STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019) CALIFORNIA ENERGY COMMISSION

A) New Agreement # EPC-21-034 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Anthony Ng	51	916-445-5297

C) Recipient's Legal Name	Federal ID Number
Enzinc Inc.	27-0756346

D) Title of Project
A Safe, High-Performance, Rechargeable, Recyclable Zinc-Based Battery for Stationary Energy Storage Applications

E) Term and Amount

Start Date	End Date	Amount
6/29/2022	3/31/2025	$ 1,807,600

F) Business Meeting Information

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

Proposed Business Meeting Date 6/8/2022 ☐ Consent ☒ Discussion

Business Meeting Presenter Anthony Ng Time Needed: 5 minutes

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

Agenda Item Subject and Description:

Enzinc Inc. Proposed resolution approving Agreement EPC-21-034 with Enzinc Inc. for a $1,807,600 grant to scale development of Enzinc's zinc metal sponge anode and integrate and test it in a full battery cell and battery pack, and adopting staff's determination that this action is exempt from CEQA. There are two primary solutions to stationary energy storage for discharge times between two hours and twelve hours: lead-acid and lithium-based batteries, each of which have limitations. Enzinc has developed a zinc-based battery that combines the low cost and dependability of lead-acid batteries with the performance of lithium-based batteries. (EPIC funding) Contact: Anthony Ng.

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, § 15301
      ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section: Cal. Code Regs., tit. 14, sec. 15301 provides that projects which consist of the operation, repair, maintenance, permitting,

leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, and which involve negligible or no expansion of use, are categorically exempt from the provisions of the California Environmental Quality Act. The project includes development and testing of a zinc-based battery prototype for stationary storage applications. The project will also involve the build-out and demonstration of a pilot production line for zinc sponge anodes, a critical component of zinc-based batteries. This project will take place at an existing, approximately 4,000 square-foot laboratory facility, that is already designed for this type of work. New equipment that will be installed include furnaces, drying chambers, battery cycling equipment and is expected to occupy approximately 2,500 square-feet of the existing facility. The proposed project will result in negligible or no expansion of use of the existing laboratory facility. Therefore, the project falls within section 15301 and will not have a significant effect on the environment.

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

b) Agreement **IS NOT** exempt. (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**
Intertek USA Inc.	$ 33,334
The Regents of the University of California - Riverside	$ 53,333

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

Legal Company Name:

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J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	21-22	301.001I	$1,807,600

R&D Program Area: EDMFO: EDMF TOTAL: $ 1,807,600

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Michael Burz

Address: 1301 S 46Th St

City, State, Zip: Richmond, CA 94804-4600

Phone: 301-312-4780

E-Mail: mburz@enzinc.com

2. Recipient's Project Manager

Name: Michael Burz

Address: 1301 S 46Th St

City, State, Zip: Richmond, CA 94804-4600

Phone: 301-312-4780

E-Mail: mburz@enzinc.com

L) Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-20-301

☐ First Come First Served Solicitation Solicitation #:

☐ Non-Competitive Bid Follow-on Funding (SB 115)

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
Enzinc Inc.

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2	X	Create Systems Level Requirements Document
3		Scaling Zinc Sponge Anode
4		Design and Test Cells
5		Design and Test Battery
6	X	Demonstration of Anode Pilot Line Production
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
ARPA-E	Advanced Research Projects Agency – Energy (US DoE)
BOM	Bill of Materials
CalSEED	California Sustainable Energy Entrepreneur Development program
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CERT	Center for Environmental Research and Technology
CPR	Critical Project Review
CDR	Critical Design Review
LRIP	Low-Rate Initial Production
MRR	Manufacturing Readiness Review
PDR	Preliminary Design Review
Recipient	Enzinc Inc.
TAC	Technical Advisory Committee
TPD	Test Plan Document
TR	Test Report
TRD	Test Requirements Document
TRR	Test Readiness Review
SDR	Systems Requirements Review

