California Energy Commission
July 10, 2024 Business Meeting
Backup Materials for BoxPower Inc.

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: 24-0710-13g

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: BoxPower Inc.

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-24-008 with BoxPower Inc. for a $2,988,031 grant. This agreement will advance, in Grass Valley, the development of a turnkey containerized microgrid product to the LRIP line stage, providing a utility grade renewable energy supply capable of rapid deployment to any location; 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

STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

CEC-270 (Revised 01/2024)

GRANT REQUEST FORM (GRF)

A. New Agreement Number

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

New Agreement Number: -EPC-24-008

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Ayat Osman, Ph.D.
3. MS-:None
4. Phone Number: 916-909-2558

C. Recipient's Information

1. Recipient's Legal Name: BoxPower Inc.
2. Federal ID Number: 82-0671452

D. Title of Project

Title of project: Elevating Microgrid Production to Optimize Widespread Energy Resilience (E.M.P.O.W.E.R)

E. Term and Amount

1. Start Date: 8/01/2024
2. End Date: 3/31/2029
3. Amount: $2,988,031.00

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: Benson Gilbert
5. Time Needed for Business Meeting: 10 minutes.
6. The email subscription topic is: EPIC (Electric Program Investment Charge).

Agenda Item Subject and Description:

a. **BoxPower Inc.** Proposed resolution approving agreement EPC-24-008 with BoxPower Inc. for a $2,988,031 grant and adopting staff's recommendation that this action is exempt from CEQA. This agreement will advance, in Grass Valley, the development of a turnkey containerized microgrid product to the LRIP line stage, providing a utility grade renewable energy supply capable of rapid deployment to any location. (EPIC Funding) Contact: Ayat Osman

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, § 15306

California Code of Regulations, title 14, section 15301, provides that projects which consist of the operation, repair, maintenance, permitting, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, and which involve negligible or no expansion of existing or former use, are categorically exempt from the provisions of the California Environmental Quality Act (CEQA). This project involves designing and manufacturing a plug-and-play solar and storage container that serves as a microgrid electricity generation and storage solution. The project involves design, manufacturing, and testing activities at an existing, developed site on land that is not environmentally sensitive. The project will involve no expansion of existing use at the facility. No historical resources or buildings will be affected. Noise and odors will not be generated by these activities in excess of existing permitted amounts. The design, manufacturing, and testing activities will not increase traffic to the site and will not require permits for air, water, conditional use, building expansion, hazardous waste, or rezoning. Therefore, the project is exempt from CEQA under section 15301.

California Code of Regulations, title 14, section 15303, provides that projects which consist of the construction and location of limited numbers of new, small facilities or structures are categorically exempt from the provisions of CEQA. This project involves designing and manufacturing a plug-and-play solar and storage container that serves as a microgrid electricity generation and storage solution. The project involves design enhancements and limited field testing of a limited number of small structures. The solar and storage containers used in the field tests are accessory or appurtenant small structures.

California Code of Regulations, title 14, section 15306, provides that projects which consists of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource are categorically exempt from the provisions of CEQA. This project involves basic data collection, research, experimental management, and resource evaluation activities which do not result in serious or major disturbance to an environmental source. This project includes mechanical design studies and engineering analyses of a plug-and-play solar container that serves as a microgrid electricity generation and storage solution. Manufacturing processes will be designed, evaluated, and optimized. This work will not result in a serious or major disturbance to an environmental resource. Therefore, the project is exempt from CEQA under section 15306.

This project does not involve impacts on any particularly sensitive environment; 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.

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.

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"?

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
BAEHR HEATING AND AIR INC	$ 12,900	**$** 2,100
Pfadt, Inc	$ 15,480	**$** 2,520
Freschi Construction, Inc.	$ 25,800	**$** 4,200
ULSE Inc.	$ 81,700	**$** 13,300
David Long Consulting LLC	$ 10,320	**$ 1,680**
TBD-Develop facility layout plan	$ 15,480	**$ 2,520**

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
Schweitzer Engineering Laboratories, Inc.	**$**9,900	**$**1,100
Doble Engineering Company	**$**18,000	**$**2,000
Fluke Electronics Corporation	**$**3,150	**$350**
Fluke Electronics Corporation	**$2,610**	**$290**
SIERRA UTILITY SALES, INC.	**$**10,800	**$**1,200
MADDOX INDUSTRIAL LLC	**$**18,000	**$**2,000
SIERRA UTILITY SALES, INC.	**$**45,000	**$**5,000
SIERRA UTILITY SALES, INC.	**$7,920**	**$880**
QUINCY COMPRESSOR LLC	**$**11,250	**$**1,250
WISCONSIN RYTEC CORPORATION	**$**15,300	**$**1,700
ELITE SUPPLY SOURCE INC	**$**23,760	**$**2,640
CANADIAN SOLAR (USA) INC.	**$6,885**	**$765**
STANLEY BLACK & DECKER, INC.	**$9450**	**$1,050**
ULSE INC.	**$1800**	**$200**
TEKTRONIX, INC.	**$2,250**	**$250**

