California Energy Commission
July 10, 2025 Business Meeting
Backup Materials for Regents of the University of California, on behalf of the Merced Campus

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

[PROPOSED]

RESOLUTION NO: 25-0710-09c

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: Regents of the University of California, on behalf of the Merced Campus

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-25-004 with the Regents of the University of California, on behalf of the Merced Campus for a $589,265 grant. This project will advance the understanding of solar-over-water systems with a regional cost-benefit analysis that includes co-benefits and technology readiness level analyses and modeling of solar-over-water technology designs deployed on reservoirs and water conveyance systems in 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 10, 2025.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

_____
Kim Todd
Secretariat

STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

CEC-270 (Revised 01/2024)

GRANT REQUEST FORM (GRF)

A. New Agreement Number

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

New Agreement Number: EPC-25-004

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Emily Field
3. MS-:None
4. Phone Number: 916-258-2983

C. Recipient's Information

1. Recipient's Legal Name: The Regents of the University of California on behalf of the Merced Campus
2. Federal ID Number: 27-0093858

D. Title of Project

Title of project: Environmental cost-benefit valuation of solar-over-water deployment in California

E. Term and Amount

1. Start Date: 8/13/2025
2. End Date: 12/13/2028
3. Amount: $589,265.00

F. Business Meeting Information

1. Are the ARFVTP agreements $75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 7/10/2025
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Julia Harnad
5. Time Needed for Business Meeting: 5 minutes
6. The email subscription topic is: Electric Program Investment Charge (EPIC) Program

Agenda Item Subject and Description:

The Regents of the University of California, on behalf of the Merced campus. Proposed resolution approving agreement EPC-25-004 with The Regents of the University of California, on behalf of the Merced campus for a $589,265 grant, and adopting staff's recommendation that this action is exempt from CEQA. This project will advance the understanding of solar-over-water systems with a regional cost-benefit analysis that includes co-benefits and technology readiness level analyses and modeling of solar-over-water technology designs deployed on reservoirs and water conveyance systems in California. (EPIC funding) Contact: Julia Harnad

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, § 15306 ;

      Common Sense Exemption? 14 CCR 15061 (b) (3)
      Yes

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

      Cal. Code Regs., tit. 14, sec. 15306 provides that projects which consist 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 are categorically exempt from the provisions of CEQA. These may be strictly for information gathering purposes, or as part of a study leading to an action which a public agency has not yet approved, adopted, or funded. This agreement involves data collection, research, and resource evaluation of solar over water technologies. There will not be any serious or major disturbance to environmental resources.

      The project activity is also covered by the common sense exemption that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. The work performed under this agreement includes a paper study and computer modeling study where the potential siting of solar over water canals and floating solar will be modeled and analyzed. The co-benefits for the rural

communities, environmental, and water saving benefits will be quantified for each potential location via paper study. There is no physical work occurring in this project.

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. Is this project considered “Infrastructure”?

No

I. 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 Irvine Campus	$ 200,000	**$**0
San Jose State University Research Foundation (SJSURF)	$ 129,005	**$**0
Center for Energy Efficiency and Renewable Technologies	$ 45,711	**$**0

J. 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	**$**	**$**

K. 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

L. 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	23-24	301.001K	$ 589,265

TOTAL Amount: $ 589,265

R&D Program Area: ESB: EA

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

M. Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Anna Boyanovsky

Address: 5200 N Lake Rd Sponsored Research Services

City, State, Zip: Merced, CA 95343-5001

Phone: 209-413-9882

E-Mail: aboyanovsky@ucmerced.edu

2. Recipient's Project Manager

Name: Brandi McKuin

Address: 5200 N Lake Rd Sponsored Research Services

City, State, Zip: Merced, CA 95343-5001

Phone: 209-777-9708

E-Mail: bmckuin@ucmerced.edu

N. Selection Process Used

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

Selection Process	Additional Information
Competitive Solicitation #	GFO-24-301
First Come First Served Solicitation #	Not applicable
Other	Not applicable