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

A. Purpose of Agreement

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

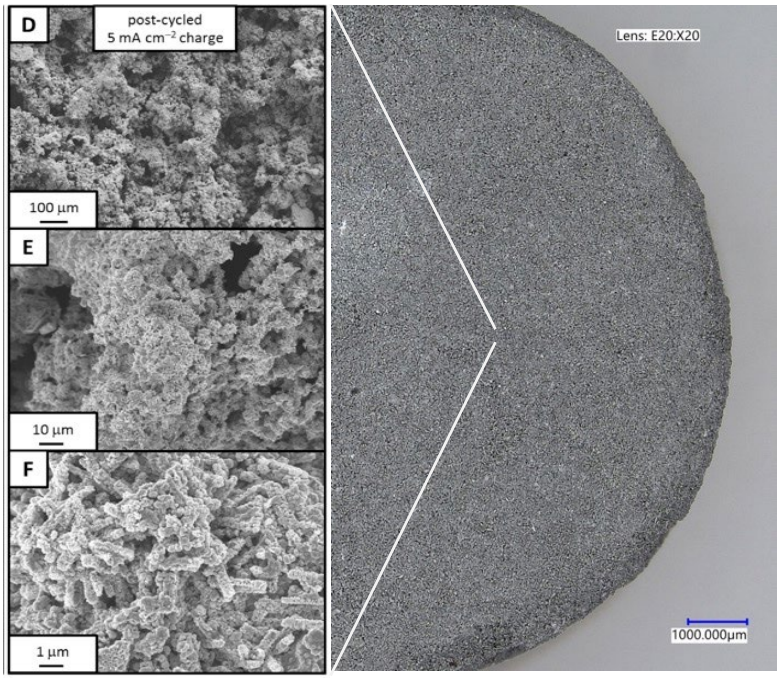
Exhibit A
Scope of Work
Enzinc Inc.

The purpose of this Agreement is to fund the design, test, and build out of a Low-Rate Initial Production (LRIP) pilot line for the manufacture of advanced stationary energy storage batteries with zinc anodes and nickel cathodes which have the energy of lithium-based batteries, and the low cost of lead-acid batteries.

B. Problem/ Solution Statement

Problem

Today there are only two solutions to stationary energy storage for discharge times between two hours and twelve hours – lead-acid and lithium-based batteries. Lead-acid batteries have been used for over 150 years. Though dependable, they have very low energy and cycle life, leading installations to be heavy and costly. Lithium-based batteries have been used in stationary energy storage for about ten years. Though they have very high energy this comes at a price in reduced discharge times, safety (thermal runaway) and environmental temperature constraints. Currently there is no cost-effective way to recycle them. The materials for lithium batteries are concentrated in foreign sources, which can hobble energy independence. As the need and desire for renewable energy generation grows, an alternative that has the energy of lithium-based batteries, the low cost and temperature range of lead acid, but is safer than either is required. Zinc chemistry has been evaluated since the time of Thomas Edison but the solutions then and the solutions now used conventional approaches to slow down dendrite growth- i.e., needle-like formations that grow rapidly and short out the zinc battery. These have limited the available performance of zinc. The increasing demand for energy storage and the constrained supply chain for lithium-based batteries require an alternative.



Solution

The Recipient, in concert with the US Naval Research Laboratory, has developed a novel zinc metal sponge electrode that offers three distinct advantages for an alternative chemistry especially over other zinc electrode approaches. The sponge structure eliminates dendrite growth, extending the life of the battery to thousands of cycles . It's high surface area extends the zinc utilization by two times over conventional zinc giving the resulting battery higher specific energy and energy density. For example, for a nickel zinc version the specific energy is greater than Lithium Iron Phosphate (LFP) batteries (130 Wh/kg vs 100 Wh/kg). And, because this is a structural solution, the electrode is cathode agnostic. This means it can deliver a family of batteries. The zinc sponge anode can be coupled with nickel, silver, manganese, and carbon (for a zinc-air battery). This proposal will focus on a nickel zinc battery.

Exhibit A
Scope of Work
Enzinc Inc.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Design and test a battery with a voltage of 12V, 141Ah to be used as a module for long duration stationary energy storage.
- Validate manufacturability of the proprietary NiZn battery having high specific energy (120 Wh/kg), potential for lower cost (<$150/kwh) compared to existing batteries, resistance to thermal runaway hazards, and temperature range of -40 °C to +60 °C.
- Conduct environmental testing of the battery (e.g., temperature, shock, safety, etc.).
- Test these batteries for discharge times from 2 hours to 12 hours.
- Design and build a pre-production fabrication line for the zinc sponge anodes capable of producing a rate of 1,000 anodes per day for one 8-hour shift with <5% reject rate.

