California Energy Commission
October 18, 2023 Business Meeting
Backup Materials for Agenda Item No 17a:
Zero Emission Industries, Inc.

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution
2. Grant Request Form
3. Scope of Work

RESOLUTION NO: 23-1018-17a

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: Zero Emission Industries, 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 PIR-23-007 with Zero Emission Industries, Inc. for a $5,250,000 grant to fund the development and demonstration of a mobile liquid hydrogen bunkering solution for medium and heavy-duty maritime applications. The findings from this project will be immediately applicable to the decarbonization of California ports and could facilitate the adoption of zero emission heavy equipment in various transportation sectors, with a demonstration occurring at Port of Los Angeles; 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 October 18, 2023.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

_____
Kristine Banaag
Secretariat

STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

CEC-270 (Revised 9/2022)

GRANT REQUEST FORM (GRF)

A. New Agreement Number

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

New Agreement Number: PIR-23-007

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Antonio Gomez
3. MS-:51
4. Phone Number: 916-776-7966

C. Recipient's Information

1. Recipient's Legal Name: Zero Emission Industries, Inc.
2. Federal ID Number: 82-4324675

D. Title of Project

Title of project: Cryogenic Hydrogen Infrastructure Replacement Product

E. Term and Amount

1. Start Date: 11/1/2023
2. End Date: 3/31/2026
3. Amount: $5,250,000.00

F. Business Meeting Information

1. Are the ARFVTP agreements $75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 10/18/2023 .
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Antonio Gomez
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: NaturalGas (NG Research Program).

Agenda Item Subject and Description:
Zero Emission Industries, Inc. Proposed resolution approving agreement PIR-23-007 with Zero Emission Industries, Inc. for a $5,250,000 grant to fund the development and demonstration of a mobile liquid hydrogen bunkering solution for medium and heavy-duty maritime applications, and adopting staff's determination that this action is exempt from CEQA. The findings from this project will be immediately applicable to the decarbonization of California Ports and could facilitate the adoption of zero emission heavy equipment in various transportation sectors. (PIER NG funding) Contact: Antonio Gomez

G. California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
Yes

If yes, skip to question 2.

If no, complete the following (PRC 21065 and 14 CCR 15378) and explain why Agreement is not considered a "Project":

Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because:

2. **If Agreement is considered a "Project" under CEQA answer the following questions.**

a) Agreement **IS** exempt?

Yes

Statutory Exemption?
No

If yes, list PRC and/or CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

PRC section number: None

CCR section number: None

Categorical Exemption?
Yes

If yes, list CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

CCR section number: Cal. Code Regs., tit. 14, § 15301 ;

Common Sense Exemption? 14 CCR 15061 (b) (3)
No

If yes, explain reason why Agreement is exempt under the above section. If no, enter "Not applicable" and go to the next section.

The CEQA exemption under California Code of Regulations, title 14, section 15301, Existing Buildings, applies. Section 15301 covers the operation, maintenance, or minor alteration of existing public or private structures, facilities, mechanical equipment, involving negligible or no expansion of existing or former use. This project involves the designing and building of a mobile liquid hydrogen bunkering solution. Both design and build activities will take place in existing research facilities.

The mobile liquid hydrogen bunkering system will then be temporarily demonstrated at one or more existing ports in California, without the need for additional construction at the ports. The deployment of this fueling system is not expected to increase activity at the demonstration site beyond normal. Hydrogen safety rules will be followed, according to a hydrogen safety plan.

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

CEQA Guidelines section 15300.2 apply to this project, and this project will not have a significant effect on the environment.

b) Agreement **IS NOT** exempt.

IMPORTANT: consult with the legal office to determine next steps.

No

If yes, answer yes or no to all that applies. If no, list all as “no” and “None” as “yes”.