O. 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	No

Approved By

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

Agreement Manager: Emily Field

Approval Date: 5/23/25

Branch Manager: Alex Horangic

Approval Date: 5/28/25

Director: Jonah Steinbuck (delegated to Branch Manager)

Approval Date: 5/28/25

Exhibit A
Scope of Work
The Regents of the University of California, Merced

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Evaluate the Costs and Technology Readiness Levels of Different Solar-Over-Water Technologies.
3		Co-Benefit Quantification of Solar-Over-Water Technologies
4	x	Cost-Benefit Analysis of Solar-Over-Water Technologies
5		Evaluation of Project Benefits
6		Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CSCI	California Solar Canal Initiative
CEC	California Energy Commission
CO2e	Carbon dioxide equivalents
CPR	Critical Project Review
FPV	Floating photovoltaic
GIS	Geographic Information Systems
GHG	Greenhouse Gases
GWh	Giga-watt hours
MMT	Million metric tons
NOx	Nitrogen oxides
PV	Photovoltaic
SB	Senate Bill
TAC	Technical Advisory Committee

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

Exhibit A
Scope of Work
The Regents of the University of California, Merced

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

A. Purpose of Agreement

The purpose of this Agreement is to fund a regional cost-benefit analysis that will include co-benefits and technology readiness level analyses of solar-over-water technology designs deployed on reservoirs and water conveyance systems in California, with suspended canopies and floating systems.

B. Problem/ Solution Statement

Problem

Plans to meet California's SB 100 policy goal at minimum cost entails the significant expansion of utility-scale PV capacity, but face several practical challenges including but not limited to: 1) the large tracts of land needed for development may conflict with other land use priorities such as agriculture, wildlife conservation, cultural use, and recreation, leading to community opposition to project development; 2) the vast expanses of land required for solar development can require complex negotiations for land acquisition or leases, which can slow development timelines; 3) delays in the environmental permitting process and high litigation rates can slow development timelines; 4) the limited availability of transmission capacity to support interconnection to the grid; and 5) limited availability of water for construction and panel cleaning in locations with high solar resources in the southwest.

Solution

The Recipient will conduct a cost-benefit analysis to advance understanding of the value proposition of solar-over-water technologies and the role they may have in contributing towards California's SB 100 goals. A cost-benefit analysis will document the factors and conditions that may increase, decrease, or outweigh such benefits. For example, the economic benefits that may be most relevant to solar project developers include: 1) reduced costs for land acquisition or leases, 2) faster timelines for environmental permits and avoided mitigation costs, 3) deferral of or avoidance of grid interconnection upgrades which could reduce costs and lead to faster project development timelines. Additionally, there are potential water conservation benefits that have important social, economic, and environmental benefits. The Recipient will expand on past work on solar canals to include an analysis of the technical potential of floating photovoltaics (FPV) in man-made reservoirs and address important questions about whether solar-over-water technologies (both FPV and solar canals) can reduce impacts to biodiversity and can defer or avoid costly grid interconnection upgrades by using existing infrastructure. The Recipient will compare results from the cost-benefit analysis to previous solar canal and FPV studies and relevant ground-mounted solar projects to understand the role these technologies may have as low-impact sites for new clean energy facilities that align with transmission planning. Siting new solar developments on or over water bodies could yield both economic (savings on land, permit timelines and avoided mitigation costs, grid interconnection costs) and conservation benefits, and provide more certainty to solar project developers in accelerating renewable energy deployment.

