and under delegated to Executive Director

Proposed Business Meeting Date 10/14/2020 ☐ Consent ☒ Discussion

Business Meeting Presenter Quenby Lum Time Needed: 5 minutes

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

Agenda Item Subject and Description:**The Pechanga Band of Luiseño Indians**

THE PECHANGA BAND OF LUISEÑO INDIANS. Proposed resolution approving Agreement EPC-20-003 with The Pechanga Band of Luiseño Indians for a \$1,998,101 grant to fund a project that will connect 2MWh of modular vanadium redox flow batteries to the Tribe's recreation center/emergency shelter to provide 10 hours or more of backup power, and adopting staff's determination that this action is exempt from CEQA. In the event of an electric grid outage or Public Safety Power Shutoff, this storage system will allow the recreation center/emergency shelter to remain operational while the grid is down. A replicable battery storage solution at this site will have far-reaching positive impacts on the tribes in the surrounding area. (EPIC funding) Contact: Quenby Lum. (Staff Presentation: 5 minutes)

G) 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":

2. If Agreement is considered a "Project" under CEQA:

a) ☒ Agreement **IS** exempt.

☐ Statutory Exemption. List PRC and/or CCR section number:

☒ Categorical Exemption. List CCR section number: Cal. Code Regs., tit 14, § 15301

**GRANT REQUEST FORM (GRF)**

☒ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section:

The project will involve the installation of a ground mounted VRFB ESS within a fully developed property. The ESS installation will be a minor alteration to a recreational facility and emergency shelter buildings within the interior of the Pechanga Reservation with no expansion beyond the existing reservation operation. The project will not have a significant adverse effect on the environment due to unusual circumstances, result in a significant cumulative impact, damage resources within a designated state scenic highway, cause a substantial adverse change to the significance of a historical resource, or be located on a listed hazardous waste site. For these reasons, the ESS is categorically exempt from CEQA under California Code of Regulations, title 14, section 15301, as a minor alteration of an existing facility.

The project will install and operate a VRFB ESS at the Pechanga Indian Reservation. The new ESS will increase reliability of electric service to multiple facilities within the reservation including critical emergency response facilities such as the emergency shelter building. The installation of the ESS will not result in the expansion of the existing use. Vehicle trips associated with the construction of the project will be temporary and the operation of the ESS will result in a negligible number of regular operational trips for maintenance. The project will not be visible from off-reservation locations. No significant effects to off-reservation water quality or to air quality would occur as a result of the project. Therefore, the project is exempt under the common sense exemption listed in California Code of Regulations, title 14, section 15061(b)(3), as there is no possibility the installation of the ESS will have a significant effect on the off-reservation environment.

The section 15301 and 15061 (b)(3) exemptions each serve as an independent basis for finding the project exempt.

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

Check all that apply

- ☐ Initial Study
☐ Negative Declaration
☐ Mitigated Negative Declaration
☐ Environmental Impact Report
☐ Statement of Overriding Considerations

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

Legal Company Name:	Budget
SepiSolar, Inc.	\$ 262,625



STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

Legal Company Name:	Budget
Invinity Energy Systems, PLC	\$ 139,000
UC San Diego	\$ 199,230
TBD Electrical Contractor	\$ 300,000
	\$

I) List all key partners: (attach additional sheets as necessary)

Legal Company Name:

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	19-20	301.001G	\$1,998,101
			\$
			\$

R&D Program Area: ESRO: ETSI

TOTAL: \$ 1,998,101

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information**1. Recipient's Administrator/Officer**

Name: Pi-Ta Pitt

Address: 12705 Pechanga Rd

City, State, Zip: Temecula, CA
92592-2903

Phone: 951-770-6240

E-Mail: ptu@pechanga-nsn.gov

2. Recipient's Project Manager

Name: Pi-Ta Pitt

Address: 12705 Pechanga Rd

City, State, Zip: Temecula, CA
92592-2903

Phone: 951-770-6240

E-Mail: ptu@pechanga-nsn.gov

L) Selection Process Used☒ Competitive Solicitation Solicitation #: GFO-19-306☐ First Come First Served Solicitation Solicitation #:**M) The following items should be attached to this GRF**

- | | |
|---|--|
| 1. Exhibit A, Scope of Work | ☒ Attached |
| 2. Exhibit B, Budget Detail | ☒ Attached |
| 3. CEC 105, Questionnaire for Identifying Conflicts | ☒ Attached |
| 4. Recipient Resolution ☒ N/A | ☐ Attached |
| 5. CEQA Documentation ☐ N/A | ☒ Attached |



