



**CALIFORNIA
ENERGY COMMISSION**



**California Energy Commission
July 10, 2024 Business Meeting
Backup Materials for Sacramento Municipal Utility District**

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

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

[PROPOSED]

RESOLUTION NO: 24-0710-12

STATE OF CALIFORNIA

**STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION**

RESOLUTION: Rincon Band of Luiseno 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 LDS-24-001 with Sacramento Municipal Utility District (SMUD) for a \$10,000,000 grant. This project will demonstrate a long duration energy storage system with a 3.6 MW, 8-hour battery at a SMUD facility in Sacramento and its capability and reliability to support grid distribution and transmission systems; 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 July 10, 2024.

AYE:

NAY:

ABSENT:

ABSTAIN:

Dated:

Kristine Banaag
Secretariat



GRANT REQUEST FORM (GRF)

A. New Agreement Number

IMPORTANT: New Agreement # to be completed by Contracts, Grants, and Loans Office.

New Agreement Number: LDS-24-001

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Yahui Yang
3. MS-:None
4. Phone Number: 916-352-0414

C. Recipient's Information

1. Recipient's Legal Name: Sacramento Municipal Utility District
2. Federal ID Number: 94-6001157

D. Title of Project

Title of project: Hedge ESS Flow Battery Pilot and Demonstration

E. Term and Amount

1. Start Date: 9/1/2024
2. End Date: 8/31/2029
3. Amount: \$10,000,000.00

F. Business Meeting Information

1. Are the ARFVTP agreements \$75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 7/10/2024 .
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Yahui Yang
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: Research (Energy RD&D / PIER program).

Agenda Item Subject and Description:

Sacramento Municipal Utility District

Proposed resolution approving agreement LDS-24-001 with Sacramento Municipal Utility District (SMUD) for a \$10,000,000 grant, and adopting staff's determination that this action is exempt from CEQA. This project will demonstrate a long duration energy storage system with a 3.6 MW, 8-hour battery at a SMUD facility in Sacramento and its capability and reliability to support grid distribution and transmission systems. (LDES Funding) Contact: Yahui Yang (Staff Presentation: 5 minutes)

G. California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?

Yes

If yes, skip to question 2.



If no, complete the following (PRC 21065 and 14 CCR 15378) and explain why Agreement is not considered a "Project":

Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because:

2. If Agreement is considered a "Project" under CEQA answer the following questions.

a) Agreement **IS** exempt?

Yes

Statutory Exemption?

No

If yes, list PRC and/or CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

PRC section number: None

CCR section number: None

Categorical Exemption?

Yes

If yes, list CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

CCR section number: Cal. Code Regs., tit. 14, § 15301 ; Cal. Code Regs., tit. 14, § 15303 ; Cal. Code Regs., tit. 14, § 15304 ;

Common Sense Exemption? 14 CCR 15061 (b) (3)

No

If yes, explain reason why Agreement is exempt under the above section. If no, enter "Not applicable" and go to the next section.

Cal. Code Regs., tit. 14, sect. 15301 provides that projects which consist of the operation, repair, maintenance, permitting, leasing, licensing, or minor alternations of existing public or private structures, facilities, mechanical equipment, or topographical features, and which involve negligible or no expansion of existing or former use at the time of the lead agency's determination, are categorically exempt from the provisions of the California Environmental Quality Act (CEQA). Examples listed in section 15301 include, but are not limited to, existing facilities of both investor and publicly owned utilities used to provide electric power, natural gas, sewerage, or other public utility services. The proposed project will install and demonstrate a 3.6 MW/8 hour duration energy storage system at Sacramento Municipal Utility District (SMUD) Hedge Solar Facility at 9268 Tokay Ln, Sacramento. The project site, which was previously used for solar panels, is approximately 6 acres of bare land and adjacently south of the existing Hedge Battery Energy Storage System onsite. Up to 1,000 feet of trenching at a depth of 4 feet will be required to install electrical cable and then backfilled. Underground sump will be installed to collect electrolyte in case of leaks. Thus, the Project will involve the minor alternation of an existing power generation facility and would not result in expansion of use. This project will result in negligible or no



expansion of use beyond that already existing. Therefore, the project falls within section 15301 and will not have a significant effect on the environment.

