STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

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

A) New Agreement # EPC-21-019 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	Braden Henderson	51	916-776-0769

C) Recipient's Legal Name	Federal ID Number
Porifera, Inc.	26-2704998

D) Title of Project
Manufacturing of Large Format Osmotic Membrane Module

E) Term and Amount

Start Date	End Date	Amount
4/8/2022	3/31/2026	$ 2,980,226

F) Business Meeting Information

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

Proposed Business Meeting Date 3/9/2022 ☐ Consent ☒ Discussion

Business Meeting Presenter Michael Ferreira Time Needed: 5 minutes

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

Agenda Item Subject and Description:

Porifera, Inc. Proposed resolution approving agreement EPC-21-019 with Porifera, Inc. for a $2,980,226 grant to develop an automated manufacturing line for a large-format forward osmosis membrane module that enables efficient industrial, agricultural, and municipal wastewater reuse and adopt staff's determination that this action is exempt from CEQA.The full-scale prototype of the large-format Porifera Forward Osmosis system (PFO200) has been designed, built, and demonstrated, making it ready to scale-up for commercialization. This project will design and build an automated manufacturing line at low-rate initial production for membrane packets. (EPIC funding) Contact: Anthony Ng.

G) California Environmental Quality Act (CEQA) Compliance

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

   Explain why Agreement is not considered a "Project":

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

Explain reason why Agreement is exempt under the above section:

This project involves the minor alteration of an existing private structure or facility by proposing to design and build-out a low-rate initial production manufacturing line for more cost effective, energy-efficient wastewater processing. The activities funded by the agreement will not cause a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because the proposed scope of work will be performed at an existing processing plant. No building additions will be proposed as part of the scope of work. For these reasons, the project will not have a significant effect on the environment and falls under the categorical exemption listed in 14 CCR Section 15301.

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

Check all that apply

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

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

Legal Company Name:	**Budget**
Mann+Hummel Water & Fluid Solutions, Inc.	$ 98,000
Simplexity Product Development Inc.	$ 40,000
Michael Bordonaro	$ 10,000
	$

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

Legal Company Name:

J) Budget Information

Funding Source	**Funding Year of Appropriation**	**Budget List Number**	**Amount**
EPIC	19-20	301.001G	$2,980,226
			$

R&D Program Area: EDMFO: EDMF TOTAL: $ 2,980,226

Explanation for “Other” selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Olgica Bakajin
Address: 1575 Alvarado St
City, State, Zip: San Leandro, CA 94577-2640
Phone: 510 999 5393
E-Mail: olgica@poriferanano.com

2. Recipient's Project Manager

Name: Olgica Bakajin
Address: 1575 Alvarado St
City, State, Zip: San Leandro, CA 94577-2640
Phone: 510 999 5393
E-Mail: olgica@poriferanano.com

L) Selection Process Used

☒ Competitive Solicitation Solicitation #: GFO-20-302
☐ First Come First Served Solicitation Solicitation #:
☐ Non-Competitive Bid Follow-on Funding (SB 115)

M) The following items should be attached to this GRF

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

Agreement Manager **Date**

Office Manager **Date**

Deputy Director **Date**

Exhibit A
Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2	X	Design and Build Manufacturing Equipment
3		Product Manufacturing
4		Evaluation of Project Benefits
5		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
GHG	Greenhouse Gas
LRIP	Low-Rate Initial Production
PFO	Porifera Forward Osmosis
QC	Quality Control
TAC	Technical Advisory Committee
ZLD	Zero Liquid Discharge

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the design and build-out of a Low-Rate Initial Production (LRIP) manufacturing line of Porifera Forward Osmosis (PFO) 200 membrane packets that, when assembled, form the large format PFO200 modules for energy-efficient wastewater processing.

B. Problem/ Solution Statement

Problem

Water is a critical resource for drought-prone California. The agriculture and industry sectors face increasing pressure to reduce freshwater consumption and to implement reuse of wastewater. There is opportunity to utilize wastewater through recycling technology and processes. However, high purity water reuse is traditionally energy intensive, expensive and requires large treatment facilities.