STATE OF CALIFORNIA
GRANT REQUEST FORM (GRF)
CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

EXHIBIT A
Scope of Work
The Pechanga Band of Luiseño Indians

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Engineering of 10-hour VRF Battery Module
3	X	Design and Engineering of 2 MWh VRF Battery System
4	X	Installation & Commissioning
5		System Operation, Optimization, and Evaluation
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities
8		Production Readiness Plan

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CPR	Critical Project Review
EMS	Energy Management System
ESS	Energy Storage System
PWE	Pechanga Western Electric
PSPS	Public Safety Power Shutoffs
PV	Photovoltaic
SCE	Southern California Edison
TAC	Technical Advisory Committee
VRF	Vanadium Redox Flow

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

A. Purpose of Agreement

The purpose of this Agreement is to fund a technology demonstration and deployment research project that accelerates the integrated distributed storage market. This project involves installing and operating a pre-commercial 2 MWh battery system comprised of modular vanadium redox flow batteries, a non-lithium ion-based energy storage technology, near the Recipient's (The Pechanga Band of Luiseño Indians) government buildings. The system is being designed to provide 10 hours or more of backup power if the Recipient's supply of electricity is cut off, as well as to shift solar PV generation from mid-day to evening time periods.

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 Pechanga Band of Luiseño Indians

B. Problem/ Solution Statement

Problem

The Recipient is located in a high fire risk area in southern Riverside County and relies significantly on a single medium-voltage transmission feeder line operated by Southern California Edison (SCE). In the event of a Public Safety Power Shutoff (PSPS) or other outage, critical emergency facilities—including the Tribe's health clinic, emergency shelter, and water, fiber, fire, and law enforcement departments—and residences could lose electrical service from the Tribe's wholly owned and operated electric utility, Pechanga Western Electric (PWE), which receives power from SCE at the single point of interconnection. To address this shortcoming, the Recipient and PWE are actively searching for long term energy storage to provide resiliency to critical government services and residences. While lithium-ion technology is a good short-term solution, there are safety concerns and long-term performance issues that are fundamentally inherent to the underlying, core technology. The modular vanadium redox flow batteries are a cost-effective, long-term energy storage solution that could provide 10 hours of energy storage capability and have no safety issues or limitations on the number of cycles per day that can be performed. In addition, with the planned installation of 1.4 MW of solar PV on the Recipient site, PWE could benefit from daily energy shifting of solar generation to the evening solar "ramp-down" hours, which would allow PWE to store solar overproduction to offset more expensive energy in the evening hours. Cycled daily for this function, the battery system would result in a savings to PWE estimated at \$58,000 annually.

Solution

As a first step in providing broader resilience for the community, the Recipient will install 2,000 kWhs of the modular vanadium redox flow batteries at Pechanga's recreational center and emergency shelter building to provide greater than 10 hours of backup power. This backup will allow the facility to remain online during both planned and unplanned outages. When not providing backup power, the battery storage system will cycle daily in order to mitigate energy price changes experienced daily by PWE. The savings in wholesale energy costs will allow the Recipient to add additional funds to important programs like Pechanga native language education and translation services, economic development, and further development of governmental services.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Support California's goal of 100% zero-carbon generation by 2045.
- Design and develop a cost-effective 2 MWh, 10-hour long-duration energy storage technology and demonstrate its value for 12 months of operation.
- Analyze the value that longer duration energy storage provides over the classical duration of 2-4 hours.
- Provide clear value to Native American Tribes (e.g., increased resiliency, higher reliability, lower energy costs, support to local critical facilities, and the ability to maintain critical medical services to the elderly and patients needing such services).
- Provide increased reliability and resiliency services during times of power interruptions caused by weather, grid system failures or public safety power shutoffs.

EXHIBIT A Scope of Work

The Pechanga Band of Luiseño Indians

1 Ratepayer Benefits:² This Agreement will result in the ratepayer benefits of:

- 2 • **Greater Reliability:** Adding 10+ hours of storage will alleviate much of the concern
3 currently surrounding a PSPS event.
- 4 • **Increase Safety:** Keeping the Pechanga government open during a power outage means
5 that critical services such as water, fiber, shelter, fire, medical, and law enforcement can
6 continue to keep people safe.
- 7 • **Economic Development:** Upon successful demonstration at the recreational center and
8 emergency shelter, PWE intends to install long-term storage for their largest customer –
9 the Pechanga Casino, which could prevent potential outage related losses of \$100,000
10 per hour or more.
- 11 • **Environmental Benefits:** The batteries chosen have no conflict materials, are fully
12 recyclable, have a longer useful life than other technologies thereby reducing waste, and
13 increase the Tribe's use of renewable energy.
- 14 • **Public Health:** The supported Pechanga Health Clinic serves neighboring Tribes and
15 becomes a critical emergency facility in an outage event.
- 16 • **Consumer Appeal:** After successfully completing this pilot project, PWE will install long-
17 duration storage to back up their gas station, restaurants, and casino – all of which serve
18 the greater community of Riverside County.
- 19 • **Energy Security:** The Pechanga Band of Luiseño Mission Indians is a sovereign nation
20 with responsibility for the safety and well-being of its territory and members. By increasing
21 its energy security and independence, the Tribe can more effectively fulfill these
22 responsibilities and improve the security of its water, food supply, and economic
23 infrastructure for the betterment of the Tribe, fellow tribal nations, and surrounding
24 communities.

