

**GRANT REQUEST FORM (GRF)**

CEC-270 (Revised 10/2015)

CALIFORNIA ENERGY COMMISSION

New Agreement EPC-19-001 (To be completed by CGL Office)

| Division | Agreement Manager: | MS- | Phone        |
|----------|--------------------|-----|--------------|
| ERDD     | Bryan Lee          | 43  | 916-327-1414 |

| Recipient's Legal Name      | Federal ID Number |
|-----------------------------|-------------------|
| UniEnergy Technologies, LLC |                   |

| Title of Project                |
|---------------------------------|
| Reflex Flow Battery at Farm ACW |

| Term and Amount | Start Date | End Date  | Amount       |
|-----------------|------------|-----------|--------------|
|                 | 9/16/2019  | 6/30/2022 | \$ 2,969,998 |

| Business Meeting Information                                                            |           |                                  |                                                |
|-----------------------------------------------------------------------------------------|-----------|----------------------------------|------------------------------------------------|
| <input type="checkbox"/> ARFVTP agreements under \$75K delegated to Executive Director. |           |                                  |                                                |
| Proposed Business Meeting Date                                                          | 8/14/2019 | <input type="checkbox"/> Consent | <input checked="" type="checkbox"/> Discussion |
| Business Meeting Presenter                                                              | Qing Tian | Time Needed: 5 minutes           |                                                |
| Please select one list serve. EPIC (Electric Program Investment Charge)                 |           |                                  |                                                |

| Agenda Item Subject and Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>UNIENERGY TECHNOLOGIES, LLC. Proposed resolution approving agreement EPC-19-001 with UniEnergy Technologies, LLC for a \$2,969,998 grant to demonstrate the third generation flow battery technology at a scale that is 600% larger than a previous federally-funded grant project, and adopting staff's determination that this action is exempt from the California Environmental Quality Act (CEQA). The battery system will be deployed at Farm ACW's facility to test the optimal economic use cases for a large solar plus storage system in San Diego Gas &amp; Electric territory. The recipient will demonstrate full energy storage system integration and islanding at the site. (EPIC funding) Contact: Qing Tian (Staff presentation: 5 minutes)</p> |

| California Environmental Quality Act (CEQA) Compliance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Is Agreement considered a "Project" under CEQA?</p> <p><input checked="" type="checkbox"/> Yes (skip to question 2) <input type="checkbox"/> No (complete the following (PRC 21065 and 14 CCR 15378)):</p> <p>Explain why Agreement is not considered a "Project":</p> <p>Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>2. If Agreement is considered a "Project" under CEQA:</p> <p><input checked="" type="checkbox"/> a) Agreement <b>IS</b> exempt. (Attach draft NOE)</p> <p><input type="checkbox"/> Statutory Exemption. List PRC and/or CCR section number: _____</p> <p><input checked="" type="checkbox"/> Categorical Exemption. List CCR section number: <u>Cal. Code Regs., tit 14, § 15301</u></p> <p><input type="checkbox"/> Common Sense Exemption. 14 CCR 15061 (b) (3)</p> <p>Explain reason why Agreement is exempt under the above section:</p> <p>This project is exempt under Cal.Code Regs., tit 14, § 15301. This grant will fund design, development, installation and testing of vanadium flow battery technology in an existing building. This project consists of minor alterations to an existing structure, involving negligible or no expansion of an existing or former use. The energy storage system (ESS) units will be installed in an existing 18,000 square foot warehouse currently being used to store equipment. The ESS footprint will be 5,600 to 6,600 square feet within that warehouse, and will be housed in a dedicated and secured space. The installation will require only minor modifications inside the structure, including construction of interior walls, placement of electrical conduit and electrical equipment, painting, ventilation system upgrades, and anchoring the ESS units and the power conversion system units to the existing concrete floor. For these reasons, the project will have no significant impacts on the environment and is categorically exempt under section 15301.</p> <p><input type="checkbox"/> b) Agreement <b>IS NOT</b> exempt. (Consult with the legal office to determine next steps.)</p> <p>Check all that apply</p> <p><input type="checkbox"/> Initial Study <input type="checkbox"/> Environmental Impact Report</p> <p><input type="checkbox"/> Negative Declaration <input type="checkbox"/> Statement of Overriding Considerations</p> <p><input type="checkbox"/> Mitigated Negative Declaration</p> |

