STATE OF CALIFORNIA
GRANT REQUEST FORM (GRF)
CEC-270 (Revised 12/2019) CALIFORNIA ENERGY COMMISSION

A) New Agreement # EPC-20-013

B) Division	Agreement Manager:	MS-	Phone
ERDD	Joshua Croft	51	916-445-5309

C) Recipient's Legal Name	Federal ID Number
Noon Energy Inc.	83-1089478

D) Title of Project
Pilot Demo of Ultra Low Cost, Long-Duration Energy Storage Coupled to Solar Power

E) Term and Amount

Start Date	End Date	Amount
4/15/2021	3/31/2025	$ 2,166,000

F) Business Meeting Information

☐ ARFVTP agreements $75K and under delegated to Executive Director

Proposed Business Meeting Date 3/17/2021 ☐ Consent ☒ Discussion

Business Meeting Presenter Michael Ferreira Time Needed: 5 minutes

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

Agenda Item Subject and Description:

NOON ENERGY INC Proposed resolution approving Agreement EPC-20-013 with Noon Energy Inc.(Noon) for a $2,166,000 grant to scale-up the Recipient's low-cost, long-duration battery technology from TRL 4 to TRL 6, and approving staff's determination that this project is exempt from CEQA. The project will advance this new technology to industrial scale to meet the demands of the beachhead markets for energy storage. Noon Energy Inc.'s new class of battery technology uses ultra-low-cost storage media, matches the energy efficiency of lithium-ion technology, doubles the energy density of lithium-ion batteries, and will enable intermittent renewable electricity sources, such as solar and wind, to cost-effectively meet continual demand. (EPIC funding) Contact: Michael Ferreira.

G) California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
   ☒ Yes (skip to question 2)
   ☐ No (complete the following (PRC 21065 and 14 CCR 15378)):

   Explain why Agreement is not considered a "Project":

2. If Agreement is considered a "Project" under CEQA:
   a) ☒ Agreement **IS** exempt.
      ☐ Statutory Exemption. List PRC and/or CCR section number:
      ☒ Categorical Exemption. List CCR section number:
      Cal. Code Regs., tit. 14, §15303
      ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section: Class 3 projects that consist of the construction and location of limited number of new, small facilities or structures not exceeding 2500 square feet in floor area, and the conversion of existing small structures from one use to another where only minor modifications are made in the exterior of the structure are categorically exempt from the provisions of the California Environmental Quality Act. This project involves the demonstration of battery technology in one small structure consisting of a 20 ft x 8 ft shipping container which is significantly smaller than 2500 square feet. The project also includes the installation of a concrete pad and electrical connecting equipment, such as a transformer, that will serve the structure. Therefore, this project is categorically exempt from environmental review as a Class 3 project pursuant to Cal. Code Regs., tit. 14 § 15303.

b) Agreement **IS NOT** exempt. (consult with the legal office to determine next steps)

Check all that apply

- ☐ Initial Study
- ☐ Negative Declaration
- ☐ Mitigated Negative Declaration
- ☐ Environmental Impact Report
- ☐ Statement of Overriding Considerations

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

Legal Company Name:	**Budget**
OxEon Energy, LLC	$ 0 (Match only)

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

Legal Company Name:

J) Budget Information

Funding Source	**Funding Year of Appropriation**	**Budget List Number**	**Amount**
EPIC	19-20	301.001G	$2,166,000

R&D Program Area: EDMFO: EDMF TOTAL: $ 2,166,000

Explanation for “Other” selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Kalee Whitehouse
Address: 470 Ramona St
City, State, Zip: Palo Alto, CA 94301-1707
Phone: 650-308-9001
E-Mail: kalee@noon.energy

2. Recipient's Project Manager

Name: Christopher Graves
Address: 470 Ramona St
City, State, Zip: Palo Alto, CA 94301-1707
Phone: 650-815-6485
E-Mail: chris@noon.energy

L) Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-20-301
☐ First Come First Served Solicitation Solicitation #:

M) The following items should be attached to this GRF

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

Agreement Manager **Date**

Office Manager **Date**

Deputy Director **Date**

Exhibit A
Scope of Work
Noon Energy Inc.