25 Technological Advancement and Breakthroughs:³ This Agreement will lead to technological
26 advancement and breakthroughs to overcome barriers to the achievement of the State of
27 California's statutory energy goals by:

- 28 • Designing a vanadium flow battery system to achieve 10-hour duration
 - 29 ○ Electrolyte tanks for vanadium flow batteries are currently too small (4-hour
30 modules) and need to be enlarged (to 10-hour modules) or have its power rating
31 reduced (from 10 kW to 4 kW, per battery unit), without sacrificing constructability
32 (must maintain feasibility, standard labor trades) nor deployment costs (shipping,
33 installation, commissioning)
- 34 • Configuring the factory preparation of the system to reduce cost
 - 35 ○ Vanadium flow battery products must achieve a sufficient level of component
36 integration in the manufacturing facility in order to achieve economies of scale.
37 Any amount of component integration in-the-field or on-site translates into
38 additional cost burdens for project owners, developers, and/or engineering,

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
The Pechanga Band of Luiseño Indians

procurement and construction

- Demonstrating the system's ability to operate in a microgrid:
 - Vanadium flow batteries have limited integration with 3rd party microgrid controllers
 - Vanadium flow batteries do not have black-start capability without an outside power source (e.g., the utility grid), but could with a microgrid controller

Agreement Objectives

The objectives of this Agreement are to:

- Increase the electrolyte vanadium flow battery tank to a 10-hour module by enlarging the tank or reducing the nominal power rating of the battery to reduce the discharge rate, spanning a 10-hour period.
- Decrease production cost by providing minimum level of integration in manufacturing facility.
- Integrate vanadium flow batteries with a 3rd party microgrid controller.
- Implement black-start capability without relying on an outside power source, through integration with 3rd party microgrid controller.
- Perform Solar-PV generation shifting.
- Demonstrate the ability to have 10 hours of backup support to the facility in a grid outage.
- Operate the system for a minimum of 12 months to assess system performance.

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.

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For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all products

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

- **Electronic File Format**

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

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

- 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.

EXHIBIT A
Scope of Work
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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:

- 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

EXHIBIT A
Scope of Work
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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).
- 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

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- 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 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

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REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

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

The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
 - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds” section of the terms and conditions, including a financial report on Match Fund and in-state expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

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

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:

EXHIBIT A
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- Ensure that the report includes the following items, in the following order:
 - Cover page (**required**)
 - Credits page on the reverse side of cover with legal disclaimer (**required**)
 - Acknowledgements page (optional)
 - Preface (**required**)
 - Abstract, keywords, and citation page (**required**)
 - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
 - Executive summary (**required**)
 - Body of the report (**required**)
 - References (if applicable)
 - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
 - Bibliography (if applicable)
 - Appendices (if applicable) (Create a separate volume if very large.)
 - Attachments (if applicable)
- Ensure that the document is written in the third person.
- Ensure that the Executive Summary is understandable to the lay public.
 - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
 - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
 - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
- Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
- Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
- Include a brief description of the project results in the Abstract.
- 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

EXHIBIT A
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MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of Energy Commission funds. Match funds must be identified in writing, and the Recipient must obtain any associated commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

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

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

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

Products:

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

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Subtask 1.8 Permits

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

The Recipient shall:

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

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

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

Products:

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

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.

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- Submit a final copy of the executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

Products:

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

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

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

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

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- 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 shall include the expertise of each proposed TAC member and the value to the project. The list will be

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discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.

- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:

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

Subtask 1.11 TAC Meetings

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

The Recipient shall:

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

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

Products:

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

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- TAC Meeting Summaries

IV. TECHNICAL TASKS

TASK 2: ENGINEERING OF 10-HOUR VRF BATTERY SYSTEM

The goal of this task is to design and engineer the vanadium redox flow (VRF) battery for 10-hour long-duration operation.

