California Energy Commission
July 26, 2023 Business Meeting
Backup Materials for Agenda Item No 10b:
Lawrence Berkeley National Laboratory

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: 23-0726-10b

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: Lawrence Berkeley National Laboratory

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-23-002 with Lawrence Berkeley National Laboratory for a $3,500,000 grant to develop and validate an integrated, real-time, monitoring system to concurrently monitor marine mammal and ocean environmental impacts from floating offshore wind turbines. This project will help reduce costs, increase resiliency, and increase knowledge of potential wildlife impacts in marine waters offshore California; and

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

CERTIFICATION

The undersigned Secretariat to the CEC does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the CEC held on July 26, 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: EPC-23-002

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Mark Danielson
3. MS-:51
4. Phone Number: (916) 805-7515

C. Recipient's Information

1. Recipient's Legal Name: DOE- Lawrence Berkeley National Laboratory
2. Federal ID Number: 94-2951741

D. Title of Project

Title of project: Integrated Monitoring of Cetacean and Ocean Environmental Impacts from Floating Offshore Wind Development on the Pacific Coast

E. Term and Amount

1. Start Date: 8/1/2023
2. End Date: 3/31/2027
3. Amount: $3,500,000.00

F. Business Meeting Information

1. Are the ARFVTP agreements $75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 7/26/2023.
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Mark Danielson
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: EPIC (Electric Program Investment Charge).

Agenda Item Subject and Description:

Lawrence Berkeley National Laboratory. Proposed resolution approving agreement EPC-23-002 with Lawrence Berkeley National Laboratory for a $3,500,000 grant to develop and validate an integrated, real-time, monitoring system to concurrently monitor marine mammal and ocean environmental impacts from floating offshore wind turbines, and adopting staff's determination that this action is exempt from CEQA. This project will help reduce costs, increase resiliency, and increase knowledge of potential wildlife impacts in marine waters offshore California. (EPIC funding) Contact: Mark Danielson (Staff Presentation: 5 minutes)

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.

This project will involve environmental monitoring technologies research conducted at existing locations and testing facilities.

Cal. Code Regs., tit. 14, Section 15301, Existing Facilities, provides an exemption for the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing structures, facilities, mechanical equipment or topographical features involving negligible or no expansion of use beyond that existing. This project will conduct research and development within already existing facilities. There will be negligible or no expansion of existing use. Therefore, the project falls within Section 15301 and will not have a significant effect on the environment.

Cal. Code Regs., tit. 14, sect. 15306 consists of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. This project involves a limited amount of field testing (i.e., testing of sensors and radar outside). This work will not result in a serious or major disturbance to an environmental resource. For these reasons, the proposed project will have no significant effect on the environment and is categorically exempt under section 15306.

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
The Regents of the University of California on behalf of the Berkeley Campus	$ 1,014,178	**$**233,749
Naval Postgraduate School	$ 356,655	**$**5000
OptaSense, Inc.	$ 364,412	**$**196,407
Monterey Bay Aquarium Research Institute	$ 53,993	**$**13,500

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

No vendors to report	**$**	**$**

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
EPIC	21-22	301.001I	$ 3,500,000

TOTAL Amount: $ 3,500,000

R&D Program Area: EGRB: Renewables

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

L. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Yuxin Wu

Address: 1 Cyclotron Rd

City, State, Zip: Berkeley, CA 94720-8099

Phone: 510-486 -4793

E-Mail: YWu3@lbl.gov

3. Recipient's Project Manager

Name: Yuxin Wu

Address: 1 Cyclotron Rd

City, State, Zip: Berkeley, CA 94720-8099

Phone: 510-486 -4793

E-Mail: YWu3@lbl.gov

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-22-401
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	Enter Yes or No.
4	Recipient Resolution	Enter Yes or No.
5	Awardee CEQA Documentation	Enter Yes or No.

Approved By

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

Agreement Manager: Mark Danielson

Approval Date: 5/26/2023

Branch Manager: Kevin Uy

Approval Date: 6/1/2023

Director: Kevin Uy on behalf of Angela Gould

Approval Date: 6/1/2023

Exhibit A
Scope of Work
Lawrence Berkeley National Laboratory

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Prototype Monitoring Hardware Package for Floating Offshore Wind
3	X	Machine-Learning-Based Rapid Data Processing Capabilities
4		Laboratory Testing of Integrated Monitoring System
5		Joint Fiber Sensing-Hydrophone Data Analysis
6	X	Self-Sustaining Prototype Float Buoy System
7		Numerical Modeling and Simulations
8		Project management, coordination, and reporting
9		Evaluation of Project Benefits
10		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
FOS	Fiber Optic Sensing
FOWT	Floating Offshore Wind Technology
ML	Machine Learning
Recipient	Lawrence Berkeley National Laboratory
TAC	Technical Advisory Committee
WEA	Wind Energy Area