C. Goals and Objectives of the Agreement

Agreement Goals

This research project aims to significantly advance our understanding of how innovative solar-over-water systems can alleviate the barriers to achieving the State's statutory energy goals by quantifying the costs and benefits of these technologies in comparison to the often-over-looked externalities of utility-scale solar.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefit[s] of greater electricity reliability, and *potentially* lower costs to rate payers. This work will provide ratepayer benefits by studying how innovative solar-over-water systems can reduce the barriers to achieving the State's statutory energy goals by quantifying the costs and benefits of these technologies. The estimated benefits to ratepayers are as follows :

- Statewide potential electricity generation of up to 120,000 GWh y^{-1}
- Statewide GHG reductions of up to 40 MMT CO_2e assuming FPV capacity displaces natural gas capacity.
- Statewide NOx reductions of up to 14,286 metric tons assuming FPV capacity displaces natural gas capacity which can improve health and productivity.
- The combined land conservation potential of FPV and solar canals is nearly 290,000 acres which can save land for other priorities such as food security, biodiversity, and recreation.
- The combined water conservation potential of FPV and solar canals is nearly 912 billion gallons which is enough water to meet the residential needs of over 29 million people or to irrigate nearly 699,400 acres of farmland.
- Solar-over-water projects could provide rate payer stability and offset rising electricity prices if sited in regions with high local utility costs.
- Potentially faster environmental permitting and faster grid interconnection which could translate into rate payer savings.
- Monetizing the land savings, water savings, and other co-benefits could translate into lower electricity rates.

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 monetizing benefits from reductions in environmental externalities and potential benefits from avoiding grid interconnection upgrades using a cost-benefit analysis, Recipient will advance the understanding of solar-over-water technologies as

[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).

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

low-impact sites for new clean energy facilities that align with transmission planning. Siting new solar developments on or over water bodies could yield both economic (savings on land, permit timelines and avoided mitigation costs, grid interconnection costs) and conservation benefits, and provide more certainty to solar project developers in accelerating renewable energy deployment.

Agreement Objectives

The project will draw upon on-the-ground information from pilot study demonstrations and expand upon the Recipient's previous work to perform a more detailed assessment of the costs and benefits associated with scaling up solar-over-water systems in California. Specifically, the Recipient will perform analyses that address the following questions to improve the breadth and depth of the cost-benefit analysis for solar-over-water systems:

- Which solar-over-water technology design options (e.g., support structure designs for both solar canopies and floating panels in canals and reservoirs as well as choice of PV technology) yield the most energy and non-energy benefits for the lowest cost?

- How do the estimated water evaporation reductions affect both statewide and local/regional water supply/demand management?

- What is the ecosystem service value of water savings through reduced evaporation to riparian areas?

- How do the permitting and construction timeframes of solar-over-water projects compare to utility-scale solar PV systems?

- What is the monetary value of avoiding the need for habitat mitigation and reducing habitat management requirements?

- What is the value of potentially quicker deployment of PV capacity in terms of costs and avoided greenhouse gas emissions?

- How does accounting for grid interconnection considerations (i.e. lines to bridge distance to substations and interconnection fees) affect the cost-benefit ratio of solar-over-water systems deployed in different locations?

- How does putting solar panels over water impact operation and maintenance costs of solar panels, and canals and reservoirs?

- How do the benefits of solar-over-water systems change when accounting for the aforementioned factors and are there certain canals and reservoirs that should be prioritized for solar-over-water deployment?

Addressing these questions will help provide a more complete picture of solar-over-water technology costs and benefits, how these vary under different conditions and locations, and how these systems fit into California's broader solar PV portfolio.

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, and other CEC staff relevant to the Agreement. The Recipient's Project Manager and any other individuals deemed necessary by the CAM or the Project Manager shall participate in 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., Teams, Zoom), with approval of the CAM.