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

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CALIFORNIA ENERGY COMMISSION



| Legal Company Name:           | Budget    |
|-------------------------------|-----------|
| Peak Power Energy Corporation | \$ 15,000 |
| Socomec, Inc                  | \$ 18,000 |
| BSE Engineering, Inc.         | \$ 25,000 |
| Western Engineering           | \$ 10,000 |
| Zephyr Consulting, LLC        | \$ 5,000  |
| TBD - Installation Contractor | \$ 10,000 |
| TBD - Contractor              | \$ 25,000 |
| Farm ACW                      | \$ 70,000 |
|                               | \$        |
|                               | \$        |

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CALIFORNIA ENERGY COMMISSION



|                                                                       |
|-----------------------------------------------------------------------|
| <b>List all key partners:</b> (attach additional sheets as necessary) |
| Legal Company Name:                                                   |
|                                                                       |
|                                                                       |
|                                                                       |
|                                                                       |

| Budget Information                |                               |                      |             |
|-----------------------------------|-------------------------------|----------------------|-------------|
| Funding Source                    | Funding Year of Appropriation | Budget List No.      | Amount      |
| EPIC                              | 18-19                         | 301.001F             | \$2,969,998 |
|                                   |                               |                      | \$          |
|                                   |                               |                      | \$          |
|                                   |                               |                      | \$          |
|                                   |                               |                      | \$          |
|                                   |                               |                      | \$          |
| R&D Program Area:                 | ESRO: ETSI                    | TOTAL:               | \$2,969,998 |
| Explanation for "Other" selection |                               |                      |             |
| Reimbursement Contract #:         |                               | Federal Agreement #: |             |

| Recipient's Administrator/ Officer |                                    |      |     | Recipient's Project Manager |                                    |      |     |
|------------------------------------|------------------------------------|------|-----|-----------------------------|------------------------------------|------|-----|
| Name:                              | Nicole Saccoman                    |      |     | Name:                       | Rebecca Gillespie                  |      |     |
| Address:                           | 4333 Harbour Pointe Blvd Sw        |      |     | Address:                    | 42 Ardilla Rd                      |      |     |
| City, State, Zip:                  | Mukilteo, WA 98275-5461            |      |     | City, State, Zip:           | Orinda, CA 94563-2233              |      |     |
| Phone:                             | 425-290-8898 /                     | Fax: | - - | Phone:                      | 412)719 -8806 /                    | Fax: | - - |
| E-Mail:                            | Nicole.Saccoman@oetechnologies.com |      |     | E-Mail:                     | Becca.gillespie@uetechnologies.com |      |     |

| Selection Process Used                                        |                            |
|---------------------------------------------------------------|----------------------------|
| <input checked="" type="checkbox"/> Competitive Solicitation  | Solicitation #: GFO-18-304 |
| <input type="checkbox"/> First Come First Served Solicitation |                            |

| The following items should be attached to this GRF  |                                         |                                   |  |
|-----------------------------------------------------|-----------------------------------------|-----------------------------------|--|
| 1. Exhibit A, Scope of Work                         | <input checked="" type="checkbox"/>     | Attached                          |  |
| 2. Exhibit B, Budget Detail                         | <input checked="" type="checkbox"/>     | Attached                          |  |
| 3. CEC 105, Questionnaire for Identifying Conflicts | <input checked="" type="checkbox"/>     | Attached                          |  |
| 4. Recipient Resolution                             | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached |  |
| 5. CEQA Documentation                               | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached |  |

|                   |      |                |      |                 |      |
|-------------------|------|----------------|------|-----------------|------|
| Agreement Manager | Date | Office Manager | Date | Deputy Director | Date |
|-------------------|------|----------------|------|-----------------|------|

## EXHIBIT A Scope of Work

### TASK ACRONYM/TERM LISTS

#### A. Task List

| Task # | CPR <sup>1</sup> | Task Name                                 |
|--------|------------------|-------------------------------------------|
| 1      |                  | General Project Tasks                     |
| 2      |                  | Site Engineering                          |
| 3      | X                | Energy Storage System Engineering         |
| 4      |                  | Manufacturing and Shipment                |
| 5      |                  | Site Work                                 |
| 6      | X                | Site Acceptance Testing and Commissioning |
| 7      |                  | Operation and Testing of Scenarios        |
| 8      |                  | Training                                  |
| 9      |                  | Evaluation of Project Benefits            |
| 10     |                  | Technology/Knowledge Transfer Activities  |