Various	**$1,980**	**$220**
Various	**$41,400**	**$4,600**
Various	**$16,200**	**$1,800**
Various	**$22,500**	**$2,500**
Various	**$342,000**	**$38,000**
Various	**$157,500**	**$17,500**
Various	**$45,000**	**$5000**
Various	**$14,400**	**$1,600**
Various	**$9,000**	**$1,000**
Various	**$45,000**	**$5,000**
Various	**$40,500**	**$4,500**
Various	**$16,200**	**$1800**
Various	**$49,500**	**$5,500**
Various	**$4,500**	**$500**
CISCO SYSTEMS, INC.	**$1,980**	**$220**
California Department of Housing and Community Development		**$1050**
SIERRA UTILITY SALES, INC.	**$14,850**	**$1,650**
SIERRA UTILITY SALES, INC.	**$11,700**	**$1,300**
SIERRA UTILITY SALES, INC.	**$7,200**	**$800**
FLUKE ELECTRONICS CORPORATION	**$5,400**	**$600**
CFM EQUIPMENT DISTRIBUTORS, INC.	**$2,250**	**$250**
Uline, Inc.	**$9,000**	**$1,000**
Uline, Inc.	**$1,800**	**$200**
Uline, Inc.	**$9,945**	**$55**

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	22-23	301.001J	$ 2,988,031

TOTAL Amount: $ 2,988,031

R&D Program Area: ESB: Renewables

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: Angelo Campus

Address: 12438 Loma Rica Dr Ste C

City, State, Zip: Grass Valley, CA 95945-9040

Phone: 530-802-5477

E-Mail: catapult@boxpower.io

3. Recipient's Project Manager

Name: Alex Killam

Address: 12438 Loma Rica Dr Ste C

City, State, Zip: Grass Valley, CA 95945-9040

Phone: 530-802-5477

E-Mail: alex.killam@boxpower.io

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-21-304R2
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: Ayat Osman, Ph.D.

Approval Date: 5/17/2024

Branch Manager: Anthony Ng

Approval Date: 5/31/2024

Deputy Director: Delegated to the Branch Manager

Approval Date: 5/31/2024

Exhibit A
Scope of Work
BoxPower Inc.

I. TASK ACRONYM/TERM

A. Task List

Task #	CPR [1]	Task Name
1		General Project Tasks
2	X	Design Review and Subsystem Optimization
3		Pre-production Line Product Testing
4	X	Preparing for Low-Rate Initial Production
5		Evaluation of Project Benefits
6		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
BESS	Battery Energy Storage System
BOM	Bill of Material
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
EV	Electric Vehicle
FAT	Factory Acceptance Testing
HVAC	Heating Ventilation and Air Conditioning
IOU	Investor-owned utility
kW	Kilowatt
LRIP	Low-Rate Initial Production
MRL	Manufacturing Readiness Level
PSPS	Public Safety Power Shutoffs
PV	Photovoltaic
Recipient	BoxPower Inc.
SCADA	Supervisory Controls and Data Acquisition
TAC	Technical Advisory Committee

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

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

A. Purpose of Agreement

The purpose of this agreement is to advance recipient's Remote Grid SolarContainer product to a Manufacturing Readiness Level (MRL) of 8 - achieving Low-Rate Initial Production (LRIP) to prepare the product for mass production.

The Remote Grid SolarContainer is a turnkey microgrid product, providing a utility-grade renewable energy supply capable of rapid deployment in any location. The product consists of a rapidly deployable solar array photovoltaic (PV) subsystem, a containerized battery energy storage system (BESS) subsystem, utility-grade monitoring Supervisory Controls and Data Acquisition (SCADA) subsystem, Heating Ventilation and Air Conditioning (HVAC) subsystem, and optional backup renewable propane generators (Generator subsystem). The Remote Grid SolarContainer can be modularly scaled to meet loads from 30kW – 1,000kW and rapidly deployed in regions with either non-existent, unreliable, or capacity-constrained grid infrastructure as a safe alternative to costly grid hardening or distribution upgrades.

