California Energy Commission
June 12, 2024 Business Meeting
Backup Materials for Indian Energy LLC

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution
2. Grant Amendment Request Form
3. Scope of Work

[PROPOSED]

RESOLUTION NO: 24-0612-03e

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: Indian Energy LLC

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 amendment 2 to agreement LDS-22-001 with Indian Energy LLC. The amendment will increase the project budget by $12,000,000 for a total of $43,259,680 and extend the project term by one year to increase the microgrid capacity by 10 MWh and labor and subcontractor costs for development of a tribal microgrid on Viejas tribal lands in San Diego County. Staff recommends conditional approval of this item based upon funding availability as of the 2024 Budget Act; and

FURTHER BE IT RESOLVED, that the Executive Director or their 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 June 12, 2024.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

_____
Kristine Banaag
Secretariat

STATE OF CALIFORNIA

GRANT AMENDMENT REQUEST FORM (GARF)

CEC-277 (Revised 01/2024) CALIFORNIA ENERGY COMMISSION

Original Agreement # LDS-22-001 Amendment # 2

Division	Agreement Manager:	MS-	Phone
ERDD	Kevin Mallon		916-232-9184

Recipient's Legal Name	Federal ID #
Indian Energy LLC	27-1375128

Revisions: (check all that apply)	**Additional Requirements**
☒ Term Extension New End Date: 12/31/2029	Include revised schedule and complete items A, B, C, & F below.
☒ Budget Augmentation Amendment Amount: $ 12,000,000	Include revised budget and complete items A, B, C, D, & F below.
☐ Budget Reallocation	Include revised budget and complete items A, B, C, & F below.
☒ Scope of Work Revision	Include revised scope of work and complete items A, B, C, E, & F below.
☐ Change in Project Location or Demonstration Site	Include revised scope of work and complete items A, B, C, E, & F below.
☐ Novation/Name Change of Prime Recipient	Include novation documentation and complete items A, B, C, & F below.
☒ Terms and Conditions Modification	Include applicable exhibits with bold/underline/ strikeout and complete items A, B, C, & F below.

A) Business Meeting Information

Business Meeting approval is not required for the following types of Agreements:

☐ Minor amendments delegated to Executive Director per December 2013 Resolution

Proposed Business Meeting Date 6/12/2024 ☒ Consent ☐ Discussion

Business Meeting Presenter Kevin Mallon Time Needed: 0 minutes

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

Agenda Item Subject and Description:

Indian Energy LLC.

Proposed resolution to conditionally approve amendment 2 to agreement LDS-22-001 with Indian Energy LLC and adopting staff's determination that this action is exempt from CEQA. The amendment will increase the project budget by $12,000,000 for a total of $43,259,680 and extend the project term by one year to increase the microgrid capacity by 10 MWh and labor and subcontractor costs for development of a tribal microgrid on Viejas tribal lands in San Diego County. Staff recommends conditional approval of this item based upon funding availability as of the 2024 Budget Act. Contact: Kevin Mallon

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

Legal Company Name:	Budget
Michael Firenze Inc	$ 2,269,805
Electric Power Research Institute, Inc.	$ 250,000
SMR-ISD Consulting Structural Engineers, Inc.	$ 75,000
Construction Testing and Engineering, South, Inc.	$ 75,000
Energy Design 4 All, LLC	$ 575,000
Melrok, LLC	$ 80,000
Global Power Group, Inc.	$ 1,673,355
Adam Dombrowski LLC	$ 543,400
Skyotee Engineering LLC	$ 360,148
GS Civil Corporation	$ 25,000

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

Legal Company Name:
Invinity Energy Systems, PLC
Maada'Oozh LLC
Eos Energy Storage, LLC

D) Budget Information (only include amendment amount information)

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
GGRF	23-24	303.201	$12,000,000
			$
			$

R&D Program Area: ESTB: ETSI TOTAL: $ 12,000,000

Explanation for “Other” selection

Federal Agreement #: 3360-102-0001

E) 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: PRC § 21080.35
      - ☒ Categorical Exemption. List CCR section number: Cal. Code Regs., tit. 14, § 15301
      - ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section: This project will involve the installation of a solar PV carport system, within an existing parking lot. The PV system installation includes steel carport structures on new concrete pilings and electrical conduit to connect the system to the 12 kV microgrid loop. All solar PV panels will have an antiglare coating that maximizes light absorption and minimizes glare. Any potential glare from the operation of the solar PV system will be minimal. Equipment associated with each solar PV array will not occupy more than 500 square feet of ground surface and will be located on the same parcels as the solar panels (APNs 406-051-13-00 and 406-070-10-00). The project does not involve offsite federal Clean Water Act permit; waste discharge requirements pursuant to the Porter-Cologne Water Quality Control Act; incidental take permit for species protected under the federal Endangered Species Act or the California Endangered Species Act; streambed alteration permit pursuant to the California Fish and Game Code; or removal of protected or native plants and trees. For these reasons, the PV portion of the project is statutorily exempt from CEQA under Public Resources Code, section 21080.35, provided for installation of a solar energy system on the roof of an existing building or at an existing parking lot.