#### B. Acronym/Term List

| Acronym/Term      | Meaning                                                                                      |
|-------------------|----------------------------------------------------------------------------------------------|
| AC                | Alternating Current                                                                          |
| CAM               | Commission Agreement Manager                                                                 |
| CAO               | Commission Agreement Officer                                                                 |
| CEQA              | California Environmental Quality Act, California Public Resources Code Section 21000 et seq. |
| CPP               | Critical Peak Pricing                                                                        |
| CPR               | Critical Project Review                                                                      |
| DC                | Direct Current                                                                               |
| Energy Commission | California Energy Commission                                                                 |
| ESS               | Energy Storage System                                                                        |
| FAT               | Factory Acceptance Testing                                                                   |
| kW/kWh            | Kilowatt/Kilowatt hour                                                                       |
| MW/MWh            | Megawatt/Megawatt hour                                                                       |
| PCS               | Power Conversion System                                                                      |
| Recipient         | UniEnergy Technologies, LLC (UET)                                                            |
| RTE               | Round Trip Efficiency                                                                        |
| SDG&E             | San Diego Gas & Electric                                                                     |
| SGIP              | Self-Generation Incentive Program                                                            |
| TAC               | Technical Advisory Committee                                                                 |
| TRL               | Technology Readiness Level, herein per DOE standards.                                        |

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

<sup>1</sup> 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**

#### **A. Purpose of Agreement**

The purpose of this Agreement is to fund the development, testing, and deployment of an innovative advanced vanadium flow battery system. The 1.4 MW, 5.6 MWh flow battery project will be located at Farm ACW's facility in Fallbrook, CA and tied into an existing 7.5 MW behind the meter PV system. The flow battery system will be used primarily to conduct peak shaving and time shifting of excess PV energy on a day-to-day basis. During outages, it will allow Farm ACW to island and use their solar energy to maintain load throughout the outage. This project will demonstrate the optimal economic use cases for a large solar plus storage system in SDG&E territory. The project will be leveraged to commercialize the advanced vanadium flow battery system, and the integrated energy storage solution, throughout California.

#### **B. Problem/ Solution Statement**

##### **Problem**

Current commercially-available energy storage technologies are typically suited to the grid's current storage needs, namely peak power plant replacement, frequency regulation, and ramp rate control. California's energy storage needs are changing as large amounts of solar and wind change the shape of the net load curve. Flow batteries, due to their unique chemistry that allows for 0-100% usable capacity and unlimited cycle life, are well-suited for the future grid's energy needs. In addition, California utilities are also more cognizant in recent years of the importance of reducing wildfires. Flow batteries are inherently non-flammable, and so would not increase the fire risk of grid-deployed storage.

However, flow batteries lack field data and demonstration of their reliability and bankability for the purposes of commercial large-scale deployments. Utilities typically require that the technology has been demonstrated in the 1-2 MW range first before planning to deploy tens of MW. It is difficult for buyers to weigh the attributes of various battery storage technologies when they have yet to see utility-grade reliable flow battery technologies manufactured at scale and deployed at scale.

##### **Solution**

Work under this Agreement will demonstrate advanced vanadium flow battery technology. This project will scale up previous field deployments to provide future customers, investors and stakeholders with the data they need to evaluate the advanced vanadium flow battery system's performance and implement replications of the product commercially throughout the state. This project will provide seven times more energy capacity than the previously-funded project (May 2017) at Sandia National Laboratory<sup>2</sup>. The UniEnergy Technologies' energy storage system installed at Sandia's Energy Storage Test Pad, as an addition to Sandia's Distributed Energy Technologies Laboratory, is a 200 kW/800 kWh (peak power of 250 kW, peak energy of 1 MWh) system that was funded by the Department of Energy. Through this Agreement, the Recipient will develop a non-flammable, unlimited cycle-life product with credible field experience in California, and make the product ready for deployment at utility and other large customer sites.