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

Solution

Porifera's PFO200 technology has the potential to allow energy-efficient and cost-effective wastewater reuse with a footprint compatible with existing industrial facilities. PFO technology has been demonstrated to efficiently reuse water in numerous successful pilot tests and a number of commercial applications. For most of these projects, even when pilot test results were excellent and there was no clear competing technology, the customer communicated that footprint and cost reductions were needed to implement the technology at their site. Both cost savings and a smaller footprint can be achieved by scaling up the PFO technology from the smaller PFO100 module to the larger PFO200. The recipient proposes development of an automated manufacturing line for the PFO200. The PFO200 module operates in the same way as the smaller, currently available PFO100 modules, but will provide a two to four times smaller equipment footprint for the same amount of water processed and 50-70 percent lower membrane module cost than the PFO100, thus providing the incentives needed for widespread adoption.

C. Goals and Objectives of the Agreement

Agreement Goals

The goals of this Agreement are to:

- Design and build an LRIP manufacturing line capable of producing 56 units per day of PFO200 membrane packets that consist of injection molded plate with membrane mounted on it.
- Design the manufacturing line to be capable of producing quality membrane packets with a failure rate between 1-5 percent.
- Achieve more than 50 percent savings compared to state-of-the-art technology.
- Demonstrate the PFO200's ability to reduce total system footprint while maintaining water processing throughput.

Ratepayer Benefits:[2] This Agreement will result in the ratepayer benefits of greater electricity reliability, lower costs, or increased safety by implementing an automated manufacturing line for PFO200 membrane technology. In addition to water reuse applications, PFO200 technology will help reduce energy use in California and globally by replacing thermal evaporators for food and beverage product concentration, for more efficient lithium dewatering, and potentially for other applications as well.

Estimated benefits of this project are as follows:

1) Annual electricity savings of 72,000 MWh by 2030 and 1,467,000 MWh by 2040 if PFO200 enabled projects are implemented instead of competing technologies.
2) Decreased peak loads compared to other drought mitigation projects: PFO200 enabled systems have less than 30 percent lower peak demands for water reuse and near-zero liquid discharge (ZLD) applications and 70 percent lower total power demand than seawater desalination projects.
3) Decreased emissions compared to other drought mitigation projects: 30 percent lower greenhouse gas (GHG) emissions for industrial water reuse projects, 85 percent lower

[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).

GHG emissions for near-ZLD projects, and 70 percent lower GHG emissions than seawater desalination projects.

Technological Advancement and Breakthroughs: This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by decreasing costs and footprint of energy-saving water reuse technology. There are many reuse projects that will happen regardless of the PFO200's availability. However, there are many projects in California and globally where implementation of PFO200 technology will 1) reduce energy and space to generate high quality water for industrial reuse applications, 2) assist with overcoming regulatory and public perception hurdles for direct potable reuse, 3) enable the capture and reuse of more nutrients from waste streams, and 4) provide a low cost, small footprint, reliable solution to make water reuse and/or near-ZLD solutions possible for projects where it was previously thought to be infeasible. Expediting manufacturing and rollout of this technology can thus assist in achieving the State's statutory energy goals as water reuse continues to become more common in California.

Agreement Objectives

The objectives of this Agreement are to:

- Design and build a semi-automated pilot manufacturing line with an initial rate of production of 14 membrane packets per day.
- Upgrade the semi-automated pilot manufacturing line to be more fully automated to produce 56 membrane packets per day.
- Design and build equipment for product quality control (QC) testing
- Validate proof of manufacturing quality of the product by producing membrane packets that pass vacuum testing.
- Establish and validate a supply chain for production parts.
- Demonstrate the production of product with an LRIP pilot manufacturing line with consistent product quality.

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.

Exhibit A
Scope of Work

The Recipient shall:

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

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

For products that require a final version only

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

For all products

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

Instructions for Submitting Electronic Files and Developing Software:

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

  The following describes the accepted formats for electronic data and documents provided to the CEC as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:
  - Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
  - Text documents will be in MS Word file format, version 2007 or later.
  - Project management documents will be in Microsoft Project file format, version 2007 or later.

- **Software Application Development**

  Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open-source programs:
  - Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
  - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
  - Visual Studio.NET (version 2008 and up). Recommend 2010.

