California Energy Commission
June 22, 2026 Business Meeting
Backup Materials for The Regents of the University of California, on behalf of its San Diego campus

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

CALIFORNIA ENERGY COMMISSION

PROPOSED RESOLUTION: The Regents of the University of California, on behalf of its San Diego campus

RESOLUTION NO: 26-0622-XX

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

RESOLVED, that the CEC approves Agreement EPC-25-054 with The Regents of the University of California, on behalf of its San Diego campus for an $8,484,515 grant. This project will fund the demonstration of a medium-voltage grid connected solid-state transformer (SST) system to enable accelerated, flexible interconnection of an 800-volt direct current (VDC) power architecture data center and the development of a flexible compute load capacity tool; and

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

APPROVED AND ADOPTED this 22 day of June 2026, by the following vote:

AYE:
NAY:
ABSENT:
ABSTAIN:

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 approved and adopted by affirmative vote of the CEC at a meeting held on June 22, 2026.

Kim Todd
Secretariat

STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

CEC-270 (Revised 01/2026)

GRANT REQUEST FORM (GRF)

A. New Agreement Number

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

New Agreement Number: EPC-25-054

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Zoe Marshall
3. MS-:43
4. Phone Number: 916-931-5128

C. Recipient's Information

1. Recipient's Legal Name: The Regents of the University of California, on behalf of its San Diego campus

D. Title of Project

Title of project: Accelerating Grid-Interactive, Flexible Data Centers in California

E. Term and Amount

1. Start Date: 6/30/2026
2. End Date: 7/31/2030
3. Amount: $8,484,515.00

F. Business Meeting Information

1. Are the ARFVTP agreements $75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 6/22/2026 .
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Sebastian Rubio Ruiz
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: Electric Program Investment Charge (EPIC)

Project Description:

The Regents of the University of California, on behalf of its San Diego campus. Proposed resolution approving agreement EPC-25-054 with The Regents of the University of California, on behalf of its San Diego campus for an $8,484,515 grant and adopting staff's recommendation that this action is exempt from CEQA. This project will fund the demonstration of a medium-voltage grid connected solid-state transformer (SST) system to enable accelerated, flexible interconnection of an 800-volt direct current (VDC) power architecture data center and the development of a flexible compute load capacity tool. (EPIC funding) Contact: Zoe Marshall

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 ;

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, §15301, provides that projects which consist of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public and private structures, facilities, mechanical equipment, or topographical features, and which involve negligible or no expansion of use beyond that at the time of the lead agency's determination, are categorically exempt from CEQA. The physical aspects of this work will involve electrical system upgrades and installation of new high-voltage transformers immediately adjacent to an existing building that houses a data center and within the same vicinity of existing energy infrastructure that includes switchgear, transformers, electric chillers, and backup generators. Two new 1.2MW solid-state transformers will be installed and will be interconnected directly to existing 12 kV switches. The use of the existing structure remains the same and the equipment does in change the use of the facility.
For these reasons, the proposed work involves negligible or no expansion of use, will not have any significant effect on the environment, and is exempt from CEQA under Cal. Code Regs., tit. 14, §15301.

California Code of Regulations, tit. 14, §15303, provides that projects which consist of the 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

CEQA. This project will install new transformers located immediately adjacent to an existing building that houses a data center and within the same vicinity of existing energy infrastructure that includes switchgear, transformers, electric chillers, and backup generators. A new concrete pad, roughly 16’ x 16’ will need to be laid and the transformers will be installed on the pad. Minor trenching will be necessary to install a new underground electrical conduit. For this reason, the project will consist of the installation of a small structure, will not have a significant effect on the environment, and is categorically exempt from CEQA under California Code of Regulations, tit. 14, §15303.

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**
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”?

Yes

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
.Alderbuck Energy, Inc.	$ 2,618,092	**$**2,566,839
San Diego Gas & Electric Company	$ 652,963	**$**0
Emerald AI, Inc.	$ 95,000	$200,000
Good for Others Foundation	$ 90,000	**$**0

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
San Diego Supercomputer Center	**$**1,670,000	**$**0

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.