#### **C. Goals and Objectives of the Agreement**

##### **Agreement Goals**

The goals of this Agreement are to:

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<sup>2</sup> <https://www.sandia.gov/ess-ssl/projects/other-demonstrations/>

## **EXHIBIT A**

### **Scope of Work**

- Demonstrate the improved reliability of an innovative advanced vanadium flow battery system product.
- Demonstrate the direct current (DC) system performance of the advanced vanadium flow battery system, deployed at scale in California.
- Demonstrate the integration of the advanced vanadium flow battery system with the Power Conversion System (PCS) and higher-level controller.
- Demonstrate the optimal economic use cases for a large solar plus storage system in SDG&E territory. Demonstrate real cost savings to Farm ACW.
- Give Farm ACW the ability to island their system during outages.
- Leverage the project to amplify the Recipient's commercialization efforts in California.
- Create local engineering and construction partnerships that enable the replication of similar energy storage systems throughout the state.

#### **Ratepayer Benefits:**<sup>3</sup>

This project will provide benefits to California ratepayers by providing access to an energy storage technology with greater reliability, lower cost and increased safety. The advanced vanadium flow battery system's unlimited cycle life and 20-year calendar life promise much lower total cost of ownership for future energy storage applications that require high cycling, and increased safety because the system is non-flammable, in sharp contrast to other battery technologies that are highly flammable.

**Technological Advancement and Breakthroughs:**<sup>4</sup> 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 demonstrating the integration of an industry leading flow battery technology in the state of California. The integration of the advanced vanadium flow battery system and the PCS and peak power controller will provide a working solution for the California market and grid. The design and permitting of the storage system will provide customers and developers working in California with credible operational data, credible budgetary data and a credible pro-forma design.

#### **Agreement Objectives**

The objectives of this agreement are to:

- Demonstrate the advanced vanadium flow battery system at a larger scale, specifically, to demonstrate an operational system that is 600% larger in energy capacity than the 2017 federally-funded grant project.
- Demonstrate the improved reliability of the Recipient's third generation product in a large-scale deployment.
- Provide cycle data: power, duration, capacity and Round-Trip Efficiency (RTE) for the direct current (DC) and alternating current (AC) systems that meet or exceed the performance expectations in the advanced vanadium flow battery system data sheet and the PCS datasheets.

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<sup>3</sup> 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](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF)).

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

## **EXHIBIT A**

### **Scope of Work**

- Demonstrate no-capacity fade over the 20-year system lifetime.
- Demonstrate full Energy Storage System (ESS) integration and islanding at the site.
- Disseminate the success of this project to industry audiences via conferences, webinars and site tours.

## EXHIBIT A Scope of Work

### II. TASK 1 GENERAL PROJECT TASKS

#### PRODUCTS

##### Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. Products that require a draft version are indicated by marking “**(draft and final)**” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, “**days**” means working days.

##### The Recipient shall:

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

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

###### 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:

###### o **Electronic File Format**

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

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

## **EXHIBIT A**

### **Scope of Work**

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Documents intended for public distribution will be in PDF file format.
- The Recipient must also provide the native Microsoft file format.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

#### **o Software Application Development**

Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open source programs:

- Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
- Visual Studio.NET (version 2008 and up). Recommend 2010.
- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

Any exceptions to the Electronic File Format requirements above must be approved in writing by the CAM. The CAM will consult with the Energy Commission's Information Technology Services Branch to determine whether the exceptions are allowable.

## **MEETINGS**

### **Subtask 1.2 Kick-off Meeting**

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

#### **The Recipient shall:**

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

The administrative portion of the meeting will include discussion of the following:

- o Terms and conditions of the Agreement;
- o Administrative products (subtask 1.1);
- o CPR meetings (subtask 1.3);
- o Match fund documentation (subtask 1.7);
- o Permit documentation (subtask 1.8);

## **EXHIBIT A**

### **Scope of Work**

- o Subcontracts (subtask 1.9); and
- o Any other relevant topics.

The technical portion of the meeting will include discussion of the following:

- o The CAM's expectations for accomplishing tasks described in the Scope of Work;
  - o An updated Project Schedule;
  - o Technical products (subtask 1.1);
  - o Progress reports and invoices (subtask 1.5);
  - o Final Report (subtask 1.6);
  - o Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
  - o Any other relevant topics.
- Provide an *Updated Project Schedule*, *List of Match Funds*, and *List of Permits*, as needed to reflect any changes in the documents.