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Scale-up, optimization and testing of battery components
3		Design and modeling of integrated battery system
4	x	Build and Test 5 kW Demo System Module, Safety and Control Systems
5		Integration of Components to Produce Modules For 100 kW Demo System
6		Battery Field Testing at Industrial Demo Site (TRL 6)
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
TAC	Technical Advisory Committee

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the scale-up of the Recipient's new low-cost, long-duration battery technology from TRL4 to TRL 6, advancing this new technology to industrial scale to meet the demands of the beachhead markets for energy storage.

B. Problem/ Solution Statement

Problem

There are currently no technologies on the market that provide California ratepayers long duration, renewable, carbon emission free energy storage. Solar and wind power have come down in cost to below 3 cents/kWh in some locations, and the availability at this cost point is expected to rapidly increase in the near future. To scale up these renewables, long-duration energy storage is urgently needed to balance their intermittent supplies against demand, and existing storage technologies are too expensive or geographically limited to offer a viable

[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.

solution. The current market solutions do not have the energy density, daily cycle capability, longevity, safety, and price to be viable for the diverse set of applications that will be needed as the State makes changes to the electric grid to accommodate higher levels of renewables and a carbon free future by 2045. This requires the advancement of new technologies to provide a solution to these energy storage needs.

Solution
The Recipient's patented new class of battery technology will enable intermittent renewable electricity sources, such as solar and wind, to cost-effectively meet continual demand. It uses ultra-low-cost storage media and can match the energy efficiency of lithium-ion technology and double the energy density of lithium-ion batteries. It stores energy by splitting CO_2 into solid carbon and oxygen in a flow battery configuration, utilizing abundant materials and simple reaction chemistry. At <$1 per kWh capacity for the storage media, it will provide long-duration storage at below $20 per kWh capacity, much lower than existing storage technologies. By providing inherently low cost, safe, and compact energy storage using only earth-abundant, non-toxic materials, this new battery technology promises an ideal solution to behind-the-meter storage for California ratepayers, and to fulfilling California's state mandate of 100% carbon-free electricity by 2045.

C. Goals and Objectives of the Agreement

Agreement Goals
The goal of this Agreement is to scale-up the Recipient's new low-cost, long-duration battery technology from TRL 4 to TRL 6, advancing this emerging non-Lithium ion energy storage technology from prototype stage to field testing at a behind-the-meter energy storage site.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, and increased safety by enabling the demonstration of a new energy storage technology that provides all 3 of those results to the ratepayer at a household level, commercial level and industrial/grid level storage installation. New low-cost energy storage technologies are urgently needed to balance the rapidly growing solar power in California, which is key to achieving the state's mandate of 100% carbon-free electricity by 2045. This project will demonstrate an innovative energy storage technology that will provide the lowest cost option for balancing power supplies with demand, when compared to existing batteries, which store energy in relatively expensive metals like cobalt, lithium, and vanadium. Utilizing carbon and oxygen as storage media provides a reduced cost of <$1 per kWh capacity, enabling system-level costs below $20 per kWh capacity for hours or days of storage time.

Additionally, this flow battery is made up entirely of earth-abundant, non-toxic materials, unlike conventional lithium-ion batteries. Also, physical storage separation of the reactants makes it inherently much safer than potentially explosive lithium-ion batteries. Unique among flow

[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).

batteries, the Recipient's battery also offers more than 2x the energy density of Li-ion systems, giving it a compact footprint. This storage technology can be located anywhere on the grid, relieving congestion, and further reducing costs while increasing reliability. This enables ratepayers to supply their individual home or commercial/industrial building with reliable, on-demand energy that can be either replenished by the grid-tied system or by renewable sources such as wind and solar (the latter enabling for fully off-grid systems).