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	23-24	301.001K	$ 4,439,788
EPIC	25-26	301.001M	$ 4,044,727

TOTAL Amount: $ 8,484,515

R&D Program Area: ESTB: ETSI

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: 101 Local Assistance

M. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: William Vaughan

Address: 9500 Gilman Dr

City, State, Zip: La Jolla, CA 92093-0411

Phone:

E-Mail: wvaughan@ucsd.edu

2. Recipient's Project Manager

Name: Sasha Doppelt

Address: 9500 Gilman Dr

City, State, Zip: La Jolla, CA 92093-0411

Phone:

E-Mail: sdoppelt@ucsd.edu

N. Selection Process Used

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

Selection Process	Additional Information
Competitive Solicitation #	GFO-24-312
First Come First Served Solicitation #	Not applicable
Other	Not applicable

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	No
5	Awardee CEQA Documentation	No

Approved By

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

Agreement Manager: Zoe Marshall

Approval Date: 5/13/2026

Branch Manager: Reynaldo Gonzalez

Approval Date: 5/13/2026

Deputy Director: Johan Steinback delegated to Branch Manager

Approval Date: 5/13/2026

Exhibit A
Scope of Work
The Regents of the University of California, on behalf of its San Diego campus

I. TASK AND ACRONYM/TERM LISTS

A. Task List

Task #		
1		General Project Tasks
2		Build Flexible Load Capacity Tool Using Real-World Data Center Load Profiles
3	X	SST Construction and Utility Scale Testing
4		Installation and Integration of SST and High-Resolution PQ Meters
5	X	Full Scale Demonstration of SST Data Center Flexibility and Reliability with Load Management Software
6		Utility Assessment, Modeling, and Planning Impact of Flexible High Power Data Centers
7		Workforce Development Program for Data Center Jobs
8		Evaluation of Project Benefits
9		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
AC	Alternating Current
AI	Artificial Intelligence
BESS	Battery Energy Storage System
CA	California
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CBO	Community Based Organization
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPUC	California Public Utilities Commission
CPR	Critical Project Review
DC	Direct Current
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management System
DR	Demand Response
EMI	Electromagnetic Interference
EMS	Energy Management System
EPIC	Electric Program Investment Charge
FAT	Factory Acceptance Testing

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

Exhibit A
Scope of Work
The Regents of the University of California, on behalf of its San Diego campus

Acronym/Term	Meaning
GFOF	Good for Others Foundation (CBO)
GHG	Greenhouse Gas
GPU	Graphics Processing Unit
HVDC	High Voltage Direct Current
IEEE	Institute of Electrical and Electronics Engineers
IOU	Invested-Owned Utility
LLM AI	Large Language Model Artificial Intelligence
M&V	Measurement & Verification
MVAC	Medium Voltage Alternating Current
MW	Megawatt
MWh	Megawatt-hour
NLI	Natural Language Interface
PQ	Power Quality
R&D	Research & Development
SDG&E	San Diego Gas & Electric
SST	Solid State Transformer
TAC	Technical Advisory Committee
TEA	Techno-Economic Analysis
THD	Total Harmonic Distortion
TRL	Technology Readiness Level
UCSD	University of California, San Diego
UL	Underwriters Laboratory
UPS	Uninterruptible Power Supply
VDC	Volts Direct Current

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the demonstration of a medium-voltage grid connected solid-state transformer (SST) system to enable accelerated, flexible interconnection of an 800-volt direct current (VDC) power architecture data center and the development of a flexible compute load capacity tool.

B. Problem/ Solution Statement

Problem

California's investor-owned utilities (IOUs) face accelerating load growth and service requests to power large DC loads such as electric vehicle (EV) charging infrastructure, data centers, and industrial loads. Large load additions can require local distribution upgrades that may require

extended amounts of time to construct. Further, utilities have limited visibility and controllability of these large, rapidly varying loads, potentially impacting distribution system reliability. New advanced technologies that enable more optimal use of existing distribution capability and support system stability are critical. More efficient, compact, and cost-effective solutions must be implemented now because AI load growth in California is projected to reach 2.5 - 4 gigawatts (GW) by 2035.[2] Without field validated solutions, utilities will continue to rely on traditional AC-based solutions which will delay buildout, incur greater cost, and slow decarbonization efforts.