#### **The CAM shall:**

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

#### **Recipient Products:**

- Updated Project Schedule (*if applicable*)
- Updated List of Match Funds (*if applicable*)
- Updated List of Permits (*if applicable*)

#### **CAM Product:**

- Kick-off Meeting Agenda

#### **Subtask 1.3 Critical Project Review (CPR) Meetings**

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

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

#### **The Recipient shall:**

- Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.

## **EXHIBIT A**

### **Scope of Work**

- Submit the CPR Report along with any other *Task Products* that correspond to the technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for Task 2, submit the Task 2 products along with the CPR Report).
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

#### **The CAM shall:**

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

#### **Recipient Products:**

- CPR Report(s)
- Task Products (draft and/or final as specified in the task)

#### **CAM Products:**

- CPR Agenda
- List of Expected CPR Participants
- Schedule for Providing a Progress Determination
- Progress Determination

#### **Subtask 1.4 Final Meeting**

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

#### **The Recipient shall:**

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

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.

- o 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.
- o The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
  - Disposition of any state-owned equipment.

## EXHIBIT A

### Scope of Work

- Need to file a Uniform Commercial Code Financing Statement (Form UCC-1) regarding the Energy Commission's interest in patented technology.
- The Energy Commission's request for specific "generated" data (not already provided in Agreement products).
- Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
- "Surviving" Agreement provisions such as repayment provisions and confidential products.
- Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick, organized by the tasks in the Agreement.

#### Products:

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

### REPORTS AND INVOICES

#### Subtask 1.5 Progress Reports and Invoices

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

#### The Recipient shall:

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

#### Products:

- Progress Reports
- Invoices

#### Subtask 1.6 Final Report

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

## **EXHIBIT A**

### **Scope of Work**

#### **Subtask 1.6.1 Final Report Outline**

**The Recipient shall:**

- Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM. (See *Task 1.1* for requirements for draft and final products.)

**Recipient Products:**

- Final Report Outline (draft and final)

**CAM Product:**

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

#### **Subtask 1.6.2 Final Report**

**The Recipient shall:**

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - o 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)
  - o Ensure that the document is written in the third person.
  - o Ensure that the Executive Summary is understandable to the lay public.
    - Briefly summarize the completed work. Succinctly describe the project results and whether or not the project goals were accomplished.
    - Identify which specific ratepayers can benefit from the project results and how they can achieve the benefits.
    - If it's necessary to use a technical term in the Executive Summary, provide a brief definition or explanation when the technical term is first used.
  - o Follow the Style Guide format requirements for headings, figures/tables, citations, and acronyms/abbreviations.
  - o Ensure that the document omits subjective comments and opinions. However, recommendations in the conclusion of the report are allowed.
  - o Include a brief description of the project results in the Abstract.

## **EXHIBIT A**

### **Scope of Work**

- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt
- Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product
- Submit the revised Final Report and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period or approves a request for additional time.
- Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to Comments on the Draft Final Report*.

#### **Products:**

- Final Report (draft and final)
- Written Responses to Comments on the Draft Final Report

#### **CAM Product:**

- Written Comments on the Draft Final Report

### ***MATCH FUNDS, PERMITS, AND SUBCONTRACTS***

#### **Subtask 1.7 Match Funds**

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

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

#### **The Recipient shall:**

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

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

- o 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

## **EXHIBIT A**

### **Scope of Work**

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

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

#### **Products:**

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

#### **Subtask 1.8 Permits**

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

#### **The Recipient shall:**

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
  - o 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.
  - o 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*)

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#### **Subtask 1.9 Subcontracts**

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

#### **The Recipient shall:**

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

#### **Products:**

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

### **TECHNICAL ADVISORY COMMITTEE**

#### **Subtask 1.10 Technical Advisory Committee (TAC)**

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

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

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

- Researchers knowledgeable about the project subject matter;
- Members of trades that will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives);
- Public interest market transformation implementers;
- Product developers relevant to the project;

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

#### **Products:**

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

#### **Subtask 1.11 TAC Meetings**

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

#### **The Recipient shall:**

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

#### **Products:**

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

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### **Scope of Work**

#### **III. TECHNICAL TASKS**

##### **TASK 2 SITE ENGINEERING**

The goals of this task are to prepare necessary engineering documents and designs for the successful completion of the project. Engineering performed under this Task shall focus on the design and engineering for the balance of the plant, outside of the ESS.