B. Problem/ Solution Statement

Problem

Electric distribution wires have ignited approximately one-third of California's most devastating wildfires since 2015. These fires are predominantly caused by vegetation interference with bare conductors, of which there are more than 40,000 miles located in high wildfire threat districts across California. Historically, utility efforts to reduce wildfire ignitions have taken two forms: grid hardening in the form of covered conductor or undergrounding; and power shutoffs – either planned public safety power shutoffs (PSPS) or sensitive protective relays that shut off power at the first sign of a ground fault. Neither solution is ideal, as grid hardening costs anywhere from $1.5-4.0M per mile, and PSPS have caused outages for more than 3.6 million Californians – disproportionately impacting rural, disadvantaged, and low-income communities. By replacing these high-risk bare conductors with Remote Grid SolarContainers, electric utilities can eliminate wildfire risk for substantially less cost than grid hardening, with better reliability and cleaner energy than either traditional solution.

In addition to wildfire risk, another daunting challenge facing California energy consumers is the inability of the current electric grid to meet anticipated load increases from electric vehicle (EV) charging in the next decade, particularly in rural areas. The Remote Grid SolarContainer offers a safer, cost-effective, rapidly deployable solution to address capacity limitations for EV chargers in rural areas. By pairing rural EV chargers with Remote Grid SolarContainers, utilities, EV charging companies, and rural communities can eliminate the need for costly distribution system upgrades.

Solution

The recipient's Remote Grid SolarContainer ('SolarContainer') is the first 'plug-and-play' turnkey microgrid product that meets all utility standards for safety and reliability with capabilities to use 100% renewable energy, allowing electric utilities to rapidly deploy distributed generation resources capable of supplementing, or permanently replacing, traditional electric distribution infrastructure in rural regions of California. Combining solar PV, battery energy storage, monitoring, controls, and backup generation in a ruggedized rapidly deployable containerized platform, the SolarContainer represents a significant step forward for microgrid technology. In California, this innovation allows utilities to cost-effectively overcome three of the largest challenges threatening California energy consumers: wildfire risk, electric reliability, and distribution capacity limitations for EV charging.

C. Goals and Objectives of the Agreement

Agreement Goals

The purpose of this agreement is to prepare the SolarContainer product for LRIP by advancing it from **MRL 6**: "capability to produce a prototype system in a production relevant environment," to **MRL 8**: "Pilot line capability demonstrated. Ready to begin low-rate initial production."

The goals of this agreement are to:

- Reduce SolarContainer product line Bill of Material (BOM) diversity by standardizing modular subsystems for use across product size nodes.
- Reduce SolarContainer production time
- Increase SolarContainer manufacturing capacity
- Establish factory commissioning, testing, and quality control facilities and procedures.

Ratepayer Benefits:[2]

This agreement will result in California ratepayer benefits of safety, greater reliability, and lower costs, especially for those living in rural and wildfire-prone regions of the state, by addressing catastrophic wildfire risk, poor electric reliability, and increasing electricity costs.

First, SolarContainers permanently replace overhead distribution lines in high wildfire threat areas, eliminating the risk of fires sparked by overhead utility infrastructure. Wildfires sparked by energy infrastructure tend to be more devastating due to the weather conditions that caused the equipment to malfunction.

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

Second, due to PSPS, rolling brownouts, and weather-related outages, rural and disadvantaged communities ratepayers are disproportionately affected by worse reliability than their urban counterparts and face significant hardship when the power goes out for an extended period of time. The SolarContainers relieve ratepayers of the impacts of intermittent electricity by providing them with a clean, reliable source of local generation that is not subject to rolling blackouts or PSPS.

Finally, the SolarContainers have the potential to dramatically reduce the cost of both wildfire mitigation and grid modernization for EVs, saving the Investor-owned utility (IOU)s and their ratepayers the avoided costs associated with distribution infrastructure, grid hardening, and grid modernization costs. According to Pacific Gas and Electric (PG&E), undergrounding costs in 2022 averaged $3.75M per mile[3]. Comparatively, the SolarContainers typically replace 1-10 miles of distribution line per project, with initial pilot costing between $500k-$1M. The recipient's first three SolarContainer projects with California IOUs saved ratepayers an average of $5 million dollars per project in avoided grid hardening costs. If extrapolated to the 10,000 miles of line that PG&E plans to underground, SolarContainers have the potential to save California ratepayers in excess of $4-5 Billion dollars in avoided grid hardening costs.