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 and laboratory demonstration of an integrated monitoring system combining multimodal fiber optic sensing (FOS) technologies (acoustic, temperature, and strain) and advanced vector hydrophones for concurrent monitoring of marine mammal presence and behavior both before and after from floating offshore wind technology (FOWT) deployment off the Pacific coast. Additionally, the sensor system will be developed to monitor potential ocean water column and current disturbance, as well as detect

[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.

ocean floor landslides and earthquakes to ensure durability and resilience of sub-surface offshore wind infrastructure. This novel monitoring package will be developed in conjunction with an advanced machine learning-based algorithm for data reduction and signal recognition to translate data into actionable knowledge in real time without human intervention. Results will reduce costs and increase resiliency by providing real-time environmental monitoring capabilities without the need for electric power access on fiber sensors and increase knowledge of potential wildlife impacts in marine waters offshore California.

B. Problem/ Solution Statement

Problem

Environmentally sustainable development of offshore wind needs to evaluate its potential impacts on marine life and ocean environments. There is a large knowledge gap in marine mammal distribution, abundance, and habitat-use and how they might be impacted by offshore wind development. While key to guide the permitting, site selection, construction, and operations of offshore wind farms, such knowledge is currently limited. In addition to the impacts on marine animals, FOWT deployment could alter ocean environments near the wind farms, while also be subject to impacts from ocean environmental dynamics. Specifically, deployments of large FOWT structures could alter local ocean current dynamics, impacting the upwelling and downwelling processes, as well as horizontal ocean currents in both shallow and deep zones.

Solution

The solution to this challenge is to design, prototype and validate an integrated distributed monitoring package combining multimodal FOS technologies and advanced vector hydrophones for concurrent marine mammal and ocean environmental impact monitoring for floating offshore wind. This integrated monitoring package is specifically suitable for the deep-water environment in the current and future California Wind Energy Areas (WEAs). This integrated system will be co-deployable on the mooring system of Floating Offshore Wind Technologies (FOWTs) and include a float buoy component with power and communication solutions for independent ocean deployment to support continuous off-grid operation. Advanced machine learning (ML) algorithms and simulation tools will be developed to allow rapid data reduction and signal recognition to produce actional information to support decision making processes. Successful development of this integrated monitoring system will provide comprehensive ground-breaking capabilities to monitor impact of FOWT development to both marine mammals and ocean environments throughout their operational life of multiple decades.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Improve the ability to detect and locate marine mammals in and around floating offshore wind farms by designing, testing, and validating an integrated monitoring system to assess impacts to marine mammal movement and behavior from floating offshore wind deployments.
- Advance the detection of ocean water column and current disturbance by both magnitude and direction, as well as detection of ocean floor landslides and earthquakes, in order to facilitate comprehensive monitoring of potential ocean environmental impacts from floating offshore wind energy development in California.

- Advance data reduction and characterization from offshore wind environmental monitoring systems through machine learning algorithms.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of the following:

- Reduction of annual electricity energy cost: Reduction of electricity cost can be realized via the reduced operation and maintenance costs as well as increased capacity factor and productivity of offshore wind farms when equipped with the proposed technology. The fiber optic sensors don't require electric power, which enables monitoring cost savings, contributing to lower overall energy cost.
- FOWT Infrastructure resiliency and reliability: This can be achieved by the proposed technology via its capability to provide real time, continuous monitoring data on the environmental conditions and potential issues (e.g., animal entanglement and collision). This helps to effectively design and guide corrective actions, and reduce possible false alarms, leading to improved resiliency and reliability.
- Environmental sustainability benefits: Significantly increase our capability to collect high temporal and spatial resolution data on the impact of FOWT on marine animals and ocean environments. This promotes environmentally responsible development of FOWTs and helps gain public support.

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 developing an integrated, all-in-one monitoring system to monitor the environmental impacts from FOWT development. Its capability to be co-deployed on FOWT structural component and capability to provide significantly improved spatial and temporal resolution and coverage provide unprecedented capabilities for holistic environmental monitoring beyond the current state-of-the-art technologies.

Agreement Objectives

The objectives of this Agreement are to:

- Design and prototype an integrated sensing system to detect marine mammal presence and location continuously in time throughout a wind farm area.
- Design and prototype an integrated sensing system to detect, ocean water column and current disturbance (both magnitude and direction) and ocean floor landslides and earthquakes (at a less-than meter scale and less-than 5.0 Richter scale, respectively).
- Develop and test a machine learning-based rapid data processing capability, including data reduction and signal recognition algorithms, to allow for autonomous and rapid processing of a large volume of data from the proposed sensing system.
- Design and prototype a buoy float system for independent operation of the sensing system to allow for environmental monitoring and data collection prior to installation of FOWT structures.