##### **The Recipient shall:**

- Prepare a *Summary of the Balance of Plant (BOP) Design*. The summary shall include but not be limited to:
  - o Design and engineering package for the BOP;
  - o Design an enclosure for the advanced vanadium flow battery;
  - o Electrical design to meet grid requirements and energy storage system requirements, including but not limited to:
    - Specifications and requirements of the advanced vanadium flow battery; and
    - A description of the site.
- Develop and provide a *Site Readiness Report* which shall include but not be limited to the following considerations:
  - o Prepare engineering documents required by the authority having jurisdiction or as necessary to complete project.
  - o Complete Interconnection applications.
  - o Complete Self-Generation Incentive Program (SGIP) application.
- Develop and provide a *Summary of Site Engineering Lessons Learned*.

##### **Products:**

- Summary of the BOP Design
- Site Readiness Report
- Summary of Site Engineering Lessons Learned

##### **TASK 3 ENERGY STORAGE SYSTEM ENGINEERING**

The goals of this task are to finalize the design and engineering of the ESS components: the PCS, the site controller, and the advanced vanadium flow battery for a smooth deployment; make any necessary engineering or testing plans to integrate the components of the ESS before their field deployment; finalize the design of the site controller based on a detailed understanding of the load, tariff and interconnection options; and draft an overarching site acceptance plan.

##### **The Recipient shall:**

- Design the controls network for the ESS with shall include but not be limited to the following considerations:
  - o Determine the controls hierarchy among the PCS, site controller and advanced vanadium flow battery for all activities and scenarios.
  - o Determine the required physical interconnections and networks.
  - o Select the network components.
  - o Communicate interface documentation and requirements to the site contacts, and all relevant subcontractors.

## **EXHIBIT A**

### **Scope of Work**

- o Design PCS/battery/site controller and develop a *Pre-Deployment ESS Integration Plan* to ensure that the devices will communicate with one another and behave as expected once on site.
- Design the site controller.
  - o Determine appropriate economic use cases and expected savings and revenues.
  - o Design controller to perform specific tasks.
  - o Determine metering requirements of site controller.
  - o Report on the key *Economic Analysis Findings*, including but not limited to the optimal deployment strategy, the optimal operational strategy and expected revenues.
- Compile the site acceptance testing recommendations of each of the component parts and determine the key system-level metrics and activities that should be demonstrated before handoff to create a system level *Site Acceptance Test Plan* (draft).
- Create the *M&V Plan* to verify the performance of the system. Determine the metrics and levels by which the Recipient can demonstrate that the goals have been achieved. Determine methods by which the data will be collected and reported, and the parties responsible for collecting the data and reporting the data.
- After the system has been commissioned and operated, summarize the *Energy Storage System Engineering Lessons Learned*, namely any way in which the system was not well integrated despite the upfront planning and testing.
- Conduct a TAC meeting as described in subtask 1.11.
- Participate in a CPR Meeting as described in subtask 1.3 and provide a *CPR Report #1*.

#### **Products:**

- Pre-deployment ESS integration plan
- Economic Analysis Findings
- Site Acceptance Test Plan (draft)
- M&V Plan
- Energy Storage System Engineering Lessons Learned

#### **TASK 4 MANUFACTURING AND SHIPMENT**

The goal of this task is to manufacture material necessary to facilitate the project and deliver all equipment to the site.

#### **The Recipient shall:**

- Manufacture the advanced vanadium flow battery modules.
- Perform the Factory Acceptance Testing (FAT) on the advanced vanadium flow battery modules.
- Summarize the *Advanced Vanadium Flow Battery FAT Results*, including any major deviations from the expected performance or design.
- Manufacture the advanced vanadium flow battery interconnecting cable sets.
- Have the Power Conversion System manufactured.
- Provide *Photos of Advanced Vanadium Flow Battery Modules and PCS Ready to Ship*.
- Perform the FAT on the PCS.
- Summarize the *PCS FAT Results*, including any major deviations from the expected performance or design.
- Develop the site controller software to perform peak shaving, islanding operations, and any other planned economic use cases.