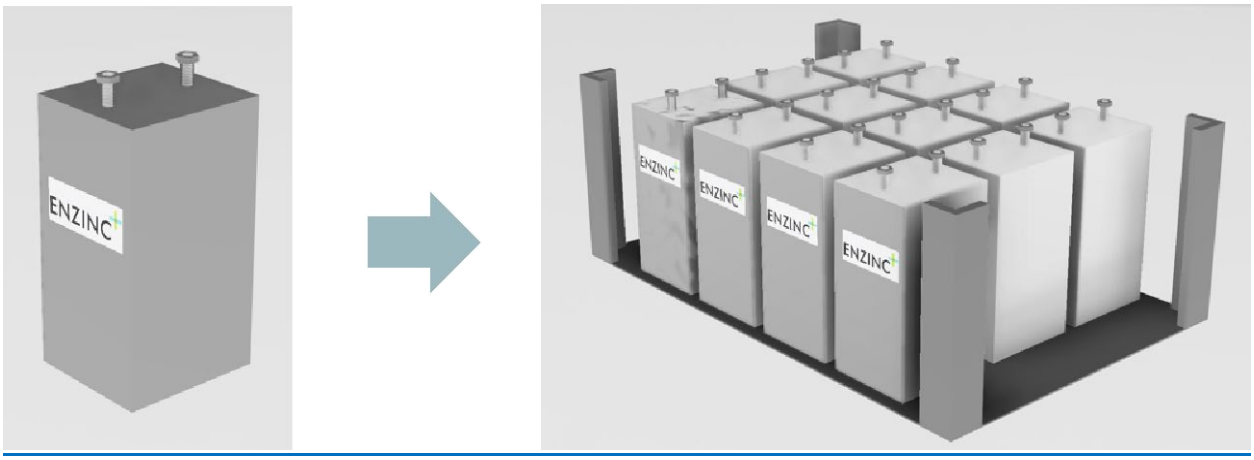


Figure 1 Battery (left) that is 12V, 141 Ah, 8 cells, 15 kg that can be installed in a module (right) consisting of twelve (12) batteries on a tray.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of increased grid system resiliency, greater electricity reliability, lower costs, and increased safety by:

- Reducing the cost and increasing the deployment configuration of microgrids, thereby increasing grid resiliency.
- Providing increased deployment of energy storage systems at the residential, neighborhood, campus, and municipal levels, thereby increasing grid reliability by minimizing brown outs and wildfire potential.
- Lowering costs using a lower cost energy storage battery thereby increasing deployment and the resulting knock-on effect of lowering operational costs from the two items above.

[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).

- Increased safety due to a high-performance energy storage chemistry that does not suffer from thermal runaway and therefore can be used in wider applications (e.g., inside apartment buildings, office buildings, condominiums.).

Technological Advancement and Breakthroughs:[3] 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 delivering a zinc-based battery using a novel three-dimensional sponge anode that has the energy of lithium-based batteries, and the low cost of lead-acid batteries.

Agreement Objectives

The objectives of this Agreement are to:

- Design, build, and test a large format (120mm X 135mm) zinc sponge anode.
- Design, build, and test a large format nickel-zinc cell (1.65V) to be used in a 12V battery.
- Design, build, and test a 12V, 141 Ah battery to be used as the battery element of a long duration stationary energy storage system that meets California's definition of short term (4-6 hours) and long-term energy storage (10 to 12 hours). The 12V battery is intended to be a demonstration "building block" for a one (1) MW stationary energy storage system.
- Demonstrate a pre-production fabrication process for manufacturing large-scale zinc sponge anodes.

Exhibit A
Scope of Work
Enzinc 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.

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 on Draft Final Report* received on the Executive Summary. For each comment received, the recipient will identify in the summary the following:
  - Comments the recipient proposes to incorporate.
  - Comments the recipient does propose to incorporate and an explanation for why.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Incorporate all CAM comments into the *Final Report*. If the Recipient disagrees with any comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.
- Submit the revised *Final Report* electronically with any Written Responses to Comments within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the CAM specifies a longer time period or approves a request for additional time.