Solution

This project will demonstrate an SST-based 800 V DC power architecture at scale. The SST directly converts 12 kV AC to 800 V DC in a compact, modular package, eliminating multiple conversion stages typical of 480 V AC systems. Using high-efficiency silicon carbide power electronics, embedded telemetry, and bidirectional control, the technology improves energy efficiency, enhances visibility, and provides voltage and power-flow management that support flexible interconnection and greater utilization of existing distribution capacity.

The joint utility-customer demonstration will provide the first California field validation of a medium-voltage-connected SST and digital control solution. Conducted in partnership with an IOU at an operational data center site, the project will generate real-world data on conversion efficiency, voltage regulation, and grid interoperability. The project builds a dynamic flexible load capacity tool built on a Hardware-in-the-loop (HIL)/ Controller-Hardware-in-the-loop (CHIL) platform. It will fill planning gaps by generating utility-verified operational data on voltage support, ride-through, bidirectional power flow and controllability with respect to large variable load, while providing a validated modeling environment. Integrating real performance data with an advanced emulator-based planning tool enables utilities to accurately evaluate, interconnect, and manage next-generation large DC loads and unlock meaningful ratepayer benefits. These results will inform utility planning tools, interconnection procedures, and standards development for broader adoption across data centers, EV charging infrastructure, and industrial DC loads. The project will advance SSTs toward commercial readiness and address key protection and safety knowledge gaps that currently limit adoption while providing IOUs with a proven pathway to expand hosting capacity, improve distribution visibility, and defer costly infrastructure upgrades through more efficient and controllable large-load interconnections.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Demonstrate a medium voltage interconnected 800 VDC data center power architecture using an SST to validate streamlined interconnection, increased efficiency, and reduced electrical footprint for high-density AI compute facilities.

[2] CEC Data Center Load Forecasts 2024-2040 Presentation (10/21/2024)

- Establish a dynamic flexible compute load capacity tool to help California IOUs improve distribution upgrade deferral frameworks and cost-benefit analysis To expand hosting capacity and improve grid reliability, the tool will demonstrate advanced telemetry, voltage regulation, and bidirectional control functions that enhance visibility and controllability of large, rapidly varying loads.
- Establish HIL and CHIL platform interfaces to simulate the performance of the proposed SST-based 800 VDC architecture against AI data center load profiles to de-risk field operations.
- Advance the commercial readiness of the higher voltage DC architectures through an extended operational period, generating data to inform interconnection standards, grid-planning models, standards, and certifications.
- Reduce data center energy use, capital cost, and ratepayer impacts by validating a more compact, efficient, and interoperable power-conversion chain that supports decarbonization.
- Produce technical and economic performance data through extended field operations, including documentation of installation issues, operational constraints, and operational performance
- Identify core skillsets and create career pathway map to support a skilled engineering workforce in California.

Ratepayer Benefits:[3]

This Agreement will result in the ratepayer benefits of greater electricity reliability and lower costs by demonstrating a more efficient and flexible method for interconnecting and managing large new DC loads on California's electric grid. The SST-based 800 VDC power architecture is anticipated to reduce power conversion chain losses by 4 percent, reduce power equipment footprint by more than 50 percent, accelerate installation timelines, and improve voltage regulation through direct medium-voltage conversion and embedded digital control. These capabilities allow utilities to interconnect large loads more quickly and make fuller use of existing distribution infrastructure through increased visibility and controllability. The project can inform planning, potentially delaying and/or reducing the need for costly transformer and feeder upgrades that would otherwise be recovered through customer rates. By enabling higher hosting capacity on existing feeders and improving power quality, the project supports more reliable service for all customers.