The project will install and operate a microgrid system combining a solar PV system and VRFB and ZHC LDES within previously disturbed areas at the Viejas Indian Reservation Business Enterprises facility. The microgrid system installation will be a minor alteration to an existing facility within the interior of the Viejas Indian Reservation with no expansion beyond the reservation operation. Vehicle trips associated with the construction of the project will be temporary and the operation of the microgrid system will result in a negligible number of regular operational trips for maintenance. BMPs will be used during installation and operation of the micro grid system. Therefore, no adverse effects to off-site air or water quality will occur as a result of the project. The installation and operation of the microgrid system would not substantially degrade the existing visual character or quality of off-reservation visual resources, as the system components are not visually obtrusive. The project will not have a significant adverse effect on the off-reservation 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 project is categorically exempt from CEQA under California Code of Regulations, title 14, section 15301, as a minor alteration of existing facility, involving no expansion of the existing use.

Staff has determined that this amendment falls within the scope of the above exemptions. There is no off-reservation impact from the additional work, no increase to soil hauled in or out, construction equipment or number of workers, and there are no new off-reservation permits. Although the amendment will increase microgrid capacity from 60MWh to 70MWh, there will be no change in footprint of the project, and no additional land will be disturbed. This is due to the increase in energy density of Eos's latest generation of battery technology.

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

F) Is this project considered "Infrastructure"? No

G) The following items should be attached to this GARF (as applicable)

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

Agreement Manager **Date**

Branch Manager **Date**

Deputy Director **Date**

Exhibit A
Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Develop Site and Microgrid Design Integrating LDES Technologies
3	X	Procure Equipment and Materials for LDES System
4	X	Installation and Pre-energization Testing of LDES Technologies and Microgrid Components
5	X	Functionally Test and Commission the LDES System for Final Acceptance
6	X	Operate LDES as Part of Microgrid to Support Site During PSPS, Other Outage Events, or to Reduce Load During Peak Demand
7	X	Monitoring, Verification, and Performance Evaluation
8		Evaluation of Project Benefits
9		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AHJ	Authority Having Jurisdiction
BESS	Battery Energy Storage System
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CCI	**California Climate Investments[2]**
CEC	California Energy Commission
Commissioning	Full charge and discharge at 6MW for 10hrs for the combined LDES technologies during PSPS, other outage events, or for load reduction at times of peak demand
CPR	Critical Project Review
GGRF	**Greenhouse Gas Reduction Fund**
GHG	**Greenhouse Gas**
kV	Kilovolt
LDES	Long Duration Energy Storage
MWh	Megawatt-hour
Mechanical completion of LDES systems	Point at which (a) structural installation of the applicable project system(s) has occurred and (b) the project(s) is mechanically, electrically, and functionally complete to the extent necessary to be ready for initial commissioning, adjustment, and testing
PSPS	Public Safety Power Shut Off
TAC	Technical Advisory Committee

[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.

[2] An umbrella term and associated logo developed for the purpose of communication with funding recipients and the general public to identify programs or projects funded in whole or in part by the Greenhouse Gas Reduction Fund (GGRF). For information, visit: www.caclimateinvestments.ca.gov

Exhibit A
Scope of Work

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

A. Purpose of Agreement

Funding for the Long Duration Storage (LDES) program comes partially from the California Climate Investments (CCI) program. The CCI program requires that all funded projects must facilitate the achievement of greenhouse gas (GHG) emission reductions and further the purposes of AB 32 (AB 32, Nunez, Global Warming Solutions Act of 2006, Chapter 488, 2006), SB 32 (SB 32, Pavley, California Global Warming Solutions Act of 2006, Chapter 249, 2016), and related statutes. The purpose of this Agreement is to fund deployment of ~~6 MW/60 MWh~~ **7 MW/70 MWh** of non-lithium-ion long duration energy storage (LDES) using two different LDES technologies. The LDES systems will be operated as part of microgrid that includes 15 MW of solar photovoltaics and serves the Viejas Band of Kumeyaay Indians. The project will demonstrate the microgrid's ability to power critical Tribal operations during Public Safety Power Shut Off (PSPS) events and during times of peak grid demand.