The Recipient shall:

- Prepare Electrochemical Design, which includes,
 - Cell stacks
 - Electrolyte
 - Electrolyte tanks
 - Battery enclosure and secondary containment
 - Factory acceptance testing
- Prepare Mechanical Design, which includes,
 - Electrolyte pumps and hoses
 - Reference cell
 - Cooling fans
- Prepare Electrical Design which includes,
 - Battery bank controllers, suitable for interfacing between the customer's control system and an array of the current generation of battery product
 - Design power conversion system (PCS)
 - Design energy management system (EMS) capable of performing demand charge reduction
- Develop energy storage system (ESS) electrical drawings and protection equipment specification.
- Develop ESS civil and electrical works
- Prepare a *Battery Design & Engineering Report* that describes and summarizes the lessons learned from improving the design of system to achieve a 10 hour duration.

Products:

- Battery Design & Engineering Report

TASK 3: DESIGN AND ENGINEERING OF 2 MWH VRF BATTERY SYSTEM

The goal of this task is to perform design and engineering of the ESS, including battery, power conversion module (inverter, transformer, grid protection) and interconnecting wiring.

The Recipient shall:

- Define all requirements & specifications for design and engineering of the 2 MWhr VRF battery system by completing the following:
 - Site planning
 - Site specifications
 - Mounting & racking methods
 - Electrical elevations

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- Required Safety Placards
- Define system sizing & configuration, including:
 - Electrical single-line and three-line diagrams for utility and permit processing.
 - Battery storage system sizing and performance modeling and optimization.
 - Stand-alone energy storage design for peak shaving, backup, uninterruptible power supply, and emergency applications.
 - Designs for DC- or AC-coupled energy storage systems.
 - Design energy management system (EMS) capable of performing demand charge reduction.
- Design and document the 2MWh VRF battery system.
- Develop *System Test Plan*, to include:
 - Testing for solar-PV generation shifting.
 - System capability to provide a minimum of 10 hours of backup support to the facility in the event of a grid outage.
- Prepare the site & perform all ESS civil and electrical work (construction, cabling, trenches, etc.).
- Prepare *Site Engineering Report*, which shall include a summary of, and results from, the activities described in Task 3.
- Prepare *CPR Report #1* and participate in CPR Meeting as described in subtask 1.3.
- Procure equipment and materials for the 2Mwh VRF battery system. Recipient must receive CAM written approval prior to procuring equipment and materials for the battery system.

Products:

- System Test Plan (draft and final)
- Site Engineering Report
- CPR Report #1

TASK 4: INSTALLATION & COMMISSIONING

The goal of this task is to install and commission the 2 MWh energy storage system, including battery, power conversion module (inverter, transformer, grid protection) and interconnecting wiring.

The Recipient shall:

- Install the total system which includes,
 - Installation and commissioning of ESS, including battery, power conversion module (inverter, transformer, grid protection) and interconnecting wiring.
 - Energy storage utility interconnection.
 - Commission the site.
- Prepare *Installation & Commissioning Report*, which shall include a summary of, and results from, the activities described in Task 4.
- Prepare *CPR Report #2* and participate in CPR Meeting as described in subtask 1.3.

Products:

- Installation & Commissioning Report
- CPR Report #2

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TASK 5: SYSTEM OPERATION, OPTIMIZATION, AND EVALUATION

The goal of this task is to monitor, evaluate and optimize energy storage system.

The Recipient shall:

- Operate the system for a minimum of 12 months. The duration of data collection may be reduced with prior CAM written approval.
- Collect operational data in accordance with the System Test Plan.
- Evaluate the performance of ESS. This includes solar-PV generation shifting, and system capability to provide a minimum of 10 hours of backup support to the facility in the event of a grid outage.
- Optimize ESS performance to maximize benefit to the facility.
- Prepare *System Performance Report*, to include results from system and facility data analyses, results from ESS performance evaluation, and measures taken to optimize ESS performance.

Products:

- System Performance Report

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 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.
 - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.

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

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

Products:

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

TASK 7: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

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

The Recipient shall:

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

Products:

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- High Quality Digital Photographs
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

TASK 8: 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:

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- 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.

Products:

- Production Readiness Plan (draft and final)

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: THE PECHANGA BAND OF LUISEÑO INDIANS

RESOLVED, that the State Energy Resources Conservation and Development Commission (CEC) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

RESOLVED, that the CEC approves Agreement EPC-20-003 with The Pechanga Band of Luiseño Indians for a \$1,998,101 grant to fund a project that will connect 2MWh of modular vanadium redox flow batteries to the Tribe's recreation center/emergency shelter to provide 10 hours or more of backup power. In the event of an electric grid outage or Public Safety Power Shutoff, this storage system will allow the recreation center/emergency shelter to remain operational while the grid is down. A replicable battery storage solution at this site will have far-reaching positive impacts on the tribes in the surrounding area; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her designee shall execute the same on behalf of the CEC.

CERTIFICATION

The undersigned Secretariat to the CEC 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 CEC held on October 14, 2020.

AYE:

NAY:

ABSENT:

ABSTAIN:

Cody Goldthrite
Secretariat