The project will also improve safety and operational visibility by integrating advanced telemetry and control compliance with Institute of Electrical and Electronics Engineers (IEEE) 2030.5, Underwriter's Laboratory (UL) and California Public Utilities Commission's (CPUC) Rule 21 standards, allowing utilities and users to monitor and manage power flow, detect faults, and

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

coordinate protection in near-real time. Field validation of these capabilities under actual operating conditions can inform new interconnection standards and grid-protection practices, reducing technical and financial risks of future deployments. Collectively, these benefits will help California ratepayers by lowering long-term system costs, improving service continuity, and supporting a more resilient, efficient, and decarbonized grid.

Technological Advancement and Breakthroughs:[4]

This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals. Through a collaborative partnership between a California IOU, researchers, a technology provider, and data center end-user, this project will implement the first ever at-scale demonstration of an SST including utility assessment and collection of extended operational data. This project directly addresses California's grid modernization and load integration challenges by enabling faster, more cost-effective, and more efficient interconnection of new large loads. SST technologies can reduce the number of power conversion stages, consolidate multiple bulky pieces of equipment into a compact, high-efficiency product, and leverage a modular and scalable design. Through demonstration of advanced telemetry, voltage regulation, and bidirectional control, SST technologies expand California's IOUs capability to treat large loads as flexible, grid-supportive resources - directly addressing system visibility, load shift, and distribution-level situational awareness. This reduces the need for distribution system upgrades by increasing existing distribution system hosting capacity, advancing the state's objectives to optimize existing grid assets and defer ratepayer-funded infrastructure expansions.

Agreement Objectives

The objectives of this Agreement are to:

- Demonstrate a utility-interconnected 12 kV AC to 800 VDC SST system serving 2 MW of data center load and conduct extended testing to validate performance, safety, and interoperability under real-world operating conditions.
- Validate the performance of the SST-based 800 VDC architecture in real-time HIL/CHIL simulations and demonstrate less than 5 percent model error on key electrical parameters, less than ±15 percent improvement in hosting capacity forecasts for 2 MW data center load profiles, and mitigation of at least two operational risks prior to field deployment, with results documented in a Model Verification Plan and operational brief.
- Achieve 4 percent efficiency improvement, greater than 50 percent power equipment footprint reduction, 50 percent reduction in installation timeline, and more than 20 percent cost reduction through the streamlined SST-based DC architecture relative to conventional 480 V AC systems.
- Conduct utility SST testing and exceed IEEE 1547 grid-support capabilities including voltage regulation, power-quality performance, performance against grid disturbances.

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

- Demonstrate 0 to100 percent load curtailment in under one minute using IEEE 2030.5-compliant telemetry and bidirectional control.
- Satisfy safety, protection, and interoperability requirements by performing field-based tests aligned with UL standards and Rule 21 expectations for MV-connected power electronics.
- Assess the potential to defer distribution upgrades by measuring SST impacts on feeder loading, peak demand, and flexible interconnection in collaboration with the utility partner, demonstrating that data center load can be curtailed on signal through automated telemetry and dispatch.
- Develop data-driven models and decision-support tools for IOU planners including SST performance profiles, flexible-load modeling, to support replication and future grid planning.
- Quantify potential hard and soft cost benefits of grid-interactive data center loads for ratepayers with linkage to ongoing improvement efforts in grid modernization plans and the project's alignment with planning processes and the CPUC.

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, 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;
  - 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 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 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 may 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 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 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.
  - 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

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:
    - Cover page (**required**)
    - Credits page on the reverse side of cover with legal disclaimer (**required**)

- Acknowledgements page (optional)
- Preface (**required**)
- Abstract, keywords, and citation page (**required**)
- Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
- Executive summary (**required**)
- Body of the report (**required**)
- References (if applicable)
- Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
- Bibliography (if applicable)
- Appendices (if applicable) (Create a separate volume if very large.)
- Attachments (if applicable)

- 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 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 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. 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.

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 Obtain and Execute Subawards and Agreements with Site Hosts

The goals of this subtask are to: (1) procure and execute subrecipients and site host agreements, as applicable, required to carry out the tasks under this Agreement; and (2) ensure that the subrecipients and site host agreements are consistent with the Agreement terms and conditions and the Recipient's own contracting policies and procedures.