B. Problem/ Solution Statement

Problem

LDES technologies capable of storing and discharging electricity for eight hours or longer can play an important role supporting electric reliability and resilience with high levels of renewable generation. However, the majority of storage systems deployed in California today are short-duration lithium-ion batteries and LDES technologies have only been demonstrated at relatively small scales generally below 1 MW.

Solution

Public Resources Code section 2541 provides that the CEC:

> Shall establish and implement the Long-Duration Energy Storage Program to provide financial incentives for eligible projects,[2] located at eligible storage facilities,[3] that have power ratings of at least one megawatt and are capable of reaching a target of at least eight hours of continuous discharge of electricity at that power rating in order to deploy innovative energy storage systems to the electrical grid for purposes of providing critical capacity and grid services.[4]

This project will deploy two LDES technologies as part of a behind-the-meter microgrid that can be deployed and configured rapidly and with no impact on operations. The LDES technologies include 10MWh Invinity vanadium redox flow battery and ~~50~~ **60** MWh Eos zinc hybrid cathode

[2] Under Public Resources Code section 25642, an "eligible project" shall include, but not be limited to, an eligible storage facility that includes any of the following: (i) Compressed air or liquid air technologies; (ii) Flow batteries, advanced chemistry batteries, or mechanical energy storage; (iii) Thermal storage or aqueous battery systems; or (iv) A hydrogen demonstration project. "Eligible project" shall not include a pumped storage project or lithium-ion-based storage technology. Cal. Pub. Res. Code § 25642 (b)(2)(A).
[3] "Eligible storage facility" shall include, but not be limited to, an energy storage system that is interconnected to the electrical grid in California or to a California balancing authority. Cal. Pub. Res. Code § 25642.
[4] Cal. Pub. Res. Code § 25641.

battery for a combined LDES capacity of ~~60~~ **70** MWh. The LDES and microgrid will be capable of powering critical facilities during PSPS or other outage events for more than 10 hours with equivalent or greater power quality than experienced at the facility today. The microgrid will also be able to provide MW-scale load reduction during times of peak electric grid demand, helping to support system reliability and achieve policy goals for 100 percent zero carbon renewable electricity.

As an enhancement to the microgrid, the excess capacity outside of the needs of the Viejas critical infrastructure shall be utilized to support the local grid as a merchant energy storage and ELRP asset.

C. Goals and Objectives of the Agreement

Agreement Goals
The goals of this Agreement are to:

- Deploy two proven non-lithium-ion LDES technologies at a combined scale of ~~6~~ **7** MW discharged for 10 hours during PSPS events or times of peak electric grid demand.
- Demonstrate LDES technologies as part of a microgrid using 100 percent on-site renewable generation capable of sustaining critical operations for 72 hours or more**, using 42MWh of LDES**.
- Demonstrate how LDES as part of a microgrid can provide reliability and resilience benefits to the electricity grid by reducing load at times of peak demand.
    - **This includes a demonstration of utilizing 28MWh of LDES as a local asset in merchant battery and ELRP settings.**
- Increase the scale of LDES technology deployments to help reduce costs and inform future deployments in California.
- Develop strategies to increase deployment of LDES technologies in low-income, disadvantaged, and tribal communities to support a more equitable distribution of benefits.
- Achieve LDES system readiness by summer ~~2023~~ **2024** and full microgrid operational readiness by early ~~2024~~ **2025**.

Deployment of Innovative Energy Storage System: This Agreement will result in the deployment of an innovative energy storage systems to the electrical grid for purposes of providing critical capacity and grid services by deploying and demonstrating how large-scale LDES can enable 100 percent renewable penetration in a rapid and seamless manner. The project will provide a clear and replicable path toward implementing 100 percent renewables in a resilient manner and includes a new non-lithium-ion technology that can demonstrate future savings that are repeatable. This will enable a cleaner environment that is less harmful to humans, a grid that is more resilient and able to adapt to climate change, and significantly reduced long term ownership costs which will eventually lead to the dramatic reduction in the costs of electrical energy throughout California.

This Agreement will demonstrate a way in which LDES can be utilized in a 100 percent renewable environment to secure critical/essential loads while simultaneously relieving the grid of congestion and volatility and therefore enabling further electrification for uses like transportation. Additionally, this agreement will allow the non-lithium-ion technology provider to demonstrate the ability to perform all the services necessary to accomplish this goals that is currently only being done by lithium-ion technology providers.