## **EXHIBIT A**

### **Scope of Work**

- Develop required energy and economic reporting tools, using the site controller software and data collection stream where possible, to actualize the M&V plan.
- Manufacture hardware required for site controller operations (cabinet, controller, meters)
- Manufacture long lead items required by the balance of plant design, such as the 480 V to 4 kV transformer and the 4 kV switchgear.
- Prepare a *Summary of Shipment Plan and Status*.
- Ship the advanced vanadium flow battery modules and PCS to the site.
- Provide a *Manufacturing and Shipment Lessons Learned* summary.

#### **Products:**

- Reflex FAT Results
- Photos of Reflex modules and PCS Ready to Ship
- PCS FAT Results
- Summary of Shipment Plan and Status
- Manufacturing and Shipment Lessons Learned

#### **TASK 5 SITE WORK**

The goal of this task is to perform necessary work on the site to facilitate this project. This includes preparing the site for the arrival of the ESS equipment, such as civil works, the installation of the ESS equipment and the final electrical connections of the equipment to enable charge and discharge.

#### **The Recipient shall:**

- Modify the building as required to meet the requirements of the local code and the advanced vanadium flow battery system requirements. This includes but is not limited to installation of AC electrical works as per Recipient's specification, drawings and local code requirements.
- Install PCS as per manufacture specification, drawings and local code requirements.
- Install advanced vanadium flow battery modules as per Recipient's specification, drawings and local code requirements.
- Install site controller system as per manufacturer's specification, drawings and local code requirements.
- Provide *Photographs of the Installed ESS* and prepare *Installation Lessons Learned*, including but not limited to any technical, permitting or schedule issues that were unforeseen during the designs and engineering conducted in Task 1 and Task 2.

#### **Products:**

- Photographs of the Installed ESS
- Installation Lessons Learned

#### **TASK 6 SITE ACCEPTANCE TESTING AND COMMISSIONING**

The goal of this task is to perform site inspection and validation to ensure the advanced vanadium flow battery system is functioning and performing as designed. The site inspection shall include testing of the system at various levels as it is integrated and culminate with site acceptance tests, aimed at demonstrating the system achieving its nameplate capacity and power. Because this is an islanding system, the acceptance test will also demonstrate the ability of the system to island and support the load and PV behind the meter.

## **EXHIBIT A**

### **Scope of Work**

#### **The Recipient shall:**

- Finalize a *Site Acceptance Test Plan* to ensure system/sub systems are functioning as designed and demonstrate rated capacity and RTE. This shall include but not be limited to:
  - o Plan for testing and inspecting individual components of the ESS upon arrival.
  - o Plan for testing the system at the string level, if required.
  - o Plan for testing the system as an entire system including but not limited to characterizing the 4-hour power capacity, energy capacity and RTE capabilities of the system.
  - o Plan for testing the system operating in islanded mode.
  - o Plan for any additional AC system commissioning tests required by the interconnecting authority.
- Perform site acceptance tests according to the *Site Acceptance Test Plan*.
- Perform interconnection commissioning tests as required by the interconnecting authority.
- Report on major findings and deviations if any during the Site Acceptance Test in a *Site Acceptant Test Report*. This shall include but not be limited to:
  - o Summarize the component test results and lessons learned.
  - o Summarize any integration issues discovered on site and lessons learned.
  - o Summarize the system level performance test results including the DC Power, energy capacity and RTE, and the system AC Power, energy capacity and RTE.
  - o Report on the status/success of the interconnection commissioning tests, if any.
  - o Summarize the island testing activities and outcomes.
- Validate the reporting tools and data for M&V reports.
- Participate in a CPR meeting as described in subtask 1.3 and provide a *CPR Report #2*

#### **Products:**

- Site Acceptance Test Plan (final)
- Site Acceptance Test Report

#### **TASK 7 OPERATION AND TESTING OF SCENARIOS**

The goals of this task are to operate the system to execute planned use cases, optimizing the economic return for Farm ACW. The primary use case will be peak shaving during the on-peak period with participation in the Critical Peak Pricing (CPP) program serving as a secondary use case. A third use-case is islanding

#### **The Recipient Shall:**

- Operate the system for 8 months using the site controller software.
- Monitor the energy produced, DC RTE, AC RTE of the system for the purposes of M&V reporting on those metrics and the metrics calculated by analyzing those data.
- Monitor the economic benefits of the system including the energy and demand charge savings and the CPP revenues for the purposes of M&V reporting on those metrics.
- Monitor and report on usages of the system to island the site's load, including the duration of the outage and the energy discharged and charged during the outage for the purposes of M&V reporting on those metrics
- Implement the M&V Plan to verify the performance of the system and report on progress each month during operations.
- Prepare a *M&V Report* that summarizes the results of demonstration and M&V.