Cal. Code Regs., tit. 14, sec. 15303 provides that projects which consists of construction and location of limited numbers of new, small facilities or structures; installation of small new equipment and facilities in small structures; and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure, are categorically exempt from the provisions of CEQA. The proposed project consists of 25 double-stacked ESS Energy Center containers plus ancillary equipment. Each container measures 40 feet long by 8 feet wide by 9.5 feet high, and will be placed on concrete foundations consisting of approximately 2 feet by 10 feet pads. These containers are small structures to be installed on the ground surface. The energy storage system will be connected to an existing 12-kV distribution line. Therefore, the proposed project falls within section 15303 and will not have a significant effect on the environment.

Cal. Code Regs., tit. 14, sect. 15304 provides that projects which consist of minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes are categorically exempt from the provisions of CEQA. Examples listed in section 15304 include, but are not limited to, minor trenching and backfilling where the surface is restored. The proposed project consists of up to 1,000 feet trenching and backfilling in bare land for installation of electric cable. The Project would not remove any healthy, mature, or scenic trees. The trenching would be temporary and the surface would be restored. Therefore, the project falls within section 15304 and will not have a significant effect on the environment.

The project will not impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law by federal, state, or local agencies; does not involve any cumulative impacts of successive projects of the same type in the same place that might be considered significant; does not involve unusual circumstances that might have a significant effect on the environment; will not result in damage to scenic resources within a highway officially designated as a state scenic highway; the project site is not included on any list compiled pursuant to Government Code section 65962.5; and the project will not cause a substantial adverse change in the significance of a historical resource. Therefore, none of the exceptions to categorical exemptions listed in CEQA Guidelines section 15300.2 apply to this project, and this project will not have a significant effect on the environment.

b) Agreement **IS NOT** exempt.

IMPORTANT: consult with the legal office to determine next steps.

No

If yes, answer yes or no to all that applies. If no, list all as "no" and "None" as "yes".

Additional Documents	Applies
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STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

Grant Request Form
CEC-270 (Revised 01/2024)

Initial Study	No
Negative Declaration	No
Mitigated Negative Declaration	No
Environmental Impact Report	No
Statement of Overriding Considerations	No
None	Yes

H. Is this project considered “Infrastructure”?

No

I. Subcontractors

List all Subcontractors listed in the Budget (s) (major and minor). Insert additional rows if needed. If no subcontractors to report, enter “No subcontractors to report” and “0” to funds. **Delete** any unused rows from the table.

Subcontractor Legal Company Name	CEC Funds	Match Funds
PXiSE Energy Solutions LLC	\$ 0	\$128,000
Black & Veatch Corporation	\$ 0	\$150,000
TBD (Engineering, Procurement and Construction)	\$ 0	\$12,200,000
TBD (measurement and verification)	\$ 0	\$150,000

J. Vendors and Sellers for Equipment and Materials/Miscellaneous

List all Vendors and Sellers listed in Budget(s) for Equipment and Materials/Miscellaneous. Insert additional rows if needed. If no vendors or sellers to report, enter “No vendors or sellers to report” and “0” to funds. **Delete** any unused rows from the table.

Vendor/Seller Legal Company Name	CEC Funds	Match Funds
ESS Tech, Inc.	\$10,000,000	\$5,325,200

K. Key Partners

List all key partner(s). Insert additional rows if needed. If no key partners to report, enter “No key partners to report.” **Delete** any unused rows from the table.

Key Partner Legal Company Name
No key partners to report

L. Budget Information

Include all budget information. Insert additional rows if needed. If no budget information to report, enter “N/A” for “Not Applicable” and “0” to Amount. **Delete** any unused rows from the table.



STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

Grant Request Form
CEC-270 (Revised 01/2024)

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
GGRF	23-24	303.201	\$ 10,000,000

TOTAL Amount: \$ 10,000,000

R&D Program Area: Admin: General

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

M. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Tom Moore

Address: 6201 S St

City, State, Zip: Sacramento, CA 95817-1899

Phone: (916)732-5064

E-Mail: tom.moore@smud.org

3. Recipient's Project Manager

Name: Jeanne Duvall

Address: 6201 S St, PO Box 15830

City, State, Zip: Sacramento, CA 95817

Phone: 916)732-6112

E-Mail: jeanne.duvall@smud.org

N. Selection Process Used

There are three types of selection process. List the one used for this GRF.