This overall advancement will specifically include advancements and breakthroughs in the LDES and microgrid modeling, LDES use case development, LDES private financing, LDES performance insurance and warranty backstops, interconnection strategies and techniques, LDES implementation phasing, LDES and microgrid infrastructure design, startup, and enhanced commissioning. The hybrid LDES technology approach will serve ISO reliability services in the area by providing resilience and value through multiple battery technologies working in unison. The unique value proposition of a hybrid approach to LDES implementation will be assessed to find the maximum value by the technologies. This will aid in both technologies value proposition and market offerings and will provide an installation guide to test this scaling technique out with others.

Agreement Objectives

The objectives of this Agreement are to:

- Demonstrate how large-scale non-lithium-ion LDES can be the key to unlocking 100 percent renewables in California while strengthening the resilience posture of ratepayers.
- Identify all final barriers to scaling and implementation of large-scale LDES.
- Provide a clear path for rapid proliferation of large-scale LDES solutions through California.

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).** All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations**.** All technical tasks should include product(s). Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, **"days"** means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

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

For all products

- Submit all data and documents required as products in accordance with the following:

Instructions for Submitting Electronic Files and Developing Software:

- **Electronic File Format**
  - Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the California Energy Commission's (CEC) 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.

  The following describes the accepted formats for electronic data and documents provided to the CEC 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.
  - 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 CEC'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 CEC 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;
  - Invoicing and auditing procedures;
  - 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 (subtask 1.5);
  - Final Report (subtask 1.6);
  - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
  - Any other relevant topics.

- Provide *Kick-off Meeting Presentation* to include but not limited to:
  - Project overview (i.e. project description, goals and objectives, technical tasks, expected benefits, etc.)
  - Project schedule that identifies milestones
  - List of potential risk factors and hurdles, and mitigation strategy

- Provide an *Updated Project Schedule, Match Funds Status Letter,* and *Permit Status Letter*, 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:

- Kick-off Meeting Presentation
- Updated Project Schedule *(if applicable)*
- Match Funds Status Letter (subtask 1.7) *(if applicable)*
- Permit Status Letter (subtask 1.8) *(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 CEC 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 CEC 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 CEC.

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 CEC, 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 and submit 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.
- 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* with 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)

CAM Products:

- CPR Agenda(s)

- 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 CEC 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 procured equipment.
    - The CEC'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 copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

Products:

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

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices
The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

The Recipient shall:

- Submit a monthly *Progress Report* to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the

Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.

- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Funds and in-state expenditures.
- Provide a *Six-Month Employee Labor Projection* that details the hour projections every six months covering the subsequent six months for each individual working on this Agreement. The Recipient shall submit a monthly review of the previous labor spent by each employee for the previous month in a *Monthly Time Tracking Report* for written approval by the CAM.
- In no event shall any individual providing direct labor under this Agreement, and combined with any other active or future Agreement with the CEC, invoice more than 1800 hours of direct labor per year without prior CAM written approval, regardless of the maximum number of hours permitted within any Budget.

Products:

- Progress Reports
- Invoices
- Six-Month Employee Labor Projection
- Monthly Time Tracking Report

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. When creating the Final Report Outline and the Final Report, the Recipient must use the CEC 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 *Energy Commission Style Manual* provided by the CAM.

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Energy Commission 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, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:
    - Cover page (**required**)

- Credits page on the reverse side of cover with legal disclaimer (**required**)
- Acknowledgements page (optional)
- Preface (**required**)
- Abstract, keywords, and citation page (**required**)
- Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
- Executive summary (**required**)
- Body of the report**/<u>Summary table that includes the following information, but not limited to</u>** (**required**)
    - **<u>Recipient name;</u>**
    - **<u>Project description;</u>**
    - **<u>Project location(s);</u>**
    - **<u>Census tract;</u>**
    - **<u>Dates: project selected and completed;</u>**
    - **<u>GGRF dollars allocated;</u>**
    - **<u>Leveraged and/or match funds;</u>**
    - **<u>Estimated/actual total project GHG emission reductions;</u>**
    - **<u>Estimated/actual energy saved (kWh, therms, or other fuels) for energy efficiency projects;</u>**
    - **<u>Estimated/actual energy generated (kWh or therm equivalents) for renewable energy projects;</u>**
    - **<u>Other benefits or results;</u>**
    - **<u>Other market sectors that can benefit from the project;</u>**
    - **<u>Benefits to priority populations</u>**
- 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)

- Submit a draft of the Executive Summary to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments on Draft Final Report* received on the Executive Summary. For each comment received, the recipient will identify in the summary the following:
    - Comments the recipient proposes to incorporate.
    - Comments the recipient does not propose to incorporate and an explanation for why.
- 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.
- Incorporate all CAM comments into the *Final Report*. If the Recipient disagrees with any comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.