  The Kick-off meeting will include discussion of the following:
  - The CAM's expectations for accomplishing tasks described in the Scope of Work;
  - An updated Project Schedule;
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;
  - Travel;

- Equipment purchases;
- Administrative and Technical products (subtask 1.1);
- CPR meetings (subtask 1.3);
- Monthly Calls (subtask 1.5)
- Quarterly Progress reports (subtask 1.6)
- Final Report (subtask 1.7)
- Match funds (subtask 1.8);
- Permit documentation (subtask 1.9);
- Subawards(subtask 1.10);
- Technical Advisory Committee meetings (subtasks 1.11 and 1.12);
- Agreement changes;
- Performance Evaluations; 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 may 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 may 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. A determination of unsatisfactory progress This may result in project delays, including a potential Stop Work Order, while the CEC determines whether the project should continue.
- 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 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* organized by the tasks in the Agreement.

Products:

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

MONTHLY CALLS, REPORTS AND INVOICES

Subtask 1.5 Monthly Calls

The goal of this task is to have calls at least monthly between the CAM and Recipient to verify that satisfactory and continued progress is made towards achieving the objectives of this Agreement on time and within budget.

The objectives of this task are to verbally summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, to verify match funds are being proportionally spent concurrently or in advance of CEC funds or are being spent in accordance with an approved Match Funding Spending Plan, to form the basis for determining whether invoices are consistent with work performed, and to answer any other questions from the CAM. Monthly calls might not be held on those months when a quarterly progress report is submitted or the CAM determines that a monthly call is unnecessary.

The CAM shall:

- Schedule monthly calls.
- Provide questions to the Recipient prior to the monthly call.
- Provide call summary notes to Recipient of items discussed during call.

The Recipient shall:

- Review the questions provided by CAM prior to the monthly call

- Provide verbal answers to the CAM during the call.

Product:

- Email to CAM concurring with call summary notes.

Subtask 1.6 Quarterly 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 reporting period, 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. Progress reports are due to the CAM the 10th day of each January, April, July, and October. The Quarterly Progress Report template can be found on the ECAMS Resources webpage available at: https://www.energy.ca.gov/media/4691
- Submit a monthly or quarterly *Invoice* on the invoice template(s) provided by the CAM.

Recipient Products:

- Quarterly Progress Reports
- Invoices

CAM Product:

- Invoice template

Subtask 1.7 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 1.7.1 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 Products:

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

Subtask 1.7.2 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 SUBAWARDS

Subtask 1.8 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. 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 application 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 application 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 1.9 Permits
The goal of this subtask is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track. Permit costs and the expenses associated with obtaining permits are not reimbursable under

this Agreement, with the exception of costs incurred by University of California recipients. Permits must be identified and obtained before the Recipient may incur any costs related to the use of the permit(s) for which the Recipient will request reimbursement.

The Recipient shall:

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

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

Products:

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

Subtask 1.10 Obtain and Execute Subawards and Agreements with Site Hosts

The goals of this subtask are to: (1) procure and execute subrecipients and site host agreements, as applicable, required to carry out the tasks under this Agreement; and (2) ensure that the subrecipients and site host agreements are consistent with the Agreement terms and conditions and the Recipient's own contracting policies and procedures.

The Recipient shall:

- Execute and manage subawards and coordinate subrecipients activities in accordance with the requirements of this Agreement.
-
- Incorporate this Agreement by reference into each subaward.
- Include any required Energy Commission flow-down provisions in each subaward, in addition to a statement that the terms of this Agreement will prevail if they conflict with the subaward terms.
- Submit a *Subaward and Site Letter* to the CAM describing the subawards and any site host agreement needed or stating that no subawards or site host agreements are required.

- If requested by the CAM, submit a draft of each *Subaward* and any *Site Host Agreement* required to conduct the work under this Agreement.
- If requested by the CAM, submit a final copy of each executed *Subaward* and any *Site Host Agreement*.
- Notify and receive written approval from the CAM prior to adding any new subrecipient (see the terms regarding subrecipient additions in the terms and conditions).

Products:

- Subaward and Site Letter
- Draft Subawards *(if requested by the CAM)*
- Draft Site Host Agreement *(if requested by the CAM)*
- Final Subawards *(if requested by the CAM)*

Final Site Host Agreement *(if requested by the CAM*

TECHNICAL ADVISORY COMMITTEE

Subtask 1.11 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 1.12.
- 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 1.12 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 Knowledge Transfer Plan.