Selection Process	Additional Information
Competitive Solicitation #	Not applicable
First Come First Served Solicitation #	Not applicable



Other	Non-competitive. This noncompetitive award is authorized under (PRC 25643(d)(3)) because the cost to the state is reasonable and because it is in the best interest of the state to do so. Recipient is a Public-Owned Utility with resources to facilitate LDES projects and experience in grid-connected, green energy projects in California and around the world, and the battery to be assessed is unique. Moreover, California needs to dramatically increase its energy storage.
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O. Attached Items

1. List all items that should be attached to this GRF by entering “Yes” or “No”.

Item Number	Item Name	Attached
1	Exhibit A, Scope of Work/Schedule	Yes
2	Exhibit B, Budget Detail	Yes
3	CEC 105, Questionnaire for Identifying Conflicts	Yes
4	Recipient Resolution	Yes
5	Awardee CEQA Documentation	Yes

Approved By

Individuals who approve this form must enter their full name and approval date in the MS Word version.

Agreement Manager: Yahui Yang

Approval Date: 5/28/2024

Branch Manager: Reynaldo Gonzalez

Approval Date: 5/31/2024

Director: Delegated to the Branch Manager

Approval Date: 5/31/2024

Exhibit A Scope of Work Sacramento Municipal Utility District

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2		Develop Construction and Deployment Documentation
3	x	Procure Equipment and Materials for LDES System
4		Construct Site 1B and Install LDES Batteries
5	x	Test and Commission Site 1B LDES
6		Operation of Site 1B LDES with Grid
7		Construct Site 1C and Install LDES
8	x	Test and Commission Site 1C LDES
9		Operation of LDES with Grid
10	x	Measurement and Verifications
11		Evaluation of Project Benefits
12		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CCI	California Climate Investments ²
CEC	California Energy Commission
Commissioning	Full charge and discharge of the installed energy storage system with a capacity of 3.6 MW for 8 hour duration
CPR	Critical Project Review
Energy Center	145 kW iron flow energy storage system manufactured by ESS Tech Inc.
EPC	Engineering, Procurement and Construction
GGRF	Greenhouse Gas Reduction Fund
GHG	Greenhouse Gas
Grid	Bulk Energy System
kV	Kilovolt
LDES	Long Duration Energy Storage

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
Sacramento Municipal Utility District

Acronym/Term	Meaning
M&V	Measurement and Verifications
MW	Megawatt
MWh	Megawatt Hour
Recipient	Sacramento Municipal Utility District
RFP	Request For Proposal
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

Funding for the Long Duration Energy Storage (LDES) program comes 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 the demonstration of an emerging iron flow battery technology for LDES. Sacramento Municipal Utility District (the Recipient) will partner with ESS Tech, Inc. to deploy and test their iron-flow energy storage batteries for use in the Recipient's service territory.

B. Problem/ Solution Statement

Problem

In 2021, the Sacramento Municipal Utility District Board of Supervisors adopted the 2030 Zero Carbon Plan which set a goal of zero carbon emissions in its power supply by 2030. As the Recipient moves forward with this goal, they will have to transition away from thermal plants and there will be a need for LDES. LDES enables the Recipient to store and access affordable power and provide reliable and environmentally friendly energy solutions such as wind and solar that tends to be intermittent in nature. With temperatures reaching 116 degrees in 2023 in the Sacramento region, additional battery solutions are needed to keep the grid reliable.

Solution

The Recipient will partner with ESS Tech Inc. to deploy 3.6 megawatt (MW) of ESS Tech Inc.'s Energy Centers that use iron flow battery technology and evaluate the technology's capabilities to support the Recipient's need for resource adequacy, energy arbitrage and renewable support. Twenty-five (25) Energy Centers will be deployed. The ESS technology adopts a redox process using iron electrolyte solution made of easily sourced materials. This technology is safer than lithium-ion and has a low flammability. Deploying and demonstrating the iron flow battery technology will allow the Recipient to conduct a series of tests to evaluate the LDES performance. This will allow the Recipient to determine the best uses for the LDES with the hope of eventually being competitive on cost and performance relative to lithium-ion batteries for 8-hour duration and longer.