- Submit the revised *Final Report* electronically with any Written Responses to Comments within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the CAM specifies a longer time period or approves a request for additional time.

Products:

- Summary of TAC Comments on Draft Final Report
- Draft Final Report
- Written Responses to Comments *(if applicable)*

- Final Report

CAM Product:
- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds
The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this Agreement and applies them to the Agreement during the Agreement term.

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

Products:
- Match Funds Status Letter

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

Subtask 1.8 Permits
The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

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

  The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

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

Subtask 1.9 Subcontracts
The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions of this Agreement.

The Recipient shall:

- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.

- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of each 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.
- 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, to the extent the TAC members feel is appropriate, 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.

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.

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.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

Products:

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

Subtask 1.12 Project Performance Metrics

The goal of this subtask is to finalize key performance targets for the project based on feedback from the TAC and report on final results in achieving those targets. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology's potential success.

The Recipient shall:

- Complete and submit the project performance metrics section of the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task, to the CAM.
- Present the draft project performance metrics at the first TAC meeting to solicit input and comments from the TAC members.
- Develop and submit a *TAC Performance Metrics Summary* that summarizes comments received from the TAC members on the proposed project performance metrics. The *TAC Performance Metrics Summary* will identify:
    - TAC comments the Recipient proposes to incorporate into the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
    - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Develop and submit a *Project Performance Metrics Results* document describing the extent to which the Recipient met each of the performance metrics in the *Final Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

IV. TECHNICAL TASKS

*Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear*

after the product name, only a final version of the product is required. ***Subtask 1.1 (Products)*** *describes the procedure for submitting products to the CAM.*

TASK 2: DEVELOP SITE AND MICROGRID DESIGN INTEGRATING LDES TECHNOLOGIES
The goal of this task is to complete the engineering design for installation and integration of the LDES technologies and microgrid components including all electrical, civil, structural, architectural, and miscellaneous items required to develop a complete Issued for Construction set of design drawings.

The Recipient shall:

- Develop and submit *Issued for Construction* Drawings for review that include but are not limited to the following:
    - Hardware design and specifications for the LDES technologies and microgrid components
    - Anticipated construction and interconnection timelines
    - All necessary permits filed for building, interconnection, and back up generation
- Conduct TAC Meeting #1 per subtask 1.10
    - Document, submit, and discuss these tasks and lessons learned during the TAC meeting with the TAC and the CAM
- Prepare a *Design Report* that includes but is not limited to the following.
    - Summary of all planned operational use cases for the LDES and microgrid over the course of the project
    - Schematics and integration details
    - Electrical design
    - Definition of schematic symbols and data entry types
    - Documentation of the capabilities of the battery management system(s)
    - System documentation
- Obtain approval and provide a *Copy of Notice to Proceed* from the authorities having jurisdiction (AHJ)
- Prepare a *Design Report Presentation (PowerPoint)* which will include the design plans and summarize and highlight the *Design Report* and present at a Design Report meeting.

Products:

- Issued for Construction Drawings
- Design Report (Draft and Final)
- Design Report Presentation (PowerPoint)
- Copy of Notice to Proceed

TASK 3: PROCURE EQUIPMENT AND MATERIALS FOR LDES SYSTEM
The goal of this task is to procure, track and manage logistics for delivery of the ~~6 MW/60 MWh~~ **7 MW/70 MWh** combined LDES technologies to the demonstration site.

The Recipient shall:

- Develop a detailed *Master List of Equipment and Materials* for the 6MW/60MWh LDES technologies
- Receive Written Approval of Master List of Equipment and Materials from CAM before placing purchase order for LDES technologies
- Create purchase orders based on approved Master List of Equipment and Materials