Technological Advancement and Breakthroughs:[3] This Agreement will lead to technological advancement and breakthroughs to overcome barriers to achieving the State of California's statutory energy goals by advancing this new carbon-oxygen battery to TRL 6 and enabling this technology to mature towards market adoption. This technology will be able to provide long-duration storage (e.g. 20 to 200-hour storage capacity) with a storage capital cost below $20 per kWh capacity. This breakthrough specifically addresses the urgent need for energy storage to balance the rapidly growing solar power in California, which is key to achieving the state's mandate of 100% carbon-free electricity by 2045.

Agreement Objectives

The objectives of this Agreement are to achieve:

- Optimization and scale-up of materials and battery components from sub-kW to 5-100 kW stack scale and 100-200 h duration capacity
- Design and modeling of an integrated battery system product
- Build and testing of a 5-kW demo system module, with safety and control systems
- Integration of components to produce modules for 100 kW demo system
- Battery field testing at industrial demo site for >1000 h (TRL 6)

[3] 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
Noon Energy Inc.

III. TASK 1 GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V).** All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations**.** All technical tasks should include product(s). Products that require a draft version are indicated by marking **"(draft and final)"** after the product name in the "Products" section of the task/subtask. If "(draft and final)" does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, **"days"** means working days.

The Recipient shall:

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

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

For products that require a final version only

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

For all products

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

Instructions for Submitting Electronic Files and Developing Software:

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

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

- Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
- Text documents will be in MS Word file format, version 2007 or later.
- Project management documents will be in Microsoft Project file format, version 2007 or later.

- **Software Application Development**

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

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

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

  The administrative portion of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;

- Administrative products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Match fund documentation (subtask 1.7);
- Permit documentation (subtask 1.8);
- Subcontracts (subtask 1.9); and
- Any other relevant topics.

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

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

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

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

The CAM shall:

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

Recipient Products:

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

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

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

The Recipient shall:

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

The CAM shall:

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

Recipient Products:

- CPR Report(s)

CAM Products:

- CPR Agenda
- Progress Determination

Subtask 1.4 Final Meeting

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

The Recipient shall:

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

The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.
  - The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
  - The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
    - Disposition of any procured equipment.
    - The CEC's request for specific "generated" data (not already provided in Agreement products).
    - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
    - "Surviving" Agreement provisions such as repayment provisions and confidential products.
    - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

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

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

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

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

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

Subtask 1.6.1 Final Report Outline

The Recipient shall:
- Prepare a *Final Report Outline* in accordance with the *Energy Commission Style Manual* provided by the CAM.

Recipient Products:
- Final Report Outline (draft and final)

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

Subtask 1.6.2 Final Report

The Recipient shall:
- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:
    - Cover page (**required**)
    - Credits page on the reverse side of cover with legal disclaimer (**required**)
    - Acknowledgements page (optional)
    - Preface (**required**)
    - Abstract, keywords, and citation page (**required**)
    - Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
    - Executive summary (**required**)
    - Body of the report (**required**)
    - References (if applicable)
    - Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
    - Bibliography (if applicable)
    - Appendices (if applicable) (Create a separate volume if very large.)
    - Attachments (if applicable)
- Submit a draft of the Executive Summary to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments* 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
- Draft Final Report
- Written Responses to Comments *(if applicable)*
- Final Report

CAM Product:
- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

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

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

The Recipient shall:

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

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

    - If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

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

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

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

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

Products:
- Permit Status Letter
- Updated List of Permits *(if applicable)*

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

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

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

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)
The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:
- Provide guidance in project direction. The guidance may include scope and methodologies, timing, and coordination with other projects. The guidance may be based on:
  - Technical area expertise;
  - Knowledge of market applications; or
  - Linkages between the agreement work and other past, present, or future projects (both public and private sectors) that TAC members are aware of in a particular area.
- Review products and provide recommendations for needed product adjustments, refinements, or enhancements.
- Evaluate the tangible benefits of the project to the state of California, and provide recommendations as needed to enhance the benefits.
- Provide recommendations regarding information dissemination, market pathways, or commercialization strategies relevant to the project products.
- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.

- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate, to the extent the TAC members feel is appropriate, on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

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

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

The Recipient shall:

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

Products:

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

Subtask 1.11 TAC Meetings

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

The Recipient shall:

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

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

Products:

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

Subtask 1.12 Project Performance Metrics

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

The Recipient shall:

- Complete and submit the project performance metrics 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

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

TASK 2: Scale-Up, Optimization and Testing of Battery Components
The goal of this task is to optimize and scale-up the core materials and components of the carbon-oxygen battery and make necessary advancements.

The Recipient shall:

- Prepare *Test Plan for Long-term Component Tests* which describes planned long-term testing and evaluation plan for components. This test plan will include specification of cycling profiles for core materials and electrochemical cell stacks, tested separately and integrated, with respect to temperature, cycle duration, throughput, etc. This test plan will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.
- Set up testing equipment
- Perform long-term tests of baseline materials and components, including use of target demo-system operation and system design parameters
- Prepare a *Report on Long-Term Testing*. This report will describe the long-term test results and any assessed need for further optimization of components. This report will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.
- Improve components as needed by development of materials and screening of components from different suppliers, at ~100-W sub-scale
- Perform failure mode analysis with advanced temperature cycling
- Prepare a *Report on Failure Analysis.* This report will describe the results of stress-testing the components including more intensive cycling and thermal operation profiles than in the earlier tests. This report will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.

Products:

- Test Plan for Long-term Component Tests
- Report on Long-Term Testing
- Report on Failure Analysis

TASK 3: Design and Modeling of Integrated Battery System
The goal of this task is to design and model the scaled system components and the integration of these components for a household system design.

The Recipient shall:

- Perform thermo-fluid modeling of baseline system design and submit a *Report on Baseline System Model*. This report will provide an overview of the baseline system design as determined by 3D modeling. This report will be 3-10 pages, will include

graphics and figures, and will have an executive summary that is written for a non-technical audience.
- Configure size, pressure, voltage, wattage requirements for household system
- Identify safety risks by analysis of components and overall battery system and submit a *Report on Safety Analysis* which will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience. This report will describe the assessed safety risks including pressure vessel regulations.
- Finalize system design by refining and exploring alternatives and submit a *Report on Final Demo-System Design Model* report which will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience. This report will provide an overview of the improved system design to be constructed, as evolved from the original baseline system design.

Products:
- Report on Baseline System Model
- Report on Safety Analysis
- Report on Final Demo-System Design Model

TASK 4: Build and Test 5 kW Demo System Module, Safety and Control Systems
The goal of this task is to build and test the first standalone 5-kW 200-h battery system, including probing the storage pressure limits, integrating the control system and safety system. This system is also a module that will be used in the field-tested demo system in Task 5. This module has the opportunity to be initially field-tested at a solar-powered house in a California IOU ratepayer territory.

The Recipient shall:
- Create a *Design and Testing Plan* which will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience. This document will describe the plan and procedures for testing and integrating the components of the full demo system.
- Build and test heat management subsystem
- Integrate 5-kW electrochemical cell stack with heat management subsystem and pressure vessels
- Test the system and subsystems at different storage pressures to probe any limitations
- Design, build and test safety subsystem and control system
- Perform >1000-hour battery cycling test in the lab and assess residential field-testing
- Submit a document, updated as required by the CAM called *Report on Subsystems Design and Testing* which will be 3-20 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience. This report will describe the constructed 5-kW demo system and its subsystems and the long-term test results of the system and its subsystems.

Products:
- Design and Testing Plan
- Report on Subsystems Design and Testing
- CPR Report #1

TASK 5: Integration of Components to Produce Modules for 100 kW Demo System
The goal of this task is to integrate the components as a set of 5-kW modules, test the integrated system before field testing at the demonstration site. This allows for improvements, potential additions or changes, and de-risking activities before field-testing at the demonstration site.