Exhibit A

Scope of Work

Sacramento Municipal Utility District

The project will be built in two phases, both at the Hedge Solar Facility. The first phase will consist of the construction and deployment of 1.8 MW of Energy Centers at Site 1B and the second phase will consist of the building of the remaining 1.8 MW of Energy Centers at Site 1C. Sites 1B and 1C correspond to the different phases of the project at the same location.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Demonstrate LDES ability to increase the opportunity for California to have more and different battery technologies and resources that can potentially be more cost competitive than traditional Lithium-ion technologies in longer duration systems of 8 hours and above.
- Demonstrate LDES functionality and reliability to support the distribution system.
- Demonstrate LDES ability to support the transmission system.

Ratepayer Benefits: This Agreement will result in ratepayer benefits by reducing capacity needs and enabling energy arbitrage through the demonstration. By verifying performance through the reliability and capability of LDES battery system, we can overlay modeled results from resource planning to determine reduced needs for renewables curtailment or increase the ability to host renewables.

Technological Advancement and Breakthroughs: This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by evaluating the reliability and use cases to assist the emerging LDES systems to evolve into commercial ready systems. ESS Tech, Inc. will benefit from partnering with the Recipient as they further develop and improve their battery system through our test periods.

Agreement Objectives

The objectives of this Agreement are to:

- Design and construct a site at the Recipient's Hedge Solar Facility for the deployment of two LDES systems.
- Install and commission a 3.6 MW, 8-hour battery system at the Recipient's Hedge Solar Facility.
- Provide metrics to measure and track for LDES with regard to GHG emission reduction in alignment with the Greenhouse Gas Reduction Fund (GGRF).
- Demonstrate, through use case testing, the battery capabilities and how best to utilize the technology for the grid. The use cases will include, but are not limited to:
 - System Specifications Verification Tests
 - Basic Functional Characterization Tests
 - Duty Cycle Performance Tests
 - Functional Capability Evaluation

Exhibit A
Scope of Work
Sacramento Municipal Utility District

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.

Exhibit A

Scope of Work

Sacramento Municipal Utility District

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, and other CEC staff relevant to the Agreement. The Recipient's Project Manager and any other individuals deemed necessary by the CAM or the Project Manager shall participate in 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., Teams, Zoom), with approval of the CAM.

The Kick-off meeting will include discussion of the following:

- The CAM's expectations for accomplishing tasks described in the Scope of Work;
- An updated Project Schedule;
- Terms and conditions of the Agreement;
- Invoicing and auditing procedures;
- Travel;
- Equipment purchases;

Exhibit A
Scope of Work
Sacramento Municipal Utility District

- Administrative and Technical products (subtask 1.1);
 - CPR meetings (subtask 1.3);
 - Monthly Calls (subtask 1.5)
 - Quarterly Progress reports (subtask 1.6)
 - Final Report (subtask 1.7)
 - Match funds (subtask 1.8);
 - Permit documentation (subtask 1.9);
 - Subawards (subtask 1.10);
 - Technical Advisory Committee (TAC) meetings (subtasks 1.11 and 1.12);
 - Agreement changes;
 - Performance Evaluations; 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 Commission Agreement Officer 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 may be reallocated to cover the additional costs borne by the Recipient, but the overall Agreement

Exhibit A

Scope of Work

Sacramento Municipal Utility District

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 may 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. A determination of unsatisfactory progress This may result in project delays, including a potential Stop Work Order, while the CEC determines whether the project should continue.
- 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.

Exhibit A
Scope of Work
Sacramento Municipal Utility District

- The administrative portion of the meeting will involve a discussion with the CAM 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* organized by the tasks in the Agreement.

Products:

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

MONTHLY CALLS, REPORTS AND INVOICES

Subtask 1.5 Monthly Calls

The goal of this task is to have calls at least monthly between the CAM and Recipient to verify that satisfactory and continued progress is made towards achieving the objectives of this Agreement on time and within budget.

The objectives of this task are to verbally summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, to verify match funds are being proportionally spent concurrently or in advance of CEC funds or are being spent in accordance with an approved Match Funding Spending Plan, to form the basis for determining whether invoices are consistent with work performed, and to answer any other questions from the CAM. Monthly calls might not be held on those months when a quarterly progress report is submitted or the CAM determines that a monthly call is unnecessary.