The recipient's SolarContainers directly provide safer, more reliable, and lower-cost power by dramatically reducing wildfire risk, providing significantly higher reliability, and saving an average of $6 million in infrastructure costs per site.

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 by providing safe, reliable, affordable clean energy to all through the following technological advancements and innovations:

Modular platform design:
The SolarContainer is based on an innovative modular platform design allowing individual subsystems to be rapidly configured, combined, and deployed – eliminating reengineering time, increasing sizing flexibility, and enabling future mass production. Key subsystems include the rapidly deployable PV subsystem, BESS subsystem, Generator subsystem, HVAC subsystem, and SCADA subsystem. Together, these subsystems seamlessly integrate to form the SolarContainer – a configurable product

[3] Pacific Gas and Electric Company, California Public Utilities Commission Workshop on Public Safet Power Shutoff (PSPS). (See slide 25) https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/safety-and-enforcement-division/meeting-documents/psps-briefings-february-2022/pge-psps-briefing-presentation-feb-2022.pdf

[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

platform that allows for the rapid design and deployment of remote microgrids ranging in size from 30 kW-1,000 kW output.

Productization for Rapid Deployment:
The SolarContainer utilizes International Standards Organization container enclosures to enable complete factory prefabrication, integration, and testing of all microgrid subsystems before field deployment – substantially reducing installation time, cost, and risk of component failure. This is key for wildfire mitigation, where speed of deployment is critical. The SolarContainers can be used by utilities to restore power to customers whose distribution infrastructure has been damaged or destroyed by wildfires, as well as to eliminate high-risk lines before wildfire season.

Compared to traditional custom-built microgrids, the SolarContainer offers benefits including cost savings and speed of deployment. By prefabricating a modular platform-based microgrid system in a factory environment, engineering, field integration, and commissioning labor hours are all substantially reduced – providing significant cost savings and accelerated deployment timelines. Finally, by productizing the entire microgrid system, the SolarContainer has the potential to be mass-produced in assembly line environments, supporting California's SB100 goals significantly faster and at a larger scale than custom microgrid solutions.

Utility-grade Reliability, Safety, Monitoring, and Control:
The recipient's SolarContainer is the first standalone renewable energy product to receive approval from the California Public Utilities Commission as a 'standard sole service offering meaning that it meets or exceeds all the same reliability, safety, and control requirements as traditional grid infrastructure. This is enabled through the complex and thorough integration of substation-grade protective relay capabilities, modular redundancy of all critical systems, and the ability to integrate with legacy SCADA (Supervisory Control And Data Acquisition) and Distributed Energy Resources Management systems used by electric utilities. Together, these innovations have achieved a 99.9999% uptime over the first two years of their first PG&E pilot project.

Compared to current best practices for grid hardening and resilience, such as electric distribution undergrounding, which is the leading solution deployed by California IOUs to reduce wildfire risk and increase reliability, the SolarContainers offer a faster, more affordable, and cleaner solution.

Agreement Objectives
The objectives of this Agreement are to:

- Advance the design of SolarContainer for modular integration by standardizing modular subsystems to achieve total system sizes ranging from 30 kW to 1,000 kW; includes BESS, PV, HVAC, Generator, and SCADA.

- Design and update existing manufacturing and testing facility to achieve LRIP for SolarContainer, exceeding production volumes of 20 units per year at less than three weeks per unit.
- Produce one pre-production prototype to use for long-term in-house testing.
- Produce up to two full system pre-production prototypes for in-house field testing.
- Perform field testing, which will occur in BoxPower manufacturing and testing facility, on two full system pre-production prototypes to validate reliability and compile customer feedback.

III. TASK 1 GENERAL PROJECT TASKS

A. 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:

<u>For products that require a draft version, including the Final Report Outline and Final Report</u>

- 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.

B. MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

  The administrative portion of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;
  - Administrative products (subtask 1.1);
  - CPR meetings (subtask 1.3);
  - Match fund documentation (subtask 1.7);
  - Permit documentation (subtask 1.8);
  - Subcontracts (subtask 1.9); and
  - Any other relevant topics.

  The technical portion of the meeting will include discussion of the following:
  The CAM's expectations for accomplishing tasks described in the Scope of Work;
  An updated Project Schedule;
  Technical products (subtask 1.1);
  Progress reports (subtask 1.5);
  Final Report (subtask 1.6);
  Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
  Any other relevant topics.

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

- Provide an *Updated Project Schedule, Match Funds Status Letter,* and *Permit Status Letter*, as needed to reflect any changes in the documents.