The Recipient shall:

- Execute and manage subawards and coordinate subrecipients activities in accordance with the requirements of this Agreement.
- Execute and manage site host agreements and ensure the right to use the project site throughout the term of the Agreement, as applicable. A site host agreement is not required if the Recipient is the site host.
- Notify the CEC in writing immediately, but no later than five calendar days, if there is a reasonable likelihood the project site cannot be acquired or can no longer be used for the project.

- Incorporate this Agreement by reference into each subaward.
- 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.
- Submit a *Subaward and Site Letter* to the CAM describing the subawards and any site host agreement needed or stating that no subawards or site host agreements are required.
- If requested by the CAM, submit a draft of each *Subaward* and any *Site Host Agreement* required to conduct the work under this Agreement.
- If requested by the CAM, submit a final copy of each executed *Subaward* and any *Site Host Agreement*.
- Notify and receive written approval from the CAM prior to adding any new subrecipient (see the terms regarding subrecipient additions in the terms and conditions).

Products:

- Subaward and Site Letter
- Draft Subawards *(if requested by the CAM)*
- Draft Site Host Agreement *(if requested by the CAM)*
- Final Subawards *(if requested by the CAM)*
- Final Site Host Agreement *(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;
- 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* for each TAC Meeting 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 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

IV. TECHNICAL TASKS

TASK 2: BUILD FLEXIBLE LOAD CAPACITY TOOL USING REAL-WORLD DATA CENTER LOAD PROFILES

The goals of this task are to develop a flexible compute load capacity tool through development of HIL models of the SST power stages and high frequency switching dynamics of the silicon carbide switches and to establish a data center power electronics model that can capture the harmonics introduced due to power electronic components in the data centers. The tool will be used to evaluate the grid interactive data center flexibility for increasing the hosting capacity of the local distribution feeder, as well as power demand visibility and controllability.

The Recipient shall:

- Develop a complete model of the SST based on the project design specifications which covers all power stages including 12kV AC to MV DC, dual bridge to convert MV DC to lower voltage direct current (LV DC) with an intermediate LV AC stage and galvanic isolation.
- Prepare a *Modeling Design Brief* on the HIL model of the SST including its capabilities and limitations.
- Establish the analog and digital communication interface between the SST controller and the HIL field-programmable gate array (FPGA) simulator.

- Deploy data center load management software at the DER.
- Connect Distributed Energy Resource Management Systems (DERMS) and interface with the SST controller over the IEEE 2030.5 protocol. DERMS will be used for the orchestration of Battery Energy Storage System (BESS), and EVs.
- Establish communication between the DERMS, SST controller, and the utility partner's IEEE 2030.5 server.
- Develop a dynamic data center model using the existing AC architecture at the data center partner facility and future 800 VDC architecture where graphics processing units (GPUs) are modeled as individual components with power electronics switches.
- Prepare a draft *Model Verification Plan* consisting of three scenarios for HIL testing that represents the (i) existing AC data center architecture, (ii) proposed SST based 800 VDC architecture at the data center partner facility and, (iii) future expansion of the proposed architecture leveraging SST modules, to demonstrate load flexibility, and deferred infrastructure upgrades.
- Submit the draft *Model Verification Plan* to the CAM for feedback and incorporate changes as requested in the *Final Model Verification Plan.*
- Validate the performance of the SST controller in controller HIL simulations in the three case scenarios mentioned above before deployment at the data center partner facility.
- Prepare a *Brief on Flexible Load Capacity Tool Results and Capabilities* detailing the results of the HIL simulations based on the three scenarios within the established model.

Products:

- Modeling Design Brief
- Model Verification Plan (draft and final)
- Brief on Flexible Load Capacity Tool Results and Capabilities

TASK 3: SST CONSTRUCTION AND UTILITY SCALE TESTING

The goals of this task are to engineer and construct the SST with control hardware and software and evaluate the SST at a utility-scale laboratory. Key outcomes of this task are validation that 1) the SST meets defined requirements for operation and communication per utility and the data center partner requirements, 2) the system is ready for full-scale deployment and demonstration in Tasks 4 and 5 respectively, which includes preparing a preliminary techno-economic analysis (TEA) of the SST 800 VDC implementation versus conventional AC distribution power chain.