The CAM shall:

- Schedule monthly calls.
- Provide questions to the Recipient prior to the monthly call.
- Provide call summary notes to Recipient of items discussed during call.

The Recipient shall:

- Review the questions provided by CAM prior to the monthly call
- Provide verbal answers to the CAM during the call.

Product:

- Email to CAM concurring with call summary notes.

Subtask 1.6 Quarterly Progress Reports and Invoices

Exhibit A

Scope of Work

Sacramento Municipal Utility District

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 *Quarterly 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 reporting period, 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. Progress reports are due to the CAM the 10th day of each January, April, July, and October. The Quarterly Progress Report template can be found on the ECAMS Resources webpage available at: <https://www.energy.ca.gov/media/4691>
- Submit a monthly or quarterly *Invoice* on the invoice template(s) provided by the CAM.

Recipient Products:

- Quarterly Progress Reports
- Invoices

CAM Product:

- Invoice template

Subtask 1.7 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 1.7.1 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 Products:

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

Subtask 1.7.2 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:

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- 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 /Summary table that includes the following information, but not limited to (**required**):
 - Recipient name;
 - Project description;
 - Project location(s);
 - Census tract;
 - Dates: project selected and completed;
 - GGRF dollars allocated;
 - Leveraged and/or match funds;
 - Estimated/actual total project GHG emission reductions;
 - Estimated/actual energy saved (kWh, therms, or other fuels) for energy efficiency projects;
 - Estimated/actual energy generated (kWh or therm equivalents) for renewable energy projects;
 - Other benefits or results;
 - Other market sectors that can benefit from the project;
 - Benefits to priority populations;
 - 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.

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- 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 SUBAWARDS

Subtask 1.8 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 application 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 application 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.

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Products:

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

Subtask 1.9 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 1.10 Subawards

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

The Recipient shall:

- Manage and coordinate subrecipients activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subaward.

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- Include any required Energy Commission flow-down provisions in each subaward, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subaward terms.
- If requested by the CAM, submit a draft of each *Subaward* required to conduct the work under this Agreement.
- If requested by the CAM, submit a final copy of each executed subaward.
- Notify and receive written approval from the CAM prior to adding any new subrecipient (see the terms regarding of subrecipient additions in the terms and conditions).

Products:

- Subawards (*if requested by the CAM*)

TECHNICAL ADVISORY COMMITTEE

Subtask 1.11 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 ensure 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;

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- 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 1.12.
- 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 1.12 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.

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- 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 ensure 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 1.13 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

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IV. TECHNICAL TASKS

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

TASK 2: DEVELOP CONSTRUCTION DOCUMENTATION FOR SITES 1B AND 1C

The goal of this task is to develop a Request for Proposal (RFP) and select an Engineering, Procurement and Construction (EPC) contractor to provide engineering drawings such as, but not limited to, civil, electrical, and structural.

The Recipient shall:

-
- Award EPC Contract:
 - Develop *EPC RFP* that will include: General Condition, Technical Conditions, and Specific Conditions.
 - Send RFP out to bid
 - Review bid package, choose top bidder, negotiate contract and award *EPC Contract*
 - Deliver *Notice to Proceed* to the selected EPC contractor.
-
- Develop and submit *Construction Drawings* for review. Includes but not limited to the following:
 - Drawings and specifications for the LDES systems build out
 - Construction and interconnection schedule
 - Internal Recipient review and approval.
- Prepare a draft and final *Design Report* that includes but is not limited to the following:
 - Schematic and integration details
 - Electrical design
 - System Documentation
 - LDES system documentation of capabilities and technical performance of the battery management system
- Prepare a *Design Report Presentation* (PowerPoint) which will include next steps for the site construction and the installation of the LDES system.

Products:

- EPC RFP
- EPC Contract
- Notice to Proceed
- Construction Drawings
- Design Report (Draft and Final)
- Design Report Presentation

TASK 3: PROCURE EQUIPMENT AND MATERIALS FOR SITES 1B AND 1C LDES SYSTEMS

The goal of this task is to procure, track and manage logistics for the delivery of the 3.6 MW/28.8 megawatt-hour (MWh) LDES system to the demonstration site.