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

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

CAM Product:
- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

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

The Recipient shall:
- Prepare and submit a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

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

Recipient Products:

- CPR Report(s)

CAM Products:

- CPR Agenda(s)
- Progress Determination

Subtask 1.4 Final Meeting

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

The Recipient shall:

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

  The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.
  - The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
  - The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
    - Disposition of any procured equipment.

  - The CEC's request for specific "generated" data (not already provided in Agreement products).
  - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
  - "Surviving" Agreement provisions such as repayment provisions and confidential products.
  - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

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

C. REPORTS AND INVOICES

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 Product:

- 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)
    - This report should not disclose any confidential information.
- 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

D. MATCH FUNDS, PERMITS, AND SUBCONTRACTS

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 proposal that led to the CEC awarding this Agreement and none have been identified at the time this Agreement starts, then state this in the letter.

  If match funds were a part of the proposal that led to the CEC awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
    - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
    - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
    - If different from the solicitation application, provide a letter of commitment

from an authorized representative of each source of match funding that the funds or contributions have been secured.

- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

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

Subtask 1.9 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 Subcontracts

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

The Recipient shall:
- Manage and coordinate subcontractor activities in accordance with the requirements of this Agreement.
- Incorporate this Agreement by reference into each subcontract.
- Include any required Energy Commission flow-down provisions in each subcontract, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subcontract terms.
- If required by the CAM, submit a draft of each *Subcontract* required to conduct the work under this Agreement.
- Submit a final copy of each executed subcontract.
- Notify and receive written approval from the CAM prior to adding any new subcontractors (see the discussion of subcontractor additions in the terms and conditions).

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

E. 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 insure a long-term perspective on decision-making and progress toward the project’s strategic goals.

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

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

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The

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

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

Subtask 1.12 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.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.

- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

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

Subtask 1.13 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 from 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 DESIGN REVIEW AND SUBSYSTEM OPTIMIZATION

The goal of this task is to review and optimize product subsystem designs, finalize material and component selections, and optimize each subsystem for manufacturing - culminating in a first complete pre-production prototype. At the end of this task, the recipient plans to bring the Remote Grid SolarContainer to an MRL of 7.

Subtask 2.1 System Design Review and Optimization

The goal of this subtask is to complete a thorough engineering-for-manufacturing analysis of all product subsystems and components, optimizing for cost, interoperability, and manufacturability.

The Recipient shall:

- Conduct a thorough engineering-for-manufacturing review of all system components and subassemblies, identifying optimizations for design, production, shipping, assembly, and maintenance for future deployments.
- Analyze current design for cost efficiency, supply chain sustainability, material requirements, and long-term product reliability.
- Identify current design shortcomings and further define engineering standards for all product line modifications, improvements, and future prototyping to preserve system safety and integrity.
- Define standards for all major equipment interoperability to allow for improved system scalability.
- Update subsystem design and vet interoperability with adjacent subsystems.
- Prepare a *Product Design for Manufacturing Report*, identifying a gap analysis for targeted subsystem improvements, standards, and timelines for subsystem optimization. This report should not disclose any confidential information.

Products

- Product Design for Manufacturing Report.

Sub Task 2.2 System Integration

The goal of this subtask it to integrate all product subsystems into a pre-production prototype that will serve as a test bed and validation of the final design prior to entering pre-production.

The Recipient shall:

- Integrate all subsystem components and major equipment into a pre-product prototype.

- Analyze system design for streamlined assembly and identify any improvements for assembly line production.
- Review and revise the design as necessary to negate delays during assembly line production.
- Complete the pre-production prototype, in preparation for full-scale testing.
- Revise current fabrication drawings for efficient assembly process.
- Prepare an *Integration Validation Report* for the following subcomponents: PV array, BESS, Generator, SCADA, HVAC. This report should not disclose any confidential information.

Products:
- Integration Validation Report.

Subtask 2.3 Pre-Production Prototype Testing

The goal of this subtask is to demonstrate comprehensive testing of the pre-production prototype that simulates conditions for industry requirements.

The Recipient shall:
- Develop testing procedures, outlining precise metrics to quantify and respective predetermined criteria for successful outcomes.
- Test the system's performance, functionality, and reliability under different operational scenarios.
- Perform comprehensive in-house evaluations of the SCADA subcomponents within an environment that simulates authentic networking scenarios with limited data reliability.
- Ensure uninterrupted and fortified communication for the pre-production prototype by integrating tools to bolster and streamline network functionalities.
- Prepare *Summary Test Report* showing qualitative results of full-scale system tests. This report should not disclose any confidential information. This report should not disclose any confidential information.