The Recipient shall:

- Submit a *Testing Plan for Components, Pressure, and Cycling Operation* document which will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience. This test plan will include specification of goals and procedures for building up the larger system from the 5-kW modules, using modules similar to the one developed in Task 4.
- Integrate and test the stack, thermal and electrical components
- Integrate and test the storage components
- Pressure test integrated units
- Test cycling operation for >100 cycles
- Evaluate improvements/derisking
- Submit a *Report on Final Integration Before Field Testing* document which will be 3-10 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience.This report will describe the constructed larger demo system, its cycling operation, and any system improvements that were made based on this task and the previous task.

Products:

- Testing Plan for Components, Pressure, and Cycling Operation
- Report on Final Integration Before Field Testing

TASK 6: Battery Field Testing at Industrial Demo Site (TRL 6)
The goal of this task is to produce a TRL 6 system level demonstration in a relevant environment, the first large-scale field testing of modules in a containerized system up to 100-kW 100-h capacity.

The Recipient shall:

- Package the battery modules up in a shipping container
- Lay the site groundwork and finalize connection requirements
- Install and validate by replicating >100 cycles of the previous test
- Demonstrate battery operation supplying the industrial power facility
- Submit a *Report on Long Duration Field-Test Demonstration* document which will be 5-20 pages, will include graphics and figures, and will have an executive summary that is written for a non-technical audience. This report will describe the final demonstration system, its installation at the demo site, its long-term testing results, any issues that arose, and prospects for commercialization.

Products:

- Report on Long Duration Field-Test Demonstration at the Industrial Demo Site

TASK 7: 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 December 15th 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 at 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 at www.energizeinnovation.fund, and provide *Documentation of Organization Profile* on EnergizeInnovation.fund, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Surveys
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 8: Technology/Knowledge Transfer Activities
The goal of this task is to conduct activities that will accelerate the commercial adoption of the technology being supported under this agreement. Eligible activities include, but are not limited to, the following:

- Scale-up analysis including manufacturing analysis, independent design verification, and process improvement efforts.
- Technology verification testing, or application to a test bed program located in California.
- Legal services or licensing to secure necessary intellectual property to further develop the technology

- Market research, business plan development, and cost-performance modeling.
- Entry into an incubator or accelerator program located in California.

The Recipient Shall:

- Develop and submit a *Technology Transfer Plan (Draft/Final)* that identifies the proposed activities the recipient will conduct to accelerate the successful commercial adoption of the technology.
- Present the *Draft Technology Transfer Plan* to the TAC for feedback and comments.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the *Draft Technology Transfer Plan*. This document will identify:
  - TAC comments the recipient proposes to incorporate into the *Final Technology Transfer Plan*.
  - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit the *Final Technology Transfer Plan* to the CAM for approval.
- Implement activities identified in *Final Technology Transfer Plan.*
- Develop and submit a *Technology Transfer Summary Report (Draft/Final)* that includes high level summaries of the activities, results, and lessons learned of tasks performed relating to implementing the *Final Technology Transfer Plan*. This report should not include any proprietary information.
- When directed by the CAM, develop presentation materials for an 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:

- Technology Transfer Plan (Draft and Final)
- Summary of TAC Comments
- Technology Transfer Summary Report (Draft and Final)
- High Quality Digital Photographs

V. Project Schedule

Please see the attached Excel spreadsheet.

RESOLUTION NO: 21-0317-5b

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: NOON ENERGY 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-20-013 with Noon Energy Inc. (Noon) for a $2,166,000 grant to scale-up the recipient's low-cost, long-duration battery technology from TRL 4 to TRL 6. The project will advance this new technology to industrial scale to meet the demands of the beachhead markets for energy storage. Noon Energy Inc.'s new class of battery technology uses ultra-low-cost storage media, matches the energy efficiency of lithium-ion technology, doubles the energy density of lithium-ion batteries, and enables intermittent renewable electricity sources, such as solar and wind, to cost effectively meet continual demand; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her 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 March 17, 2021.

AYE:
NAY:
ABSENT:
ABSTAIN:

_____
Patricia Carlos
Secretariat