## **EXHIBIT A**

### **Scope of Work**

- Verify the system capacity at 8 months by repeating the 4-hour cycle test performed during commissioning testing.
- Prepare a *System Performance Report* summarizing the M&V outputs during the operational period including but not limited to:
  - o Describe the technical and economic performance of the system during each of the 8 months.
  - o Provide the summary statistics for the entire 8-month period including the money saved, operational costs, and energy charged and discharged.
  - o Operational lessons learned.

#### **Products:**

- M&V Report.
- System Performance Report

#### **TASK 8 TRAINING**

The goal of this task is to train the customer – or customer representatives – how to safely interact with the system and to perform designated preventive maintenance activities. The training shall provide basic information about the system to all critical personnel who will need to be aware of the system and also to anyone who may need to interact with the system. It will also train specialized employees of the customer or their representatives to maintain the system safely and effectively.

#### **The Recipient shall:**

- Compile a training program for the customer and their operational partners. This shall include but not be limited to:
  - o Create the site controller training program as it applies to this project.
  - o Create the PCS training program as it applies to this project.
  - o Create the ReFlex training program as it applies to this project.
- Provide the training program to the customer and any operational partners. This shall include but not be limited to:
  - o Provide site controller training as it applies to this project.
  - o Provide PCS controller training as it applies to this project.
  - o Provide advanced vanadium flow battery controller training as it applies to this project.
- Prepare a *Summary of Training Program Outcomes* that will, at least:
  - o Provide a list of trainees and their completed programs.
  - o Summarize training program goals.
  - o Summarize training program contents.
  - o Provide copies of training materials developed for customers and their operational partners.

#### **Products:**

- Summary of Training Program Outcomes

#### **TASK 9 EVALUATION OF PROJECT BENEFITS**

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

#### **The Recipient shall:**

## **EXHIBIT A**

### **Scope of Work**

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
  - o For Product Development Projects and Project Demonstrations:
    - Published documents, including date, title, and periodical name.
    - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
    - Greenhouse gas and criteria emissions reductions.
    - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
    - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.
    - A discussion of project product downloads from websites, and publications in technical journals.
    - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
    - Additional Information for Product Demonstrations:
      - Outcome of demonstrations and status of technology.
      - Number of similar installations.
      - Jobs created/retained as a result of the Agreement.
  - o For Information/Tools and Other Research Studies:
    - Outcome of project.
    - Published documents, including date, title, and periodical name.
    - A discussion of policy development. State if the project has been cited in government policy publications or technical journals, or has been used to inform regulatory bodies.
    - The number of website downloads.
    - An estimate of how the project information has affected energy use and cost, or have resulted in other non-energy benefits.
    - An estimate of energy and non-energy benefits.
    - Data on potential job creation, market potential, economic development, and increased state revenue as a result of project.
    - A discussion of project product downloads from websites, and publications in technical journals.
    - A comparison of project expectations and performance. Discuss whether the goals and objectives of the Agreement have been met and what improvements are needed, if any.
- Respond to CAM questions regarding responses to the questionnaires.

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

## **EXHIBIT A**

### **Scope of Work**

#### **Products:**

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

#### **TASK 10 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES**

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

#### **The Recipient shall:**

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

#### **Products:**

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

## **EXHIBIT A**

### **Scope of Work**

#### **IV. PROJECT SCHEDULE**

Please see the attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: UNIENERGY TECHNOLOGIES, LLC

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

**RESOLVED**, that the Energy Commission approves Agreement EPC-19-001 with UniEnergy Technologies, LLC for a \$2,969,998 grant to demonstrate the third generation flow battery technology at a scale that is 600 percent larger than a previous federally-funded grant project, and adopting staff's determination that this action is exempt from CEQA. The battery system will be deployed at Farm ACW's facility to test the optimal economic use cases for a large solar plus storage system in San Diego Gas & Electric territory; and

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

**CERTIFICATION**

The undersigned Secretariat to the Commission 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 California Energy Commission held on August 14, 2019.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Cody Goldthrite  
Secretariat