[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).

- Demonstrate the performance of the integrated system in controlled laboratory experiments to validate and improve the proposed hardware and data processing algorithms of the monitoring system and optimize sensing cable geometric layout.
- Conduct numerical modeling and simulations to assess the transferability of the laboratory prototype monitoring system to the harsh WEA ocean conditions and ensure long durability throughout FOWT operational life while maintaining high sensitivity.

Exhibit A
Scope of Work
Lawrence Berkeley National Laboratory

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(s)
- Progress Determination

Subtask 1.4 Final Meeting

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

The Recipient shall:

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

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

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

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 quarterly *Progress Report* to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding quarter, 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.
- Engage in monthly check-in calls with the CAM to discuss, at a minimum:
  - Progress made on all Agreement activities as specified in the scope of work for the preceding month, including summaries of 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.
- 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

III. TECHNICAL TASKS

TASK 2 PROTOTYPE MONITORING HARDWARE PACKAGE FOR FLOATING OFFSHORE WIND

The goal of this task is to design and construct a prototype monitoring hardware package deployable on floating offshore wind structure. This task aims to develop the sensor package co-deployable on mooring lines of FOWT and integrates multiple fiber optic sensing methods and vector hydrophone discussed above.

The Recipient shall:

- Procure and prepare the fiber optic sensors and advanced vector hydrophone before integration.
- Perform FOWT mooring system compatibility design and prototyping for the monitoring system.
- Perform high sensitivity optical fiber design, construction, and testing.
- Develop the initial integrated system prototype and perform dry testing.
- Prepare a draft *Initial System Design and Test Results Report,* that describes, at a minimum:
    - Descriptions of hydrophone datasets and WEA conditions used to guide the monitoring system design.
    - Mooring system compatibility design and prototyping descriptions.
    - High sensitivity optical fiber design and construction details.
    - Technology placements (i.e., where the vector hydrophones and fiber optic sensors would be located on the FOWT, distance between hydrophones).
    - Initial testing results.
    - Identification of technological barriers.
- Submit the draft *Initial System Design and Test Results Report* to the CAM for feedback and incorporate changes as requested in the final *Initial System Design and Test Results Report.*

Products:

- Initial System Design and Test Results Report (draft and final)

TASK 3 MACHINE-LEARNING-BASED RAPID DATA PROCESSING CAPABILITIES

This task will focus on rapid data reduction and signal recognition algorithms for rapid translation of large volumes of data into actionable knowledge and will also include forward simulations of acoustic wave propagation under laboratory conditions.

The Recipient shall:

- Conduct existing marine acoustic data analysis and training of deep learning algorithms.
- Develop on-the-fly data processing capability for deployment on both sensor edge and computation center.
- Demonstrate algorithm performance on both existing field data and newly collected lab data.
- Conduct aqueous acoustic wave propagation simulations with test facility setup.
- Prepare a draft *Algorithm Development and Test Results Report*, that describes, at a minimum:

  - Analysis of existing marine acoustic data and training of deep learning algorithms.
  - Descriptions of on-the-fly data processing capability development and algorithm performance.
  - Results of aqueous acoustic wave propagation simulations.
- Submit the draft *Algorithm Development and Test Results Report* to the CAM for feedback and incorporate changes as requested in the final *Algorithm Development and Test Results Report.*
- Prepare and submit a *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:
- Algorithm Development and Test Results Report (draft and final)
- CPR Report #1

TASK 4 LABORATORY TESTING OF INTEGRATED MONITORING SYSTEM
This task will demonstrate, validate and improve the prototype monitoring system, both hardware and data processing algorithms, built in previous tasks. The tests will include the following (1) sensitivity to direction and magnitude of Whale vocalization; (2) sensitivity to vertical temperature disturbance induce; (3) sensitivity to upwelling and downwelling of the water column; and (4) sensitivity to ocean bottom landslides and earthquakes.

The Recipient shall:
- Modify and prepare multiple existing wave tanks and pools for experiments.
- Conduct aqueous acoustic wave propagation simulation focusing on different spatial components according to the wave tank geometry.
- Conduct sensitivity tests to evaluate the system performance (e.g., ambient noise interference and signal attenuation experiments).
- Test and optimize sensing cable geometric layout to increase sensitivity and performance.
- Conduct simulated ocean upwelling and downwelling processes, as well as horizontal current movement to validate detection of direction and magnitude of disturbance.
- Conducted simulated ocean bottom landslides and earthquakes to assess system sensitivity to these events.
- Perform joint data analysis.
- Prepare a *Laboratory Experimental Test Plan*, that describes, at a minimum:
  - Technical specifications of the prototype monitoring system.
  - Testing conditions and proposed experimental setup and procedures, including wave tanks and pools.
- Consult with TAC on *Laboratory Experimental Test Plan* to verify technical feasibility in accordance with subtask 1.10 (Technical Advisory Committee). Incorporate TAC feedback into the *Laboratory Experimental Test Plan* as appropriate.
- Prepare a draft *Laboratory Test Report,* that describes, at a minimum:
  - Actual experimental setup and procedures, with images.
  - Results and data analysis.
- Submit the draft *Laboratory Test Report* to the CAM for feedback and incorporate changes as requested in the final *Laboratory Test Report.*