Additional Documents	Applies
Initial Study	No
Negative Declaration	No
Mitigated Negative Declaration	No
Environmental Impact Report	No
Statement of Overriding Considerations	No
None	Yes

H. Subcontractors

List all Subcontractors listed in the Budget (s) (major and minor). Insert additional rows if needed. If no subcontractors to report, enter “No subcontractors to report” and “0” to funds. **Delete** any unused rows from the table.

Subcontractor Legal Company Name	CEC Funds	Match Funds
TBD - Painter	$ 10,000	**$**0
TBD - Telemetry Data Collection	$ 2,500	**$**0
TBD - Video Production	$ 50,000	**$**0
TBD - Tank Frame Fabricator	$ 20,000	**$**0
TBD - Design & Permitting	$ 50,000	**$**0

I. Vendors and Sellers for Equipment and Materials/Miscellaneous

List all Vendors and Sellers listed in Budget(s) for Equipment and Materials/Miscellaneous. Insert additional rows if needed. If no vendors or sellers to report, enter “No vendors or sellers to report” and “0” to funds. **Delete** any unused rows from the table.

Vendor/Seller Legal Company Name	CEC Funds	Match Funds
Crowley Engineering Services, Inc.	**$**731,250	**$**243,750

J. Key Partners

List all key partner(s). Insert additional rows if needed. If no key partners to report, enter “No key partners to report.” **Delete** any unused rows from the table.

Key Partner Legal Company Name
No key partners to report

K. Budget Information

Include all budget information. Insert additional rows if needed. If no budget information to report, enter "N/A" for "Not Applicable" and "0" to Amount. **Delete** any unused rows from the table.

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
NG Subaccount, PIERDD	21-22	501.001	$ 5,250,000

TOTAL Amount: $ 5,250,000

R&D Program Area: EGRB: Transportation

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: 601 Program Continuous Appropriation

L. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Ricky Elder

Address: 138 W Harris Ave

City, State, Zip: South San Francisco, CA 94080-6009

Phone: 650-279-3171

E-Mail: ricky@zeroei.com

3. Recipient's Project Manager

Name: Joseph Pratt

Address: 138 W Harris Ave

City, State, Zip: South San Francisco, CA 94080-6009

Phone: 510-788-5101

E-Mail: joe@zeroei.com

M. Selection Process Used

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

Selection Process	Additional Information
Competitive Solicitation #	GFO-22-502
First Come First Served Solicitation #	Not applicable
Other	Not applicable

N. Attached Items

1. List all items that should be attached to this GRF by entering “Yes” or “No”.

Item Number	Item Name	Attached
1	Exhibit A, Scope of Work/Schedule	Yes
2	Exhibit B, Budget Detail	Yes
3	CEC 105, Questionnaire for Identifying Conflicts	Yes
4	Recipient Resolution	No
5	Awardee CEQA Documentation	Yes

Approved By

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

Agreement Manager: Antonio Gomez

Approval Date: 8/27/2023

Branch Manager: Reynaldo Gonzalez

Approval Date: 9/5/2023

Director: Reynaldo Gonzalez for Angela Gould

Approval Date: 9/5/2023

EXHIBIT A
Scope of Work
Zero Emission Industries, Inc.

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Requirements and Specifications
3	X	Development and Build
4		Safety and Permitting
5	X	Testing and Validation
6		Demonstration
7		Evaluation of Project Benefits
8		Technology/Knowledge Transfer Activities
9		Project Webinar

B. Acronym/Term List

Acronym/Term	Meaning
AHJ	Authorities Having Jurisdiction
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CHIRP	Cryogenic Hydrogen Infrastructure Replacement Product
CPR	Critical Project Review
PDP	Product Development Process
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 development of a novel, portable zero-boiloff liquid hydrogen fueling system capable of providing liquid fuel to marine vessels and other heavy-duty fuel cell power systems.