The Recipient shall:

- Coordinate delivery of the LDES systems to the project demonstration site

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- Confirm and document receipt of the LDES systems to project demonstration site by preparing a *LDES System Receipt Documentation* for the two phases of build.
- Develop and submit *Supplier Specific Payment Schedule* for written approval by CAM reflecting a milestone process for purchasing the LDES systems and associated equipment. This will include an explicit schedule for reimbursement of specific retention costs.
- Prepare CPR Report # 1 and participate in CPR Meeting, per subtask 1.3. Report shall also include:
 - Equipment and materials purchase orders.

Products:

- LDES System Receipt Documentation (for the first phase of build)
- LDES System Receipt Documentation (for the second phase of build)
- Supplier Specific Payment Schedule
- CPR 1 Report

TASK 4: CONSTRUCT SITE 1B AND INSTALL LDES SYSTEMS

The goal of this task is to fully prepare and construct site 1B and install the first half of the LDES systems, which is 1.8 MW/14.4 MWh. This work will be done up to the point of commissioning.

The Recipient shall:

- Complete civil, electrical, structural, fire suppression system and site work needed to receive and place the LDES battery systems and prepare a *Site 1B Completion Report* showing that the site is ready for LDES system installation.
- Install all equipment at the demonstration site, including but not limited to the LDES battery systems, controls, and power plant controller, and prepare a *Site 1B System Readiness Report* with information that shows the LDES systems are ready for mobilization, Task 5 test and commissioning.
- Complete interconnection of a new 12 kilovolt (kV) switchgear to the existing 12 kV distribution feed at the site and prepare a *Site 1B Interconnection Report* that shows the site is interconnected and energized.

Products:

- Site 1B Completion Report
- Site1B System Readiness Report
- Site 1B Report Interconnection Report

TASK 5: TEST AND COMMISSION SITE 1B LDES SYSTEMS

The goal of this task is to test each component of the battery system including the LDES systems, power plant controller and battery management system individually and then as a complete system.

The Recipient shall:

- Develop an *LDES Site Acceptance Testing and Commissioning Plan* for the following subsystems and system verification tests for both sites 1B and 1C:
 - Battery capacity check
 - Remote communications

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- Data system
- Controls
- Execute the LDES Site Acceptance Testing and Commissioning Plan and create a *Site 1B Project Performance Report* including the following:
 - Results of subsystems and system verification tests
 - Battery capacity check
 - Remote communications
 - Data system
 - Controls
 - Site Acceptance Testing results for each subsystem as indicated.
 - Test results of full system performance verification
- Assume ownership of all systems, equipment, and materials upon verification of successful systems commissioning and project operation
- Provide a *Release to Operations Checklist*
- Prepare *CPR Report #2* and participate in CPR Meeting, per subtask 1.3

Products:

- LDES Site Acceptance Testing and Commissioning Plan
- Site 1B Project Performance Report
- Release to Operations Checklist
- CPR Report # 2

TASK 6: PLAN FOR SITE 1B LDES OPERATION WITH GRID

The goals of this task are to develop and execute an Operations and Maintenance plan and supporting documentation for handoff to Operations.

The Recipient shall:

- Develop a draft and final *Operation & Maintenance Plan* for both sites 1B and 1C, to support the following activities
 - Handoff to system operations
 - Operational Guidelines
 - BESS optimization and operation
 - Operational Data Management
 - Routine Maintenance
 - Environmental, performance, and safety reporting
 - Operations coordination with Maintenance
 - Operator training
 - Incident preparedness and response
 - Safety protocols during operation, shutdown, maintenance, and restart
- Meet with the Distribution System Operators to verify Site 1B system will be operated according to the Operation and Maintenance Plan and prepare a *Distribution Systems Operations Meeting Summary (Site 1B)* to summarize the discussion, recommendations and meeting notes.

Products:

- Operation & Maintenance Plan (draft and final)
- Distribution Systems Operations Meeting Summary (Site 1B)

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TASK 7: CONSTRUCT SITE 1C AND INSTALL LDES SYSTEMS

The goal of this task is to fully prepare and construct site 1C and install the second half of the LDES systems, which is 1.8 MW/14.4 MWh. This work will be done up to the point of commissioning.