Products:

- Laboratory Experimental Test Plan
- Laboratory Test Report (draft and final)

TASK 5 JOINT FIBER SENSING-HYDROPHONE DATA ANALYSIS

This task focuses on joint data processing, cross-reference, comparison, and calibration, and will be carried out for acoustic datasets between distributed acoustic sensing and hydrophone. Acoustic source identification will rely on the joint use of multiple data types and the expertise across the team members.

The Recipient shall:

- Evaluate both open source and proprietary algorithms for their utility in data processing.
- Develop both physics-based (e.g., beamforming) and ML-based data reduction and signal recognition capabilities to autonomously and rapidly process large volumes of monitoring data.
- Combine multiple sensor data types for joint analysis.
- Prepare a draft *Joint Data Analysis and Results Report,* that describes, at a minimum:
    - Methodology and evaluations of algorithms.
    - Results and data analysis.
    - How data will be delivered to shore and used.
- Submit the draft *Joint Data Analysis and Results Report* to the CAM for feedback and incorporate changes as requested in the final *Joint Data Analysis and Results Report.*

Products:

- Joint Data Analysis and Results Report (draft and final)

TASK 6 SELF-SUSTAINING PROTOTYPE FLOAT BUOY SYSTEM

This task will focus on developing a self-sustaining prototype float buoy system with built-in power and communication solutions for the independent operation of the monitoring system. The design of the system will reference to the oceanographic conditions and communication constraints at the WEAs.

The Recipient shall:

- Define system performance parameters in terms of buoy geometry and design, power need, network bandwidth needs and potential solutions (e.g., solar/way and Starlink).
- Determine material sourcing and prototype the small-scale system.
- Perform prototype testing in available tank facilities and analyze data.
- Prepare a draft *System Design, Prototyping, and Test Results Report,* that describes, at a minimum:
    - System performance parameters, oceanographic conditions, communication constraints, and material sourcing.
    - Small-scale system prototype and images.
    - Buoy arrangements and how they provide spatial coverage and don't increase entanglement risks.
    - Testing procedures.
    - Results and data analysis.

- Submit the draft *System Design, Prototyping, and Test Results Report* to the CAM for feedback and incorporate changes as requested in the final *System Design, Prototyping, and Test Results Report.*
- Prepare a *CPR Report #2* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:
- System Design, Prototyping, and Test Results Report (draft and final)
- CPR Report #2

TASK 7 NUMERICAL MODELING AND SIMULATIONS
This task will focus on evaluating and improving the transferability of the lab-based prototype system to existing field conditions at the designated WEAs in order to estimate the suitability of both the hardware and the machine learning algorithms of this technology to be deployed in the field with real-world operational parameters.

The Recipient shall:
- Gather California WEA regional oceanographic parameter data (e.g., current and wave conditions, energy and communication options).
- Analyze the monitoring system field fitness in terms of performance in the expected noise level and oceanographic conditions.
- Perform a scalability analysis from laboratory prototype to field deployment.
- Engage with developers to discuss and determine feasibility of the integrated monitoring system.
- Simulate a field deployable monitoring system by extrapolating conditions from the lab-based results, including:
    - Marine mammal vocalizations, oceanic current movement, wave action, upwelling/downwelling processes, landslides, earthquakes, and the sensor system's responses to each.
- Prepare a draft *Numerical Modeling and Simulation Technology Scalability Report,* that describes, at a minimum:
    - Identification and description of system performance parameters, oceanographic conditions, and energy and communication constraints.
    - Monitoring system field fitness analysis.
    - Scalability analysis.
    - Description and feasibility of field deployable monitoring system.
    - Advantages and limitations of integrated fiber optic and vector hydrophone monitoring system for FOWT environmental and operational monitoring.
- Submit the draft *Numerical Modeling and Simulation Technology Scalability Report* to the CAM for feedback and incorporate changes as requested in the final *Numerical Modeling and Simulation Technology Scalability Report.*

Products:
- Numerical Modeling and Simulation Technology Scalability Report (draft and final)

- **TASK 8 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 at www.energizeinnovation.fund, and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory 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 9 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.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the CEC.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.

Products:

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

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.