B. Problem/ Solution Statement

Problem

Technology to fuel boats that run on liquid hydrogen is limited and not currently cost effective. While it is possible to power some light-duty vessels with gaseous hydrogen, as ZEI has demonstrated with the hydrogen passenger ferry, The Sea Change, when higher power levels or longer times between fueling are required (e.g., with dredges, tugs, locomotives, etc.) liquid hydrogen is a preferred energy carrier due to its higher density than gaseous hydrogen. However,

[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.

the use of dedicated berth space for a hydrogen fueling facility is often not feasible due to the scarcity of such space in the world's busiest ports. Furthermore, fixed infrastructure is far too costly to justify the switch to hydrogen in all but a few use cases. Therefore, a portable liquid fueling system is needed.

The process components in practical liquid hydrogen transfer systems that work on-demand cause the liquid hydrogen to boil, creating an undesirable hydrogen gas. A transfer system is needed that handles this problem without an industrial plant vent solution. This will enable use in more areas, reduced regulatory delays and increase system safety.

Solution
The Recipient will develop a portable zero-boiloff liquid hydrogen bunkering system capable of supplying liquid hydrogen at a rate of 35 kg/min. The system will be self-contained, capturing boil-off gas and using it to provide power to run the system. The Recipient will demonstrate the technology with its project partners at one or more California Ports (e.g., LA, Long Beach, or San Diego). The system will also be capable of fueling rail locomotives, fuel cell shore power and cold ironing systems, and other applications.

C. Goals and Objectives of the Agreement

Agreement Goals
The goals of this Agreement are to:

- Help California, the Ports, vessel operators, and vessel builders achieve substantial reductions in emissions from harbor craft and other energy users.
- Enable widespread adoption of liquid hydrogen fueling technology for maritime, rail and other high intensity applications.
- Help Port operators meet new requirements under the California Commercial Harbor Craft Regulation.

Ratepayer Benefits:
This agreement will result in increased safety to the ratepayer by improving air quality around the ports where the CHIRP is deployed. The CHIRP's zero-boil-off solution will minimize the climate impact associated with releasing boil-off hydrogen. The CHIRP will also promote the use of LH2 fueled equipment within ports which would normally run on fossil fuels. These changes will reduce air and noise pollution in the ports and surrounding areas.

Technological Advancement and Breakthroughs: 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 developing a novel mobile hydrogen liquid refueling system that can support an emerging market of zero-emission hydrogen powered vessels. The system will capture and re-use hydrogen boil-off gas increasing system efficiency and financial viability while allowing for flexible deployment in accordance with the relevant land-based and marine codes and standards. The system will be portable to avoid the need for valuable berth space while at the same time enabling the bunkering of liquid hydrogen onto suitable vessels. California energy usage and air pollution (both GHG and criteria pollutants) can be reduced. Currently, this market does not exist due to the lack of appropriate technology.

EXHIBIT A
Scope of Work
Zero Emission Industries, Inc.

Agreement Objectives

The objectives of this Agreement are to:

- Design and build a portable, zero-boiloff liquid hydrogen bunkering system.
- Achieve a liquid hydrogen fueling rate of at least 35 kg/min.
- Demonstrate the system in one or more California Ports and collect date to document the system performance.
- Develop technology that can be readily replicated to other Ports and heavy-duty applications in California and beyond.

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 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 <u>no permits</u> 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

IV. TECHNICAL TASKS

TASK 2 REQUIREMENTS AND SPECIFICATIONS

Subtask 2.1 Initial Customer Requirements
The goal of this task is to collect market data from project stakeholders to inform our Initial Product Specification Sheet and ZEI product backlog for internal project task tracking.

The Recipient shall:
- Conduct outreach with project stakeholders to collect information including but not limited to:
    - Customer needs
    - Customer wants
    - Product value drivers
    - Product use cases
    - Customer operating conditions
    - Gaps in market offerings
    - Market competitors
    - Possible market alignment/strategic partnerships
    - Customer pain points
    - Product market size
- Collect information through a variety of avenues including:
    - Customer surveys
    - Customer interviews
    - Partner Surveys
    - Partner Interviews
    - Competition analysis
    - Market data analysis
- Generate user stories to be included in the ZEI product backlog.
- Create a *Customer Requirements Summary* document detailing the information gathered from the activities above.