Products
- Summary Test Report.

Subtask 2.4 Design Refinement & Validation

The goal of this subtask is to validate the pre-production prototype test results against the operational requirements and objectives to ensure it meets the intended purpose. Necessary design refinements or modifications shall be made to enhance the system's performance and manufacturability.

The Recipient shall:
- Review and analyze test results for the pre-production prototype to achieve cost reduction and manufacturability improvements.

- Identify performance gaps and take corrective action to implement changes to current and future designs for any subsystem deficiencies.
- Employ work order tracking tools for structured test outcomes and system performance documentation, facilitating performance enhancement analysis.
- Leverage insights from MRL 6 review testing and prototype performance data to iteratively refine the SolarContainer design, proactively addressing vulnerabilities and enhancing reliability.
- Prepare an *Updated Product Design for Manufacturing Report* identifying changes made based on the design refinement. This report should not disclose any confidential information.

Product:
- Updated Product Design for Manufacturing Report.

Subtask 2.5 Facility Preparation for Production

The goals of this subtask are to identify and address any potential risks or issues that may arise during the facility layout and assembly line verification process; implement measures to mitigate these risks; and ensure the safety and effectiveness of the production plan.

The Recipient shall:

- Implement a holistic Risk Mitigation strategy that incorporates safety protocols across electrical, mechanical, fire, and environmental domains, supplemented with specialized fire suppression mechanisms.
- Establish storage protocols and modify facilities for safe BESS subcomponent storage.
- Consult with an expert consultant on our facility layout plan and assembly line optimization.
- Persistently augment safety across the assembly line by leveraging data analytics for improved safety protocols.
- Create FAT protocol based on established Recipient system requirements.
- Prepare a *Facility Layout Plan* for the assembly line. This report should not disclose any confidential information.

Products:
- Facility Layout Plan.

Subtask 2.6 Stakeholder Feedback:

The goal of this subtask is to gather feedback from stakeholders, including end-users and customers, to understand their requirements and expectations and incorporate their input into the prototype improvement process.

The Recipient shall:

- Continuously review feedback from stakeholders, including end-users, to better understand unique requirements and challenges for off-grid systems.
- Expand partnerships with vendors, using experience gained by dozens of deployed systems serving numerous customers to this day.
- Contribute to and further develop remote grid power system utility standards, with an overall focus on safety and compliance with standards and manufacturing best practices.
- Connect with underserved communities and educational institutions in line with recipient's company vision – a world in which every rural energy customer has access to clean, reliable, affordable energy.
- Prepare a *Stakeholder Engagement Report*, which will provide a summary for which types of stakeholders were engaged and how they were engaged. This report should not disclose any confidential information.

Products:

- Stakeholder Engagement Report.

Subtask 2.7 Manufacturing Feasibility

The goal of this subtask is to show the feasibility of manufacturing the system in an assembly line environment based on the performance and testing outcomes during the MRL 6 phase.

The Recipient shall:

- Compile complete fabrication documentation for the validated pre-production prototype.
- Finalize all operational tests and requirements for pre-product line testing.
- Implement specialized tools during MRL 6 to transparently capture findings, test outcomes, and design alterations, promoting knowledge retention.
- Complete the MRL 6 review, verifying readiness for MRL 7.
- Prepare a *MRL 6 Phase Review Report*.
- Prepare a *CPR Report 1* in accordance with subtask 1.3 (CPR Meetings)
- Participate in CPR Meeting.
- Prepare a *MRL 7 Phase Feasibility Report*, defining criteria for MRL 7 Phase readiness, technical approach, and risk analysis. This report should not disclose any confidential information.

Products:

- MRL 7 Phase Feasibility Report.
- CPR Report 1.

By following these steps, the product will advance from MRL 6 to MRL 7, demonstrating the full-scale system prototype's functionality and performance in a relevant environment. Successful completion of MRL 6 indicates the system's readiness for further optimization and validation in preparation for MRL 7, which involves completing a pre-production run of the final product and qualifying it for LRIP.

TASK 3 PRE-PRODUCTION LINE PRODUCT TESTING

The goals of this task are to: 1) complete its pre-production prototype run, producing two additional pre-production products, and 2) collect and analyze performance data from pre-production products deployed in the field.

Subtask 3.1 Finalize System Design

The goal of this subtask is to review and finalize the system's design based on the feedback and insights gathered during MRL 6 review, preparing for a 2nd pre-production run of two products.