Products:

- Summary of TAC Comments on Draft Final Report
- Draft Final Report
- Written Responses to Comments *(if applicable)*
- Final Report

CAM Product:

- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND 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 section of the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task, to the CAM.
- Present the draft project performance metrics at the first TAC meeting to solicit input and comments from the TAC members.
- Develop and submit a *TAC Performance Metrics Summary* that summarizes comments received from the TAC members on the proposed project performance metrics. The *TAC Performance Metrics Summary* will identify:
    - TAC comments the Recipient proposes to incorporate into the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
    - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Develop and submit a *Project Performance Metrics Results* document describing the extent to which the Recipient met each of the performance metrics in the *Final Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

Exhibit A
Scope of Work
Enzinc Inc.

IV. TECHNICAL TASKS

TASK 2 CREATE SYSTEMS LEVEL REQUIREMENTS DOCUMENT

The goal of this task is to create the stationary storage systems level requirements document which will define the parameters for the subsequent tasks.

The Recipient shall:

- Develop a *Systems Requirements Survey* and conduct interviews of potential customers.
    - This survey will be used to gather input from potential users of the system to inform performance and cost targets for the battery system.
- Develop a *Systems Level Requirements Document*.
    - This top-level document will define the operational parameters of the energy storage system during customer use. The information in this document will flow down to all other design and test documents.
    - The document will be constructed using information provided by potential customers of the system gathered from the Systems Requirement Survey.
    - This document will be a "living document" and may change based on customer input or testing results.
    - Operational parameters that should be defined include, but are not limited to:
        - Cycle life
        - Specific energy
        - Energy density
        - Safety
        - Storage life performance
        - Cost targets
    - Operational parameters should distinguish between expected and target performance at the battery component (anode), battery cell, and battery pack levels.
    - This document should also discuss the manufacturing requirements at the battery component (anode), battery cell, and battery pack levels.
- Create a *Systems Level Test Requirements Document*
    - This document will define the testing protocols that will be used at each stage of battery development, including the anode, cell, and battery pack systems.
    - Factors to include in this document include operational parameters, environmental factors*, cost parameters* and standards required (e.g., UL, IEEE, ASME, NEMA, UN)
    - Testing protocols and procedures may also include environmental testing (to include but not limited to powered thermal cycle testing and vibration testing) and operational testing (to include but not limited to shock and handling, safety, partial state of charge/discharge, over charge, self-discharge, and transportation).
- Prepare a *CPR Report #1* in accordance with subtask 1.3
- Participate in a CPR meeting

Products:

- System Requirements Survey
- Systems Level Requirements Document
- Systems Level Test Requirements Document
- CPR Report #1

Exhibit A
Scope of Work
Enzinc Inc.

TASK 3 SCALE ZINC SPONGE ANODE

The goal of this task is to scale production of the Recipient's zinc sponge anode to a size that supports a 12V, 141Ah battery. During this task the molds to make the anode will be evaluated for production to support Task 6.

The Recipient shall:

- Establish and optimize a process for production of a zinc sponge anode and manufacture initial quantities of zinc sponge anode.
- Conduct an Anode Design Review. This review will ensure the zinc anode design meets the systems level and component level requirements as defined in the Systems Level Requirements Document listed above.
    - Develop an *Anode Design Report* that summarizes the results of the anode design review.
- Conduct an Anode Manufacturing Review This review will ensure the zinc anode design meets the manufacturing requirements as defined in the Systems Level Requirements Document listed above.
    - Develop an *Anode Manufacturing Report* that summarizes the results of the anode manufacturing review.
- Conduct an Anode Test Review This review will ensure the zinc anode design meets the systems level and component level requirements as defined in the Systems Level Test Requirements document.
    - Develop an *Anode Test Report* that summarizes the results of the anode test review.

Products:

- Anode Design Report
- Anode Manufacturing Report
- Anode Test Report

TASK 4 DESIGN AND TEST CELLS

The goal of this task is to integrate and test the anode from Task 3 with the other cell components (e.g., nickel cathode, current collectors, separators, electrolyte, vent, and enclosure). During this task the operational testing protocols will be established for battery and cell level requirements.