The Recipient shall:

- Formalize requirements and specifications of physical, electrical, operational, and safety specifications of the SST and control functionality necessary for utility-scale testing and site integration.
- Prepare and submit an *SST Design and Specifications Package* which includes but is not limited to:
    - SST physical specifications, system functional control, and user interface diagrams including utility, SST, AI load, and DC bus connected energy storage.

    - A list and review of power hardware and controller certifications and standards for the system to demonstrate safety, reliability, flexibility, and 2030.5 interoperability between the utility and the data center partner.
- Manufacture (1) one SST block (12-kV class, 1.2 MW, 800 VDC output) for utility-scale lab testing and (2) two SST blocks (12-kV class, 2.4 MW, 800 VDC output) for installation at data center partner facility.
- Conduct Factory Acceptance Testing (FAT) for the SST.
- Prepare draft *SST Utility Lab Evaluation Plan* for utility-grade testing of the SST hardware and control system, which will include but is not limited to:
    - Operational and safety procedures.
    - Tests to be conducted.
    - Performance metrics.
    - Measurement tools for verification.
- Submit the Draft SST Utility Lab Test Plan to the CAM for feedback and incorporate changes as requested in the *Final SST Utility Lab Evaluation Plan.*
- Test the SST unit at a utility-grade testing laboratory per the SST Utility Lab Test Plan.
- Prepare and submit a *Utility Lab Test Report* which includes but is not limited to:
    - Installation and commissioning process information.
    - Technical test results including but not limited to IEEE 1547, 2030.5, and Rule 21 requirements evaluation.
    - Discussion of any issues encountered and how they were mitigated.
    - Technical, operational, and safety insights learned based on performance and utility planning limits and operating modes.
    - Lessons learned for utility planning processes and use cases.
- Prepare and submit an *SST Scalability and TEA Report*, which will include but is not limited to:
    - Equipment, integration, and operational cost savings of an SST based 800 VDC data center architecture versus traditional AC data center architecture.
    - Opportunity for acceleration and expansion of large load interconnection within the three California IOU territories based on the stated load growth pipeline through SST deployment and operational flexibility interconnection.
- Prepare *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- SST Design and Specifications Package
- SST Utility Lab Evaluation Plan (draft and final)
- Utility Lab Test Report
- SST Scalability and TEA Report
- CPR Report #1

Exhibit A
Scope of Work
The Regents of the University of California, on behalf of its San Diego campus

TASK 4: INSTALLATION AND INTEGRATION OF SST AND HIGH-RESOLUTION PQ METERS

Install SST and high-resolution power quality (PQ) meters at the data center partner's facility and integrate it with the existing electrical, telecom, and data center infrastructure. PQ meters at the 12 kV AC interconnection capture point-on-wave and harmonics data which will be used to evaluate power quality metrics on both the grid side and the data center side.

The Recipient shall:

- Prepare *Site Engineering Design and Commissioning Package***,** which includes but is not limited to:
    - SST pad requirements.
    - Conduit locations and pathways.
    - Interconnection plans on both AC and DC sides.
    - Telecom requirements and design.
    - SST installation & commissioning procedures.
- Prepare and submit a *Metering Design and Specifications Package* which includes but is not limited to:
    - Selected power quality meter and its capabilities.
    - Construction and installation design package.
- Conduct site preparation work to install the SST and PQ meters.
- Install and commission the 2.4 MW SST at data center partner facility, including high-resolution instrumentation.
- Prepare an *SST Site Commissioning Report*, which includes but is not limited to:
    - Safety and operations documentation.
    - Installation activities.
    - Commissioning testing and results.
- Install software for power quality meter monitoring and for collecting point on wave data.
- Conduct power quality analysis of both grid side and data center side harmonics.
- Prepare and submit a *Power Quality Analysis Report* that includes but is not limited to:
    - Meter installation summary as well as data collection methodology and integration with monitoring software.
    - Grid-side and data center-side power quality metrics (e.g., total harmonic distortion, voltage sags/swells, harmonics).
    - Analysis of high-frequency disturbances and transient events.
    - Comparison of power measurements at grid interconnection and compute rack level.
    - Recommendations for system optimization and ongoing monitoring.