Products:

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

Subtask 1.13 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

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

TASK 2 EVALUATE THE COSTS AND TECHNOLOGY READINESS LEVELS OF DIFFERENT SOLAR OVER-WATER TECHNOLOGIES

Because PV technologies are rapidly evolving, and the specific design and structure of the solar-over-water technologies influence the power generation, co-benefits and investments costs of a project, Recipient will perform an evaluation of different solar-over-water technology options.

Goal: Advance knowledge of best available solar-over-water technologies, and inform the cost-benefit analysis.

To accomplish this task, Recipient will: 1) synthesize the available cost information, and 2) assess technology readiness levels of currently adopted and emerging solar-over-water technologies.

TASK 2.1 SYNTHESIS OF AVAILABLE COST INFORMATION ON SOLAR-OVER-WATER TECHNOLOGIES

The Recipient shall:

- Synthesize available information about pilot study and emerging solar-over-water technologies:
    - Compile support-structure and PV panel cost data from current and planned pilot demonstrations (i.e., solar canopies and vertical array data from Project Nexus; floating solar for canal prototypes from San Luis and Delta Mendota Water Authority project).
    - Seek guidance from the TAC (see subtask 1.11) to identify the critical technology elements (e.g., emerging structural support designs or PV technologies) that are not considered in the current or planned pilot demonstrations.
    - Build on existing data to make engineering cost estimates of alternative solar-over-water designs and PV technologies not considered in current and planned pilot studies.
- Draft *Outline of Cost and Technology Readiness Level Summary*
- Prepare draft and final *Solar-Over-Water Cost Summary* based on above efforts.

Products:

- Draft Outline of Cost and Technology Readiness Level Summary
- Solar-Over-Water Cost Summary (draft and final)

TASK 2.2 ASSESS TECHNOLOGY READINESS LEVELS OF SOLAR-OVER WATER TECHNOLOGIES

The Recipient shall:

- Develop technology readiness levels assessment including:
  - Performance of technologies in test environments.
  - Identification of risks and uncertainties.
- Prepare draft and final *Cost and Technology Readiness Level Summary*

Products:

- Cost and Technology Readiness Level Summary (draft and final)

TASK 3 CO-BENEFIT QUANTIFICATION OF SOLAR-OVER-WATER TECHNOLOGIES

Goal: Characterize the potential magnitude of different co-benefits of installing solar-over-canal and floating solar on reservoir systems in different example locations across California.

Specifically, this task will investigate how well these deployments result in additional renewable generation, reduced water evaporation, land savings and associated ecosystem services, and potentially avoid grid interconnection upgrades which can lead to faster project development timelines.

To accomplish this task, Recipient will: 1) Develop GIS shapefiles of reservoir and canal locations for a geographically diverse analysis of solar-over-water technologies, 2) quantify the magnitude of the potential co-benefits of the selected technologies at the selected locations.

TASK 3.1 DEVELOP GIS SHAPEFILES OF RESERVOIR AND CANAL LOCATIONS

The Recipient shall:

- Seek guidance from the TAC (see subtask 1.11) to identify reservoir and canal analysis locations for a geographically diverse analysis of solar-over-water technologies.

- Develop *GIS shapefiles of selected canals and reservoirs*
  - For solar canals, Recipient will leverage the database in development for previous or existing solar canals, such as Project Nexus. The database includes GIS data on typical canal characteristics (shapefiles of canals including edge-to-edge surface area of canals and the extent of water surface areas); Recipient will develop specific shapefiles of the selected canals including the edge-to-edge surface area of canals, the extent of water surface areas, canal turn-outs, canal access roads, and electrical substations.
  - For reservoirs, Recipient will develop GIS and remote sensing data on man-made reservoirs based on selected characteristics (shapefiles of the extent of water surface areas and transmission interconnection locations).