- Coordinate logistics and track delivery of LDES technologies to the project demonstration site
- Confirm and document receipt of the LDES technologies to California distribution yard and facility
- Develop and submit *Supplier-Specific Payment Schedules* for written approval by CAM reflecting a milestone process for purchasing LDES technologies and associated equipment, for example:
    - Milestone 1: Invoice 25 percent of purchase order costs upon battery supplier purchase agreement execution.
    - Milestone 2: Invoice 25 percent of purchase order costs 60 days before shipment, with confirmation that all supply orders are on schedule, proof of supplier receipt of previous milestone payment, and after completion of a manufacturer site visit(s).
    - Milestone 3: Invoice 25 percent of purchase order costs when at least 75 percent of equipment has passed factory acceptance testing, with confirmation that all supply orders are on schedule, proof of supplier receipt of previous milestone payment, and after completion of a manufacturer site visit(s).
    - Milestone 4: Invoice 15 percent of purchase order costs following delivery of all equipment to the demonstration site, proof of supplier receipt of previous milestone payment, and completion of a demonstration site visit.
    - Milestone 5: Invoice 5 percent of equipment following Mechanical Completion of the supplier specific LDES systems and with proof of supplier receipt of previous milestone payment.
    - Milestone 6: Invoice 5 percent of purchase order costs at final commissioning and acceptance of supplier specific LDES systems and with proof of supplier receipt of previous milestone payment.
- All equipment reimbursed under this grant will be owned by the CEC and shall not be encumbered as set forth in Exhibit C, Terms and Conditions, until Mechanical Completion of the LDES systems. “Mechanical Completion” means (a) structural installation of the applicable project system(s) has occurred and (b) the project(s) is mechanically, electrically, and functionally complete to the extent necessary to be ready for initial commissioning, adjustment, and testing.
- Secure project insurance and furnish a *Proof of Insurance Policy* that names the CEC as an insured that satisfies the requirements set forth in Exhibit C, Terms and Conditions.
- Prepare a *CPR Report #1* and participate in CPR Meeting, per subtask 1.3. Report shall also include:
    - Equipment and materials purchase orders

Products:

- Master List of Equipment and Materials
- Supplier Specific Payment Schedules
- Proof of Insurance Policy
- CPR Report #1

TASK 4: INSTALLATION AND PRE-ENERGIZATION TESTING OF LDES TECHNOLOGIES AND MICROGRID COMPONENTS

The goal of this task is to install ~~6 MW/60 MWh~~ **7 MW/70 MWh** combined LDES technologies, 15MW on-site photovoltaic generation, back-up generators, and all microgrid and interconnection systems.

The Recipient shall:

- Install all equipment at the demonstration site, including but not limited to the LDES technologies, solar photovoltaic generation, back-up generators, and 12kV microgrid infrastructure
- Make appropriate electrical connections to utility distribution system
- Receive final approval for interconnection from the utility providing service
    - **Phase 1 BESS deployment shall be 37MWh and shall serve the Viejas critical loads.**
    - **Phase 2 BESS deployment shall be an additional 33MWh of newer technology version to result in 28MWh as a local grid serving asset.**
- Prepare an *Equipment Testing and Readiness Report* that includes but is not limited to the following:
    - Specific pre-energization testing and evaluation performed on all components to confirm proper functionality
    - Testing data sheets that verify all equipment was evaluated and tested according to established procedures to ensure all equipment and individual system components are safe to energize and will function as designed
- Participate in final inspection and obtain *Final Installation Inspection Letter* from the AHJ or its representative, confirming Mechanical Completion and System Readiness
- Prepare a *CPR Report #2* and participate in CPR Meeting, per subtask 1.3. Report shall also include:
    - Equipment and materials tracking tickets
    - Equipment and materials delivery receipts

Products:

- Equipment Testing and Readiness Report (Draft and Final)
- Final Installation Inspection Letter
- CPR Report #2

TASK 5: FUNCTIONALLY TEST AND COMMISSION THE LDES SYSTEM FOR FINAL ACCEPTANCE

The goals of this task are to test each LDES system individually and then together as one entire LDES system, to complete commissioning, and to receive permission to operate.

The Recipient shall:

- Develop a *LDES Functional Acceptance Testing and Commissioning Plan,* prior to completion of installation **of each deployment phase**, that includes but is not limited to the following.
    - LDES subsystems and systems to be functionally tested and details of testing plans
    - Sequence of LDES system functional testing and startup period
    - Goals and expected outcomes of each functional test and overall process
    - Definition of successful results, for example cell, module, and unit balancing, full control and monitoring capability, verification of inverter inputs and outputs
    - Roles and responsibilities of the parties
- Prepare a *LDES Performance and Acceptance Test Result(s) Report(s)* that includes but is not limited to the following.
    - Results of subsystem and system verification tests identified in the Functional Testing and Commissioning Plan