The Recipient shall:

- Integrate the zinc sponge anode developed in Task 3 into full battery cell incorporating other battery components including cathodes, current collectors, separators, electrolytes, etc.
- Conduct a Cell Design Review. This review will ensure the cell design meets the systems level and component level requirements as defined in the Systems Level Requirements Document listed above.
    - Develop a *Cell Design Report* that summarizes the results of the cell design review.
- Conduct a Cell Manufacturing Review. This review will ensure the zinc anode design meets the manufacturing requirements as defined in the Systems Level Requirements Document listed above.

  - Develop a *Cell Manufacturing Report* that summarizes the results of the cell manufacturing review.
- Conduct a Cell Test Review. This review will ensure the cell design meets the systems level and component level requirements as defined in the Systems Level Test Requirements document.
  - Develop a *Cell Test Report* that summarizes the results of the cell test review.

Products:
- Cell Design Report
- Cell Manufacturing Report
- Cell Test Report

TASK 5 DESIGN AND TEST BATTERY
The goal of this task is to integrate and test the cells from Task 4 into the 12V battery that will serve as the building block for the energy storage module.

The Recipient shall:
- Integrate the battery cells developed in Task 4 into full battery packs that are comprised of approximately eight battery cells.
- Conduct a Battery Pack Design Review. This review will ensure the battery pack design meets the systems level and component level requirements as defined in the Systems Level Requirements Document listed above. This is a technical gate activity for a go/no-go decision.
  - Develop a *Battery Pack Design Report* that summarizes the results of the battery design review
- Conduct a Battery Pack Manufacturing Review. This review will ensure the battery pack design meets the manufacturing requirements as defined in the Systems Level Requirements Document listed above. This is a technical gate activity for a go/no-go decision.
  - Develop a *Battery Pack Manufacturing Report* that summarizes the results of the battery manufacturing review
- Conduct a Battery Pack Test Review. This review will ensure the battery pack design meets the systems level and component level requirements as defined in the Systems Level Test Requirements document. This is a technical gate activity for a go/no-go decision.
  - Develop a *Battery Pack Test Report* that summarizes the results of the battery test review.

Products:
- Battery Pack Design Report
- Battery Pack Manufacturing Report
- Battery Pack Test Report

TASK 6 DEMONSTRATION OF ANODE PILOT LINE PRODUCTION
The goal of this task is to demonstrate and troubleshoot that the three production sub-processes for the zinc sponge anode (i.e., mixing, drying, and sintering) were integrated properly and all achieve low-rate initial production. During this task a test method will be developed to ensure processing rates are acceptable and product quality is replicable.

The Recipient shall:

- Establish verification and testing methods to demonstrate:
  - Low rate initial production
  - Product quality
- Create a *Verification Plan* that includes but is not limited to an outline of:
  - The tests being conducted
  - Critical metrics being validated
  - Measurement tools for verification
  - Desired certifications
- Prepare a *Verification Report* which includes but not limited to:
  - High-level executive summary discussing:
    - Process and results of the final demonstration
    - Testing of the product
    - Technical issues
    - Lessons learned for this phase in the project
- Submit the draft *Verification Report* to the CAM for feedback and incorporate changes as requested in the final *Verification Report*.
- Prepare a *CPR Report #2* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- Verification Plan
- Verification Report (draft and final)
- CPR Report #2

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 January 31st of each year. The Annual Survey includes but is not limited to the following information:
  - Technology commercialization progress
  - New media and publications
  - Company growth
  - Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The Final Project Benefits Questionnaire shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund), and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.

- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory on the Energize Innovation website (www.energizeinnovation.fund), and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Survey(s)
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

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

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 22-0608-8b

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: ENZINC 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-21-034 with Enzinc Inc. for a $1,807,600 grant to scale development of Enzinc's zinc metal sponge anode and integrate and test it in a full battery cell and battery pack. There are two primary solutions to stationary energy storage for discharge times between two hours and twelve hours: lead-acid and lithium-based batteries, each of which has limitations. Enzinc has developed a zinc-based battery that combines the low cost and dependability of lead-acid batteries with the performance of lithium-based batteries; and

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

CERTIFICATION

The undersigned Secretariat to the CEC does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the CEC held on June 8, 2022.
AYE:
NAY:
ABSENT:
ABSTAIN:

_____
Liza Lopez
Secretariat