- C# Programming Language with Presentation (UI), Business Object and Data Layers.
- SQL (Structured Query Language).
- Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
- Microsoft SQL Reporting Services. Recommend 2008 R2.
- XML (external interfaces).

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

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

  The administrative portion of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;
  - Administrative products (subtask 1.1);
  - CPR meetings (subtask 1.3);
  - Match fund documentation (subtask 1.7);
  - Permit documentation (subtask 1.8);
  - Subcontracts (subtask 1.9); and
  - Any other relevant topics.

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

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

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

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

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

CAM Product:
- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings
The goal of this subtask is to determine if the project should continue to receive CEC funding, and if so whether any modifications must be made to the tasks, products, schedule, or budget. CPR meetings provide the opportunity for frank discussions between the CEC and the Recipient. As determined by the CAM, discussions may include project status, challenges, successes, advisory group findings and recommendations, final report preparation, and progress on technical transfer and production readiness activities (if applicable). Participants will include the CAM and the Recipient and may include the CAO and any other individuals selected by the CAM to provide support to the CEC.

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

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

The CAM shall:
- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a *CPR Agenda* with a list of expected CPR participants in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a schedule for providing a Progress Determination on continuation of the project.

- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, products, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:
- CPR Report(s)

CAM Products:
- CPR Agenda
- Progress Determination

Subtask 1.4 Final Meeting
The goal of this subtask is to complete the closeout of this Agreement.

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

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

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

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices

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

The Recipient shall:

- Submit a 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 month, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Submit a 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 Technical Advisory (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.

Exhibit A
Scope of Work

The Recipient shall:

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

  If match funds were a part of the proposal that led to the CEC awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
    - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
    - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
    - If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

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

Subtask 1.8 Permits

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

The Recipient shall:

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

- The schedule the Recipient will follow in applying for and obtaining the permits.

The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.

- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

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

Subtask 1.9 Subcontracts

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

The Recipient shall:

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

Products:

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

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

- 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.
- 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:

- Members of relevant technical society committees.

The Recipient shall:

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

Products:

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

Subtask 1.11 TAC Meetings

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

The Recipient shall:

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

- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

The TAC shall:

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

Products:

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

Subtask 1.12 Project Performance Metrics

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

The Recipient shall:

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

Products:

- TAC Performance Metrics Summary

- Project Performance Metrics Results

IV. TECHNICAL TASKS

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

TASK 2: DESIGN AND BUILD MANUFACTURING EQUIPMENT

The goal of this task is to design and build-out a semi-automated PFO200 manufacturing line with a production rate of 14 packets per day, then upgrade and automate the system to increase the rate to 56 packets per day.

Subtask 2.1: Phase 1 Manufacturing Design and Build

The goal of this subtask is to design and build-out a semi-automated PFO200 manufacturing line for initial production.

The Recipient shall:

- Design and prepare for Phase 1 manufacturing, which includes but is not limited to:
  - Design of plate mold and die and optimization of packet design for manufacturability;
  - Top-level manufacturing design;
  - Preparation of the facility;
  - Specification of long lead time equipment;
  - Design and specification of 3D and electrical; and
  - Design QC test procedure and equipment.
- Procure and build Phase 1 manufacturing equipment, which includes but is not limited to:
  - Plate molds and dies;
  - Packet gluing equipment;
  - Membrane cutting equipment; and
  - Packet QC equipment.
- Assemble Phase 1 manufacturing line by integrating, testing, and modification of the equipment as needed.
- Commission Phase 1 line by manufacturing test product
- Prepare a 3-6 page *Phase 1 Manufacturing Report*, which includes but is not limited to:
  - High level design of the manufacturing line.
  - An overview of technical issues and lessons learned during the Phase 1 build.
  - Technical description of product produced and manufacturing quality.
  - High Quality Digital Photographs of the manufacturing line and product.
- Prepare *CPR Report #1* and participate in CPR Meeting per subtask 1.3.

Products:

- Phase 1 Manufacturing Report (draft and final)
- CPR Report #1

Subtask 2.2: Phase 2 Manufacturing Design and Build

The Recipient shall:
The goal of this subtask is to design and build-out an automated PFO200 manufacturing line with a production rate of 56 packets per day.