  - Acceptance Test results for each LDES subsystem individually at the single container level
  - Acceptance Test results for the LDES system at the level of multiple containers connected to a common electrical node
  - Test results of full system performance verification
  - Test results of a full systems readiness evaluation verifying that the full system will operate as designed in a microgrid application
- Provide a *Systems Readiness Certification*
- Achieve *Authority to Operate* by the AHJ or its representative and provide a copy of approval documentation.
- Conduct TAC Meeting #2 per subtask 1.10
  - Document, submit, and discuss this tasks lessons learned during the TAC meeting with the TAC and the CAM.
- Prepare a *CPR Report #3* and participate in CPR Meeting, per subtask 1.3

Products:
- LDES Functional Acceptance Testing and Commissioning Plan (Draft and Final)
- LDES Performance and Acceptance Test Result(s) Report(s)
- Systems Readiness Certificate
- Authority to Operate Letter
- CPR Report #3

TASK 6: OPERATE LDES AS PART OF MICROGRID TO SUPPORT SITE DURING PSPS, OTHER OUTAGE EVENTS, OR TO REDUCE LOAD DURING PEAK DEMAND
The goal of this task is to operate the microgrid and LDES to demonstrate multiple use cases culminating in the ability for the LDES based microgrid to seamlessly transition between island and non-island operation during a PSPS or other outage utilizing 100 percent renewable generation for multiple days in a row.

The Recipient shall:
- Develop a *Microgrid System Testing and Commissioning Plan,* prior to completion of installation, that includes the following at a minimum:
  - Microgrid subsystems to be tested
  - Sequence of microgrid system testing and startup period
  - Goals and expected functionality of the microgrid system
  - Definition of successful results to demonstrate support of site load during PSPS, other outage events, or to reduce load during peak demand
  - Roles and responsibilities of the parties
- Test the LDES and microgrid under the following use cases both while grid connected and while islanded:
  - ~~6~~ **7** MW discharge for 10 hrs.
  - 24-hour 100 percent renewable operation with on-site renewable generation
  - Emergency load support during PSPS or other outage events or during times of peak electric grid demand
    - Track data and report on participation in the Emergency Load Reduction Program.
  - **Discharge a 7MW/28MWh LDES asset as a local grid serving merchant asset capable of responding to ELRP events.**
- Prepare a *Microgrid Operations and Analysis Report* with the results of testing for each Use Cases

- Prepare a *Microgrid System Performance Presentation* with the results of the Use Cases test
- Prepare a *CPR Report #4* and participate in CPR Meeting, per subtask 1.3

Products:

- Microgrid System Testing and Commissioning Plan (Draft and Final)
- Microgrid Operations and Analysis Report
- Microgrid Performance Presentation
- CPR Report #4

TASK 7: MONITORING, VERIFICATION, AND PERFORMANCE EVALUATION

The team will measure and verify the performance of the microgrid and LDES technologies and compare to projected performance. The goal of this task is to conduct measurement and validation of the microgrid and LDES technologies**,** ~~and~~ to periodically evaluate and report on their performance in a number of use cases**, and to report the benefits resulting from this project by performing measurement and verification (M&V) of GHG and energy consumption reduction**.

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The Recipient shall:

- **Enter into an agreement with M&V subcontractor per Task 1.9 (if using an outside vendor)**
- **Coordinate site visits with the M&V subcontractor at the demonstration site(s)**
    - **Develop a *M&V protocol* for *pre-installation* measurement (and calculation) of electric, natural gas and/or other fossil fuel consumption, and GHG emissions of the equipment/process/system(s)/sub-system(s) that are to be upgraded and/or replaced and/or modified.**
    - **Ensure installation of sub-metering equipment and data loggers for pre/post data analysis.**
- Develop a *Measurement, Verification & Performance Evaluation Plan,* prior to initiating measurement period, that includes but is not limited to the following.
    - **A description of the monitoring equipment and instrumentation which will be used.**
    - Set up of measurement devices and data collection platform
    - **A data collection schedule, including** length of measurement and verification period
    - **A description of the key input** parameters **and output metrics** that will be measured ~~and metrics~~ **and** that will be used validate cost effectiveness and performance including but not limited to.
        - Number of MWh provided during PSPS or other outage events
        - Number and time of MW load reduction and duration provided during times of peak demand
    - **A description of the M&V protocol, analysis, and collection methods to be employed.**
    - Definition of analytical methods for processing data
    - Expected results prior to measurement period