Products:

- Site Engineering Design and Commissioning Package
- Metering Design and Specifications Package
- SST Site Commissioning Report
- Power Quality Analysis Report

Exhibit A
Scope of Work
The Regents of the University of California, on behalf of its San Diego campus

TASK 5: FULL SCALE DEMONSTRATION OF SST DATA CENTER FLEXIBILITY AND RELIABILITY WITH LOAD MANAGEMENT SOFTWARE

The goal of this task is to demonstrate the technical, operational, and economic benefits of an SST based 800 VDC architecture with intelligent load orchestration. Key outcomes of this task are a comprehensive performance and techno-economic analysis and a quantified value of the solution to grid planning and data center owner/operator capital and operating infrastructure expenses.

The Recipient shall:

- Deploy data center load management software on the data center partner facility AI supercomputing cluster which includes but is not limited to:
    - Software deployment and integration with data center partner facility cluster management system.
    - Verification of the IEEE 2030.5 communication interface with utility server and SST controller.
    - Training for data center partner facility operational staff.
    - Compute task management validation to ensure customer requirements are properly met.
    - Unit tests to verify power measurement consistency and accuracy between the power quality meters and metering at the computing rack level.
- Update/refine SST controller measurement points list.
- Prepare a draft *800 VDC Data Center M&V Demonstration Plan* which will include but is not limited to:
    - Details of specific tests to be performed.
    - Description of performance metrics to be measured and their significance.
    - Identification of what measurement tools will be used for verification.
- Submit the draft *800VDC Data Center M&V Demonstration Plan* to the CAM for feedback and incorporate changes as requested in the *final 800VDC Data Center M&V Demonstration Plan.*
- Execute tests defined in the final *800VDC Data Center M&V Demonstration Plan*. Testing scope includes, but is not limited to:
    - Full and partial load testing.
    - Voltage regulation.
    - Rapid voltage change.
    - Harmonic current distortion and total rated current distortion.
    - Total Harmonic Distortion.
    - DC injection at PCC test.
    - Flicker.
    - Voltage and frequency ride through.
    - Synchronization and reconnection.
    - Protection tests.
    - Startup time.
    - AI step load response time.

  - AI load management: response time, adjustment accuracy, critical task SLO compliance.
  - Over-current and over-voltage fault detection trip times and system recovery times.
  - Reliability (uptime).
  - Compliance with specified grid connection, compliance, and safety standards
  - Utility communication and control by IEEE 2030.5 control functions.
- Prepare a draft *800 VDC Data Center M&V Demonstration Report* which includes but is not limited to:
  - Test configuration and test procedures.
  - Photographs of test setup.
  - Results of operational testing.
  - Issues encountered, and how they were overcome.
  - Lessons learned.
  - Submit the draft *800 VDC Data Center M&V Demonstration Report* to the CAM for feedback and incorporate changes as requested in the final *800 VDC Data Center M&V Demonstration Report.*
- Update the *SST Scalability and TEA Analysis* from Task 3 based upon learnings from data center operations.
- Prepare *CPR Report #2* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.
- Prepare a *Best Practices for AI Compute Task Management and DER Coordination Brief* which includes but is not limited to:
  - Recommended configurations for optimal AI workload scheduling and energy efficiency.
  - Best practices for coordinating compute loads with grid-side events, constraints, and local DER capabilities.
  - Workflow for validating and monitoring compute task performance and completion.
  - Methods for real-time response to utility dispatch signals while maintaining user and DER requirements.
  - Guidelines for data logging, measurement accuracy, and system health monitoring.
  - Lessons learned from demonstration, including operational do's and don'ts.
- Security and reliability considerations for compute task orchestration in critical environments.