The Recipient shall:

- Make necessary refinements to address any identified issues or shortcomings. Specifically, refine the SolarContainer design by integrating feedback from stakeholders and making enhancements in structural engineering, manufacturing designs, and remote climate control.
- Finalize system design and assembly documentation for pre-production run.
- Prepare a *Pre-production System Design and Assembly Summary Report* identifying system design changes, assembly process overview, quality control measures, resource requirements, and risk assessment. This report should not disclose any confidential information.

Products:

- Pre-production System Design and Assembly Summary Report.

Subtask 3.2 Manufacturing Process Development

The goal of this subtask is to develop and optimize the manufacturing processes required to produce the system at scale.

The Recipient shall:

- Select the appropriate production methods, tooling, and automation solutions to ensure efficiency and consistency in manufacturing.
- Optimize the production line plan, including defining the Facility Layout Plan; install specialized production line equipment.
- Cross-train employees and ensure adequate training is provided.
- Implement quality control measures to meet or exceed industry standards, resulting in a Commissioning and Testing Plan.

- Prepare a *Manufacturing Process Plan,* including the Commissioning and Testing Plan. This report should not disclose any confidential information.

Products:
- Manufacturing Process Plan.

Subtask 3.3 Prepare Facilities

The goal of this subtask is to prepare the facility for pre-production assembly line and LRIP.

The Recipient shall:
- Adapt the warehouse design for easy integration, emphasizing safety training and protocols, in anticipation of new equipment.
- Streamline manufacturing into distinct steps in dedicated zones, aligning with modular designs and sequential processes.
- Establish improved diagnostic, calibration, and testing tools into dedicated stations within the facility, to ensure each unit meets rigorous FAT testing criteria before deployment.
- Employ the assembly team's time-tracking data, using software, to swiftly address production inefficiencies.
- Train and establish safety protocols based on new facilities for LRIP and Limited Deployment to enhance current shop safety protocols.
- Conduct a safety review after the changes, building on prior recommendations.
- Prepare an *Updated Facility Layout Plan* identifying facility improvements for pre-production run. This report should not disclose any confidential information.

Products:
- Updated Facility Layout Plan.

Subtask 3.4 Procure and Build Two Pre-Production Units

The goal of this subtask is to procure all materials and components required for LRIP, then produce two pre-production units to verify that the manufacturing processes can consistently produce systems that meet the required specifications.

The recipient shall:
- Conduct sourcing from reliable suppliers while ensuring that the materials meet the required quality standards.
- Finalize LRIP BOM
- Refine the subcomponent assembly procedures in an assembly line environment.
- Fabricate two pre-production units verifying the LRIP process.

- Analyze what can be replicated, and where deficiencies exist. This will provide a baseline for identifying areas that need improvement, followed by a root cause analysis to understand the underlying reasons for issues.
- Analyze what can be replicated, and where deficiencies exist. This will provide a baseline for identifying areas that need improvement, followed by a root cause analysis to understand the underlying reasons for issues.
- Prioritize the solutions based on their potential impact and feasibility. Focus on changes that can be implemented without compromising the overall functionality or quality of the pre-production units.
- Prepare a *Pre-production Assessment Report* for the completed pre-production run of two units. This report shall identify the results and lessons learned.

Products:

- Pre-production Assessment Report.

Subtask 3.5 Conduct Full-Scale Testing

The goal of the subtask is to perform extensive testing on the pre-production units to validate their performance and reliability relative to earlier prototypes in a variety of operational conditions.

The Recipient shall:

- Implement the Commissioning and Testing Plan using testing equipment at BoxPower facility to confirm the SolarContainer's performance and reliability.
- Evaluate the performance of the SolarContainer as a complete product.
- Utilize SCADA key performance indicators (KPIs) to help engineering and design teams measure complete overall system performance data.
- Employ real-world operational conditions as much as possible during testing. This involves replicating load fluctuations, weather changes, and power source transitions to simulate actual usage scenarios.
- Document interdependencies between subcomponents, such as how power source transitions may affect system and customer loads.
- Prepare a *Final Product Specification Report* including validated product environmental tolerances. This report should not disclose any confidential information.

Products:

- Final Product Specification Report.

Subtask 3.6 Certifications and Standards

The goal of this subtask is to acquire all required industry certifications required for its intended use.

The Recipient shall:

- Conduct UL9540 certification testing with a qualified testing laboratory.
- Prepare a *UL9540 Test Results Report* verifying compliance. This report should not disclose any confidential information.
- Conduct IEEE 693 design engineering and/or testing/certification for compliance, if decided as critical.
- Conduct any other certification/testing that may be required to ensure compliance for target customer. Note, testing may need to be started during earlier phases to ensure schedules are not delayed.