Products:

- GIS Shapefiles of Selected Canals and Reservoirs (draft and final)

TASK 3.2 QUANTIFY THE POTENTIAL CO-BENEFITS OF SOLAR-OVER-WATER TECHNOLOGIES

The Recipient shall:

- Quantify the potential co-benefits of the selected solar-over-water technologies for the selected locations including:
    - Renewable energy generation
    - Water savings
    - Land conservation
    - Avoided impacts to biodiversity from land conservation
    - Faster environmental permitting timelines
    - Deferral of or avoided grid interconnection upgrade costs

- Prepare *Co-Benefit Quantification of Solar-Over-Water Technologies in California Summary Outline*

- Prepare a draft and final *Co-Benefit Quantification of Solar-Over-Water Technologies in California Summary*
    - Document the extent to which technology choices contribute to the potential co-benefits
    - Document the extent to which solar-over-water systems contribute to the different potential co-benefits and explain the range of these benefits due to differences in site characteristics

Products:
- Co-Benefit Quantification of Solar-Over-Water Technologies Summary Outline
- Co-Benefit Quantification of Solar-Over-Water Technologies in California Summary (draft and final)

TASK 4 COST-BENEFIT ANALYSIS OF SOLAR-OVER-WATER TECHNOLOGIES

Goal: Advance the understanding of the holistic value proposition of solar-over-water projects and provide a better guidance of where solar-over-water projects fit within the overall supply and demand for distributed solar options in California, and the role they may have in contributing towards California's solar PV capacity needs to meet SB 100 goals. A cost-benefit analysis will document the factors and conditions that may increase, decrease, or outweigh such benefits.

To accomplish this task, Recipient will 1) value the co-benefits, 2) compute the cost-benefit metrics of solar-over-water technologies, and 3) compare cost-benefit metrics to baseline solar-over-water technologies and appropriate ground-mounted solar scenarios.

TASK 4.1 ESTIMATE THE VALUE OF POTENTIAL CO-BENEFITS OF SOLAR-OVER-WATER TECHNOLOGIES

To fully account for the value created, the co-benefits of solar-over-water technologies (identified in Task 3.2) will be monetized. In sequence, Task 4.1 builds on Task 3.2.

The Recipient shall:

- Estimate the value of the potential co-benefits (identified in Task 3.2) for the selected locations (described in Task 2) by monetizing:
    - Water conservation
    - Land conservation
    - Time-value of faster environmental permits
    - Avoided compensatory mitigation and habitat management costs
    - Faster grid interconnection timeframes and possible deferral of or avoided upgrades to grid infrastructure
- Prepare *Co-Benefit Valuation of Solar-Over-Water Technologies in California Outline*
- Prepare a *Co-Benefit Valuation of Solar-Over-Water Technologies in California Summary*

Products:

- Co-Benefit Valuation of Solar-Over-Water Technologies in California Outline
- Co-Benefit Valuation of Solar-Over-Water Technologies in California Summary (draft).

TASK 4.2 CONDUCT COST-BENEFIT ANALYSIS OF SOLAR-OVER-WATER TECHNOLOGIES

The cost-benefit analysis using monetized co-benefits (Task 4.1) can inform the value proposition of solar-over-water technologies. In sequence, Task 4.2 builds on Task 4.1.

The Recipient shall:

- Conduct a cost-benefit analysis of the selected solar-over-water technologies (described in Task 2) at the selected locations (described in Task 3.1) for a geographically diverse set of conditions across California by completing the following tasks:
    - Estimate the direct and indirect costs of the selected solar-over-water technologies (described in Task 2) for the selected locations (described in Task 3.1)
    - Calculate the costs and benefits using a techno-economic framework including the valued co-benefits (described in Task 4.1) and a range of financial models
- Prepare and draft *Cost-Benefit Analysis of Solar-Over-Water Technologies in California Report Outline*.
    - Report will build on the previous *Co-Benefit Valuation of Solar-Over-Water Technologies in California Summary* by documenting the extent to which regional valuations impact the costs and benefits

- Submit the draft *Cost-Benefit Analysis of Solar-Over-Water Technologies in California Summary Report* to the CAM for feedback and incorporate changes as requested in the final *Co-Benefit Valuation of Solar-Over-Water Technologies in California Summary*.