The Recipient shall:

- Construction: Complete civil, electrical, structural, fire suppression system and site work needed to receive and place the LDES battery systems, and prepare a *Site 1C Completion Report* showing that the site is ready for LDES system installation
- Install all equipment at the demonstration site including but not limited to the LDES battery systems, controls, and power plant controller, and prepare a *Site 1C System Readiness Report* with information that shows the LDES systems are ready for mobilization, Task 5 test and commissioning.

Products:

- Site 1C Completion Report
- Site 1C System Readiness Report

TASK 8: TEST AND COMMISSION SITE 1C LDES SYSTEMS

The goal of this task is to test each component of the battery system including the LDES systems, power plant controller and battery management system individually and then as a complete system.

The Recipient shall:

- Execute the LDES Site Acceptance Testing and Commissioning Plan developed in Task 5, and create a *Site 1C Project Performance Report* including the following:
 - Results of subsystems and system verification tests
 - Battery Capacity Check
 - Remote Communications
 - Data System
 - Controls
 - Site Acceptance Testing results for each subsystem as indicated.
 - Test results of full system performance verification
 - Assume ownership of all systems, equipment, and materials upon verification of successful systems commissioning and project operation
- Provide a Release to Operations Checklist
- Prepare *CPR Report #3* and participate in CPR Meeting, per subtask 1.3

Products:

- Site 1C Project Performance Report
- Release to Operations Checklist
- CPR Report #3

TASK 9: PLAN FOR SITE 1C LDES OPERATION WITH GRID

The goal of this task is to handoff the LDES systems to Operations using the same products listed in Task 6.

The Recipient shall:

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- Meet with the Distribution System Operators to verify Site 1C system will be operated according to the Operations and Maintenance Manual developed for Site 1B, and prepare a *Distribution Systems Operations Meeting Summary (Site 1C)* to summarize the discussion, recommendations and meeting notes.

Products:

- Distribution Systems Operations Meeting Summary (Site 1C)

TASK 10: MEASUREMENT AND VERIFICATION

The team will measure and verify the performance of the LDES systems at both Site 1B and Site 1C, and compare to projected performance. The goal of this task is to report the achievements resulting from this project by performing measurement and verification (M&V) of GHG and energy consumption reduction.

The Recipient shall:

- Enter into an agreement with M&V subcontractor per Task 1.10 (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.
- Prepare and provide a detailed *M&V Plan* for each project demonstration site to include but not be limited to:
 - A description of the monitoring equipment and instrumentation which will be used.
 - A description of the key input parameters and output metrics that will be measured.
 - A description of the M&V protocol, analysis, and collection methods to be employed.
 - A data collection schedule.
 - A description of the independent, third-party M&V services to be employed, if applicable.

Additionally, for each project demonstration site, the M&V Plan shall support the following use cases testing activities:

- System Specification Verification Tests
 - Available energy capacity, charge duration, rated continuous power, aux load, round trip efficiency
- Basic Functional Characterization Testing
 - Self-discharge rate, startup and shutdown time, response, rise, and settling time, synchronization, harmonic distortion
- Duty Cycle Performance Testing
 - Charge/Discharge management, peak load reduction, load and generation following, voltage and frequency ride-through, volt-var regulation
- Functional Capability Evaluation
 - Autonomous frequency regulation, peak power limiting, power smoothing, maximum generation limiting, power factor

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- Perform three months (or a shorter period as approved in writing by the CAM) of preinstallation measurements (and calculations) based on the M&V protocol for preinstallation.
- 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 1.6) 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 and provide a *Post-Installation M&V Findings Report* for each demonstration site that includes M&V protocol, pre and post-install measurements (and calculations), analysis, and results performed in this task. 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.
- 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.
- Report GGRF benefits per the frequency and metrics listed in the terms and conditions and as provided by the California Air Resources Board guidance.
- Prepare *CPR Report #4* and participate in CPR Meeting, per subtask 1.3.
- Participate in a CPR meeting.

Products:

- M&V Plan (*draft and final*)
- Pre-Installation M&V Findings Report (*draft and final*)
- Post-Installation M&V Findings Report(s) (*draft and final*)
- GGRF Benefits Report(s)
- CPR Report #4

TASK 11: EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

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- 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 \(www.energizeinnovation.fund\)](http://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 \(www.energizeinnovation.fund\)](http://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 12: 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.

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- 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 annual EPIC symposium(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.