Products:

- 800 VDC Data Center M&V Demonstration Plan (draft and final)
- 800 VDC Data Center M&V Demonstration Report (draft and final)
- Updated SST Scalability and TEA Analysis
- CPR Report #2
- Best Practices for AI Compute Task Management and DER Coordination Brief

Exhibit A
Scope of Work
The Regents of the University of California, on behalf of its San Diego campus

TASK 6: UTILITY ASSESSMENT, MODELING, AND PLANNING IMPACT OF FLEXIBLE HIGH POWER DATA CENTERS

The goal of this task is to evaluate the flexible compute load capacity tool established in Task 2, analyze test and demonstration data, and conduct cost-benefit analysis to assess technical, engineering, and economic grid impacts to quantify potential benefits of grid-interactive data center loads for ratepayers.

The Recipient shall:

- Evaluate performance and reliability of the SST including engineering, technical analysis, and conformance with utility requirements and standards leveraging the load capacity tool developed in Task 2, and demonstration outcomes from Task 5.
- Evaluate the applicable existing utility planning tools for grid-interactive data center load flexibility (including accelerated interconnection), load shaping, and reliability/resiliency and how they relate to existing planning and regulatory processes, investment, or business model decisions.
- Determine how the demonstration project will build from, or be integrated with, ongoing improvement efforts such as utility grid modernization plans and the project's alignment with planning processes and CPUC.
- Prepare a *Utility Impact of Grid-Interactive Data Centers Report*. The report will include but is not limited to:
    - Technical and engineering impacts: improved energy efficiency, dynamic response, harmonic distortion mitigation, reduced integration effort and footprint reduction comparing the SST against AC-based systems and meets utility safety and operational requirements.
    - Grid and system impacts: potential hosting capacity increase, ancillary services, and upgrade deferral value to quantify direct benefits to California's IOUs and ratepayers.
    - Impact of flexible load capacity tool: the degree to which increased speed of interconnection, improved data center power demand visibility and controllability can facilitate faster data center interconnection.
    - Cost-Benefit Analysis: Quantifying the degree to which the proposed solution benefits utilities, ratepayers, and society.

Products:

- Utility Impact of Grid-Interactive Data Centers Report

TASK 7: Workforce Development Program for Data Center Jobs

The goal of this task is to create clear, high-quality data center career pathways for Californians traditionally excluded from emerging technology sectors through preparation of a replicable roadmap, grounded in labor-market analysis and community input, and disseminate it statewide through a Community Based Organization (CBO) network.

Exhibit A
Scope of Work
The Regents of the University of California, on behalf of its San Diego campus

The Recipient shall:

- Conduct a statewide analysis of occupations, skills, and training needs related to data centers and supporting industries such as construction and IT infrastructure.
- Plan and host 3 regional community engagement sessions with key stakeholders in low-income and disadvantaged communities across California. Obtain feedback on:
  - Workforce development priorities and desired community benefits, including but not limited to:
    - The types of jobs, training opportunities, or community outcomes that are most important to residents, such as, access to quality jobs, paid training, local hiring opportunities, or career advancement pathways.
  - Barriers to training, employment, and career advancement, including but not limited to:
    - The challenges that may prevent residents from participating in these opportunities, such as, lack of awareness, transportation, childcare, training costs, language barriers, or limited access to relevant education and training.
  - Recommendations for improving equitable workforce access and participation, including, but not limited to:
    - The strategies that could help increase participation and success, such as, targeted outreach, supportive services, employer partnerships, paid work-based learning, or more accessible training models.
- Prepare a *Data Center Jobs Ecosystem Report* that includes but is not limited to:
  - Emerging occupations.
  - Required skills for data center jobs.
  - Existing workforce gaps.
- Create a *Career Pathways Map* that translates the ecosystem findings into visual pathways showing job progression, skills alignment, and related training opportunities.
- Combine all findings into a *Workforce Development Implementation Roadmap* that lays out a practical plan for workforce development program execution.
- Develop a concise *Knowledge Transfer Toolkit* that includes but is not limited to:
  - Executive summary of the *Workforce Development Implementation Roadmap*.
  - Slide Deck.
- Share *Knowledge Transfer Toolkit* and additional deliverables with statewide partners including:
  - Workforce boards.
  - Training providers.
  - CBOs.

Products:

- Data Center Jobs Ecosystem Report
- Career Pathways Map
- Workforce Development Implementation Roadmap
- Knowledge Transfer Toolkit

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 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.