Products:

- Cost-Benefit Analysis of Solar-Over-Water Technologies in California Report Outline
- Co-Benefit Valuation of Solar-Over-Water Technologies in California Summary (final)
- Cost-Benefit Analysis of Solar-Over-Water Technologies in California Summary Report (draft)

TASK 4.3 COMPARE COST-BENEFIT ANALYSIS TO BASELINE AND APPROPRIATE GROUND-MOUNTED SOLAR SCENARIOS

The comparison of the cost-benefit analysis (Task 4.2) to baseline and appropriate ground-mounted solar scenarios can inform decision-making about solar-over-water technologies in the context of other alternatives. In sequence, Task 4.3 builds on Task 4.2.

The Recipient shall:

- Compare the cost-benefit analysis of the selected solar-over-water technologies (described in Task 2) at the selected locations (described in Task 3) to baseline scenarios of solar-over-water technologies using pilot project data and literature values.

- Compare the cost-benefit analysis of the selected solar-over-water technologies (described in Task 2) at the selected locations (described in Task 3) to appropriate ground-mounted solar projects using pilot project data and literature values.

- Prepare a *Comparison of Cost-Benefit Analysis of Solar-Over-Water to Baseline and Ground-Mounted Solar Summary.*

- Revise draft *Cost-Benefit Analysis of Solar-Over-Water Technologies in California Summary Report*.
    - Report will build on the previous draft by incorporating the comparison of the study results to baseline scenarios and to ground-mounted solar projects, and information about canals and reservoirs that should be prioritized for solar-over-water deployment.

- Submit the final *Cost-Benefit Analysis of Solar-Over-Water Technologies in California Summary Report* to the CAM for feedback and incorporate changes as requested in the final *Comparison of Cost-Benefit Analysis of Solar-Over-Water to Baseline and Ground-Mounted Solar Summary*.

- Prepare a *CPR Report* in accordance with subtask 1.3 (CPR Meetings).

- Participate in a CPR meeting.

Products:

- Comparison of Cost-Benefit Analysis of Solar-Over-Water to Baseline and Ground-Mounted Solar Summary (draft and final)
- Cost-Benefit Analysis of Solar-Over-Water Technologies in California Summary Report (final)
- CPR Report

TASK 5: 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 6 KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to ensure the scientific and techno-economic analysis and tools developed under this agreement are utilized in the energy policy, and/or planning decisions at the state and/or local levels, academic community and/or commercial sector.

Exhibit A
Scope of Work
The Regents of the University of California, Merced

The Recipient Shall:

- Develop and submit a *Knowledge Transfer Plan* that identifies the proposed activities the Recipient will conduct to meet the goal of the task. The *Knowledge Transfer Plan* should include at a minimum:
    - Specific policy and planning efforts this project is expected to inform.
    - Specific stakeholder groups and energy policy and planning practitioners who will utilize the results of this project.
    - Proposed activities the Recipient will conduct to ensure the tools and results from this project will be utilized and adopted by the groups identified above.
- Present the *Draft Knowledge 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 Knowledge Transfer Plan*. This document will identify:
    - TAC comments the Recipient proposes to incorporate into the *Final Knowledge Transfer Plan*.
    - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Submit the *Final Knowledge Transfer Plan* to the CAM for approval.
- Implement the activities as described in the *Final Knowledge Transfer Plan.*
- Develop a *Knowledge Transfer Summary Report* that includes high level summaries of the activities, results, and lessons learned of tasks performed relating to implementing the Final Knowledge 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 California 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:

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

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.