Products:

- UL9540 Test Results Report.
- Other Applicable Test Results Report (As Needed).

TASK 4 PREPARING FOR LOW-RATE INITIAL PRODUCTION

The goal of this task is to integrate the lessons learned from Tasks 2 and 3 and prepare for LRIP and achieving MRL 8.

Subtask 4.1 Finalize Design for LRIP

The goal of this subtask is to implement the final design for manufacturability and assembly review making any necessary changes to simplify production, reduce costs, and enhance quality.

The Recipient shall:

- Implement a Management of Change process. Specifically, document the potential impacts of changes on production, cost reduction, and quality enhancement.
- Prioritize the integration of off-the-shelf components whenever feasible by aiming to reduce part counts for expedited assembly. Specifically, request suppliers to provide defect rates, delivery times, compatibility feedback, and performance metrics of components.
- Improve and finalize existing quality controls, including FAT standards for LRIP.
- Establish a process for weighing risks against the anticipated benefits of design changes, ensuring that any last-minute proposed modifications neither compromise the system's functionality nor introduce unforeseen challenges in the manufacturing process.
- Train employees on quality standards and update resource materials to reflect changes in processes or standards.
- Prepare a *LRIP Assembly Report* including refined and streamlined assembly documentation for LRIP. This report should not disclose any confidential information.

Products:

- LRIP Assembly Report.

Subtask 4.2 Manufacturing Readiness Review:

The goal of this subtask is to conduct a comprehensive Manufacturing Readiness Review (MRR) of the SolarContainer's readiness for LRIP.

The Recipient shall:

- Implement a PLM (Product Lifecycle Management) software tool to align with the identified requirements with the goal of transitioning all product data, including designs and BOMs, into the system and customizing its settings to reflect company-specific workflows.
- Collaborate closely with key suppliers to align them with Recipient's objectives, ensuring product consistency and timely deliveries. Specifically, prioritize partnerships with suppliers highlighting proven scalability, ensuring Recipient's growth is not constrained by supply chain limitations.
- Utilize a formal Supply Chain Management (SCM) software tool to ensure the system's readiness for production by integrating key product data, such as inventory levels, supplier lead times, and material flow efficiencies with the goal of documenting our production preparedness.
- Identify sub-components that would benefit from lean manufacturing principles to streamline production and reduce waste in conjunction with our Supply Chain Management (SCM) software, acknowledging items with long lead times.
- Integrate Recipient's work order planning tool for production planning and inventory control system, streamlining manufacturing processes.
- Prepare a *Manufacturing Readiness Checklist.* This report should not disclose any confidential information.

Products:

- Manufacturing Readiness Checklist.

Subtask 4.3 Production Readiness Review (PRR):

The goal of this subtask is to conduct a comprehensive review of Recipient's readiness for LRIP. The recipient shall perform a final assessment to ensure that all aspects of production, including facilities, equipment, personnel, training, and processes, are ready for LRIP.

The Recipient shall:

- Verify that all production facilities are ready for LRIP including appropriate signage, access credentials, and supervisory protocols.
- Verify the documentation and implementation of all safety training programs for manufacturing personnel, following the safety protocols defined in 3.6, including regular workshops and seminars on the specific equipment we use.
- Complete the MRL 7 review, verifying readiness for LRIP and MRL 8.

- Prepare a *MRL 7 Phase Review Report*. This report should not disclose any confidential information.
- Prepare a *CPR Report 2* in accordance with subtask 1.3 (CPR Meetings)
- Participate in CPR Meeting.

Products:
- MRL 7 Phase Review Report.
- CPR Report 2.

Subtask 4.4 Secure Funding and Support

The goal of this subtask is to identify the necessary funding, resources, and support for the LRIP and subsequent full-scale manufacturing of the SolarContainers.

The Recipient shall:
- Prepare a *Funding Resources Report* to identify the necessary funding, resources, and support to progress the SolarContainer to LRIP and subsequent full-scale manufacturing. This report should not disclose any confidential information.

Products:
- Funding Resources Report.

TASK 5 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
- These products should not disclose any confidential information.

TASK 6 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to ensure the learning that resulted from this project is captured and disseminated so that similar efforts build on the lessons learned.

The Recipient shall:

- Develop and submit a *Project Case Study Plan* that outlines how the Recipient will document the planning, establishment, and operation of the project. 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 project's development.
  - 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 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 (draft and final)*
- 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 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
- These products should not disclose any confidential information.

I. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.