  - **A description of the independent, third-party M&V services to be employed, if applicable**.
- **Perform three months (or a shorter period as approved in writing by the CAM) of pre-installation measurements (and calculations) based on the M&V protocol for pre-installation.**
- **Prepare and provide a *Pre-Installation M&V Findings Report* for each demonstration site that includes M&V protocol, pre-install measurements (and calculations), analysis, and results performed in this task.**
- **Develop M&V protocol for *post-installation* measurements (and calculations) of:**
  - **Electric, natural gas and/or other fossil fuel consumption, and GHG emissions of the equipment/process/system(s)/sub-system(s) that will be upgraded and/or replaced and/or modified. Factors and metrics to be approved by the CAM.**
- **Perform at least 6 months or two seasons, for seasonal facilities, (or a shorter period as approved in writing by the CAM) of post-installation measurements based on M&V protocol for post-installation.**
- **Provide a summary of post-installation M&V progress in Progress Report(s) (see subtask 1.5) which shall include but not be limited to:**
  - **A narrative on operational highlights from the reporting period, including any stoppages in operation and why; and**
  - **A summary of M&V findings from the reporting period.**
- **Analyze post-installation electrical, natural gas and/or other fossil fuel consumption, and GHG emissions.**
- Prepare ~~an *Initial Measurement, Verification & Performance Evaluation*~~ ***Post-Installation M&V Findings*** *Report* that includes but is not limited to the following.
  - **The M&V protocol**
  - **Pre- and post-install measurements (and calculations)**
  - Summary of data collected and period of data collection
  - Results of the measurement and verification period
    - **Results should at a minimum report on the reduction of electricity, natural gas and/or other fossil fuel usage and reductions of GHG emissions that directly result from this project.**
  - **Analysis of measurements, including but not limited to**
    - Comparison of predicted results and actual results
    - Discussion of lessons learned and future adjustments
- **Provide all key assumptions used to estimate and determine energy and GHG reductions (and additions, if applicable).**
- **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.**
- Submit updated ~~*Quarterly*~~ *Measurement, Verification & Performance Evaluation Reports* **per the frequency listed in the terms and conditions** summarizing performance of the LDES systems and microgrid, including but not limited to the following.
  - Measured LDES performance relative to nameplate guarantees; MWh throughput (subtotal and total); roundtrip efficiency; auxiliary load reports; generation mix reports; subsystem and system availability and reliability metrics; costs and economic savings; and summary statistics on utility distribution grid performance including outages, voltage, and frequency monitoring.

  - **GGRF data and benefits per the metrics listed in the terms and conditions and as provided by CARB guidance.**
- Conduct TAC Meeting #3 per subtask 1.10
  - Document, submit, and discuss this tasks lessons learned during the TAC meeting with the TAC and the CAM.
- Prepare a *CPR Report #5* and participate in CPR Meeting, per subtask 1.3

Products:

- Measurement, Verification & Performance Evaluation Plan (Draft and Final)
- **Pre-Installation M&V Findings Report (*draft and final*)**
- ~~Initial Measurement, Verification & Performance Evaluation Report~~
- **Post-Installation M&V Findings Report(s) (*draft and final*)**
- ~~Quarterly~~ Measurement, Verification & Performance Evaluation Reports
- CPR Report #5

TASK 8: EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete *the Initial Project Benefits Questionnaire*. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by January 31st of each year. The Annual Survey includes but is not limited to the following information:
  - Technology commercialization progress
  - New media and publications
  - Company growth
  - Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The Final Project Benefits Questionnaire shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund), and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Survey(s)
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 9: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES
The goal of this task is to ensure the technological learning that resulted from the demonstration(s) is captured and disseminated to the range of professions that will be responsible for future deployments of this technology or similar technologies.

The Recipient Shall:

- Develop and submit a *Project Case Study Plan* that outlines how the Recipient will document the planning, construction, commissioning, and operation of the technology or system being demonstrated. The Project Case Study Plan should include:
    - An outline of the objectives, goals, and activities of the case study.
    - The organization that will be conducting the case study and the plan for conducting it.
    - A list of professions and practitioners involved in the technology's deployment.
    - Specific activities the recipient will take to ensure the learning that results from the project is disseminated to those professions and practitioners.
    - Presentations/webinars/training events to disseminate the results of the case study.
- Present the draft *Project Case Study Plan* to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the draft *Project Case Study Plan*. This document will identify:
    - TAC comments the recipient proposes to incorporate into the final *Technology Transfer Plan*.
    - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit the final *Project Case Study Plan* to the CAM for approval.
- Execute the final Project Case Study Plan and develop and submit a Project Case Study.
- When directed by the CAM, develop presentation materials for a CEC sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in knowledge sharing event(s) sponsored by the California CEC.
- 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.

Products:

- Project Case Study Plan (draft and final)
- Summary of TAC Comments
- Project Case Study (draft and final)
- High Quality Digital Photographs

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.