Products:
- Customer Requirements Summary

Subtask 2.2 Initial Product Specification
The goal of this task is to develop an *Initial Product Specification* from the culminated user stories and circulate for stakeholder input.

The Recipient shall:
- Analyze product user stories to generate initial product specifications.

- Present an *Initial Product Specification* that, at a high level, outlines the following:
    - System features
    - Physical specifications
    - Performance predictions
    - Safety specifications
    - System orientation
    - Regulation and standard considerations
- Share the *Initial Product Specification* with project CAM.
- Reach out to project stakeholders for feedback on specifications.
- Generate new user stories with the collected feedback for use in task 4.1 and 4.2.

Products:

- Initial Product Specification

TASK 3 DEVELOPMENT AND BUILD

Subtask 3.1 Hardware Design

The goal of this task is to create an Initial Hardware Build Design Report to be reviewed in a safety assessment as part of task 4.1 as well as reviewed by project stakeholders. The Initial Hardware Build Design Report will then be modified by the project team, resulting in the Final Hardware Build Design Report for use in the Build phase of the project (Task 3.3).

The Recipient shall:

- Utilize the Initial Product Specification Sheet and newly generated user stories to design and engineer a portable innovative hydrogen fueling solution including details involving:
    - Packaging and structure design
    - Process flow diagram
    - Full piping and instrumentation diagram
    - Process simulation for various operating conditions
    - 3D modeling of internal process piping
    - Installation, operation, maintenance, and periodic testing procedures
    - Hardware selection
    - Hardware estimate
    - Electrical systems design and wiring schematics
    - Gas detection design
    - H2 Venting system design
    - Boil-off recapture system
    - Autonomous power (e.g., fuel cell) system
    - Safety system components and layout
    - Performance prediction
- Prepare an *Initial Hardware Build Design Report* that details:
    - System features
    - Physical specifications
    - Performance predictions
    - Safety specifications
    - Hardware operation descriptions
    - System renderings

    - Regulation and standard considerations
- Summate safety assessment design considerations, authority having jurisdiction (AHJ) design considerations, CEC and stakeholder design considerations, and any additional user stories collected through the ZEI Product Development Pathway (PDP).
- Present the *Final Hardware Build Design Report* which modifies the *Initial Hardware Build Design Report* to appropriately answer considerations proposed by project stakeholders as well as refines system designs to a complete build ready resolution.
- Prepare *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:
- Initial Hardware Build Design Report
- Hardware Build Design Report (Draft and Final)
- CPR Report #1

Subtask 3.2 Software Development
The goal of this task is to create an *Initial Software Build Design Report* to be reviewed in a safety assessment as part of task 4.1 as well as reviewed by project stakeholders. The Initial Software Build Design Report will then be modified by the project team, resulting in the Final Software Build Design Report for use in the Build phase of the project (Task 3.3).

The Recipient shall:
- Utilize the Initial Product Specification Sheet and newly generated user stories to design and engineer the software interface for the portable innovative hydrogen fueling solution including details involving:
    - Control method
    - Automation design
    - Control design
    - Software design
    - HMI design
    - data collection
    - user interface
    - system testing
- Contribute to the *Initial Software Build Design Report* with:
    - Control descriptions
    - Software design descriptions
    - Data collection descriptions
    - Software operation descriptions
- Summate safety assessment software design considerations, AHJ software design considerations, CEC and stakeholder software design considerations, and any additional user stories collected through the ZEI PDP.
- Analyze software design considerations and select those leading to project success, user safety, and product customer value.
- Complete the proposed software design changes.
- Contribute to the *Final Software Build Design Report* by incorporating the implemented software design changes.

Products:
- Initial Software Build Design Report
- Software Design Report (Draft and Final)

Subtask 3.3 Build
The goal of this task is to build and assemble the CHIRP and integrate the developed software.

The Recipient shall:
- Build the CHIRP by completing activities including but not limited to the following:
  - Assemble package casing
  - Assemble fuel transfer system including the frame, mounting, hydrogen piping, cooling, venting, hosing, hose connections, and nozzle
  - Assemble zero boil-off apparatus
  - Install necessary electrical wiring, terminations, controls, and data collection systems
  - Develop procedures, setup, and tests for leak integrity testing
  - Integrate and test developed software
  - Conduct leak integrity testing
- Prepare a *Build Report* that includes information regarding the following:
  - Description of the assembly and testing of the hydrogen transfer system
  - Description of the integration and testing of the software
  - Description of any changes to design or procedures based on the as-built conditions of the CHIRP

Products:
- Build Report

TASK 4 SAFETY AND PERMITTING

Subtask 4.1 Safety Assessment
The goal of this task is to run a safety assessment on the initial build designs and use cases developed by the project team and share the findings with relevant project stakeholders.

The Recipient shall:
- Run an internal safety assessment of the initial build designs developed by the project team in task 3.1.
- Prepare a *Safety Assessment Report* outlining safety considerations including but not limited to following:
  - System operational hazards
  - Hydrogen leak detection
  - Hydrogen venting solutions
  - Safety procedures for accident scenarios
  - Operator requirements
  - System operating procedures
  - Codes and standard compliance
- Share the *Safety Assessment Report* with project CAM and project stakeholders.
- Collect safety design considerations from stakeholders.

Products:

- Safety Assessment Report

Subtask 4.2 Hydrogen Safety Plan

The goal of this task is to develop a detailed hydrogen safety plan that the Recipient and any subcontractors or individuals involved in construction, operation, and maintenance of the CHIRP will follow throughout the project and as long as the CHIRP operates. The Recipient will collaborate with the Pacific Northwest National Laboratory (PNNL) Hydrogen Safety Panel (HSP) to ensure the plan is comprehensive and demonstrates a strong commitment to safety.

The Recipient shall:

- Develop a Preliminary Hydrogen Safety Plan in accordance with the PNNL HSP's most recent version of public guidelines for safety planning for hydrogen and fuel cell projects available at: https://h2tools.org/bestpractices/safety-planning.
- Submit the preliminary plan to the PNNL HSP for assessment.
- Discuss the *PNNL HSP's Assessment of the Preliminary Hydrogen Safety Plan* with members of the PNNL HSP and submit a copy to the CAM.
- Evaluate the PNNL HSP's comments and determine how to address them in the final plan.
- Inform the CAM of how it will address the PNNL HSP's comments in the Final Hydrogen Safety Plan in a *Hydrogen Safety Memo*.
- Collaborate with the PNNL HSP and CAM to resolve any questions or issues pertaining to the Hydrogen Safety Plan.
- Prepare a *Final Hydrogen Safety Plan.*

Products:

- PNNL HSP Assessment of the Preliminary Hydrogen Safety Plan
- Hydrogen Safety Memo
- Final Hydrogen Safety Plan

Subtask 4.3 Regulatory Approval and Permitting

The goal of this task is to acquire necessary regulatory approval and acquire permitting, as needed, to ensure project success.

The Recipient shall:

- Initiate early in the project with AHJs including one or more of the following:
  - Los Angeles Fire Department
  - Long Beach Fire Department
  - Port of Los Angeles
  - Port of Long Beach
  - US Coast Guard
  - Port of San Diego
  - Port of San Diego Fire Department
- Educate AHJs in hydrogen subject matter including but not limited to the following topics:
  - Current hydrogen safety standards
  - NFPA2
  - Hydrogen best practices
  - Gaseous vs. Liquid Hydrogen

  - Liquid hydrogen safety standards
- Start engaging AHJs with the content of the proposal, building confidence in hydrogen as an energy source as well as in ZEI as developers of innovative technology solutions.
- Pursue any permitting, if at all, required for the success of the project.
- Maintain communication and build upon the relationship with AHJs through activities such as:
  - Outreach for input on CEC deliverables
  - Outreach for input on project design plans
  - Conducting hydrogen education and safety training courses
  - Live hydrogen technology demonstrations
- Work with AHJs to acquire approval for operation of our technology solution in demonstration site locations.
- Provide a *Regulatory Engagement Report* that includes, but is not limited to, the following:
  - Description of approach used to acquire approval
  - List of activities performed
  - Description of the results and to what degree the goal was achieved
  - Significant issues encountered and how they were addressed
  - A discussion of the implications regarding the success or failure of the results, and the effect on the budget and the overall objectives of the project
- Continue to educate AHJs on hydrogen safety and best practices through the end of the project term in an effort to influence the development of more hydrogen specific codes and standards.

Products:
- Regulatory Engagement Report (Draft and Final)

TASK 5 TESTING AND VALIDATION
The goal of this task is to execute testing procedures for the CHIRP and validate system performance through test and use of the data collection system.

The Recipient shall:
- Prepare a *Testing and Validation Plan* which shall include but is not limited to:
  - a description of the process to be tested
  - predicted performance based on calculations or other analyses
  - test objectives and technical approach
  - a test matrix showing the number of test conditions and replicated runs
  - a description of the facilities, equipment, instrumentation required to conduct the tests
  - a description of test procedures, including parameters to be controlled and how they will be controlled; parameters to be measured and instrumentation to measure them; calibration procedures to be used; recommended calibration interval; and maintenance of the test log
  - a description of the data analysis procedures
  - a description of quality assurance procedures
  - contingency measures to be considered if the test objectives are not met
- Execute commissioning for the fuel transfer system by completing activities including:

  - Nitrogen Purge
  - System test with nitrogen
  - Conduct a hydrogen purge and first fill
  - Finalize CHIRP to be ready for use
- Execute system testing and validation per the *Testing and Validation Plan*.
- Prepare a *Final Product Specification Sheet* that details the following:
  - As-built System features
  - As-built Physical specifications
  - As-built Performance predictions
  - As-built Safety specifications
  - As-built System orientation
  - As-built Regulation and standard approvals
- Prepare *CPR Report #2* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:
- Testing and Validation Plan (Draft and Final)
- Final Product Specification Sheet
- CPR Report #2

TASK 6 DEMONSTRATION
The goal of this task is to conduct the CHIRP demonstration and collect data to quantify system performance.

The Recipient shall:
- Finalize the demonstration route(s).
- Make necessary demonstration preparations including but not limited to the following:
  - Demonstration vessel prep
  - Hydrogen source delivery scheduling
  - Remote data collection testing
  - On-site project member scheduling
  - Contingency measures in the event of system interruptions
- Conduct an innovative fueling demonstration.
- Collect and analyze data including but not limited to the following:
  - Number of refueling sessions
  - Average refueling station downtime
  - Average session duration
  - Energy delivered (kWh)
  - Average kg dispensed
  - Maximum capacity of the new fueling system
  - Normal operating hours, up time, downtime, and explanations of variations
  - Gallons of gasoline and/or diesel fuel displaced
- Prepare a *CHIRP Demonstration Report* that includes, but is not limited to:
  - Documentation of analyzed data to quantitatively describe system performance, hydrogen supply and fueling performance, maintenance, safety, costs, and user experiences.

Products:

- CHIRP Demonstration Report (Draft and Final)

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* 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* 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.
- 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

TASK 9 PROJECT WEBINAR

The goal of this task is to conduct activities that will improve the education and equity impact of the project through targeted stakeholder engagement. Eligible activities include, but are not limited to, the following:

- Hosting one or more webinars with a group or subgroup(s) of local stakeholders to discuss the project.

The Recipient Shall:

- Plan and execute a targeted webinar with local community and business stakeholders to solicit input and provide educational material related to the project.

Products:

- Webinar Summary Report

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.