- Design and prepare for Phase 2 manufacturing, which includes but is not limited to:
  - Update of the top-level manufacturing design
  - Preparation of the facility
  - Design and specification of manufacturing system layout and its electrical equipment.
- Procure and build Phase 2 manufacturing equipment, which includes but is not limited to:
  - Plate handling equipment;
  - Membrane web handling equipment; and
  - Membrane web QC equipment.
- Assemble Phase 2 manufacturing line by integration, testing, and modification of the equipment.
- Commission of Phase 2 line by testing the system to manufacture the product.
- Prepare *Phase 2 Manufacturing Report*, which includes but is not limited to:
  - Updates made since the Phase 1 Manufacturing Design and Build in Task 2.1.
  - High level design of the manufacturing line.
  - An overview of technical issues and lessons learned during the Phase 1 build.
  - Technical description of product produced and manufacturing quality.
  - High Quality Digital Photographs of the manufacturing line and product.

Products:

- Phase 2 Manufacturing Report (draft and final)

TASK 3: PRODUCT MANUFACTURING
The goal of this task is to validate the long-term manufacturability of the product. During this task the Recipient will secure the supply chain of the product components, including a second membrane supplier, and manufacture products for testing and validating the manufacturing equipment.

The Recipient shall:

- Source the packet hardware and other key product components by:
  - Requesting quotes from multiple vendors;
  - Procuring product; and
  - Making test product.
- Develop manufacturing at a secondary membrane supplier by discussing manufacturing equipment requirements with the vendor, evaluating the cost and feasibility of making membrane, and perform test manufacturing runs.
- Manufacture the test product during Phase 1 and Phase 2 build out to test components from vendor manufactured membranes as well as the equipment used to assemble the components.
- Verify performance of vendor manufactured membranes.

- Prepare 2–5 page *Supply Chain Validation Report*, which includes but is not limited to:
    - A high-level overview of securing vendors for product components
    - Observational quality control of the components procured
    - The results of the test product made
    - Impacts and benefits from the supply chain efforts.

Products:

- Supply Chain Validation Report (draft and final)

TASK 4: 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; and
    - 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 5: KNOWLEDGE TRANSFER ACTIVITIES
The goal of this task is to ensure the learning that resulted from this project is captured and disseminated so that similar efforts build on the lessons learned.

The Recipient shall:

- Develop PFO200 marketing materials that educate customers about the product's benefits, such as brochures, videos, website updates, and presentation materials.
- Participate in conferences and trade shows to communicate the product benefits.
- Develop and submit a *Project Case Study Plan* that outlines how the Recipient will document the planning, construction, commissioning, and operation of the technology or system being demonstrated. The *Project Case Study Plan* should include:
  - An outline of the objectives, goals, and activities of the case study
  - The expected impact if that learning is applied to future deployments
  - The organization that will be conducting the case study and the plan for conducting it
  - A list of professions and practitioners involved in the technology's deployment
  - Specific activities the recipient will take to ensure the learning that results from the project is disseminated to those professions and practitioners
  - Presentations/webinars/training events to disseminate the results of the case study.
- Present the draft Project Case Study Plan to the TAC for review and comment.
- Develop and submit a Summary of TAC Comments that summarizes comments received from the TAC members on the draft Project Case Study 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 *Project Case Study Plan* to the CAM for approval.
- Execute the final *Project Case Study Plan* and develop and submit a *Project Case Study*
- When directed by the CAM, develop presentation materials for a 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:

- Project Case Study Plan (draft and final)
- Summary of TAC Comments
- Project Case Study (draft and final)
- High Quality Digital Photographs

V. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.

RESOLUTION NO: 22-0309-11

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: PORIFERA, INC.

RESOLVED, that the State Energy Resources Conservation and Development Commission (CEC) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

RESOLVED, that the CEC approves Agreement EPC-21-019 with Porifera, Inc. for a $2,980,226 grant to develop an automated manufacturing line for a large-format forward osmosis membrane module that enables efficient industrial, agricultural, and municipal wastewater reuse. The full-scale prototype of the large-format forward osmosis system has been designed, built, and demonstrated, making it ready to scale-up for commercialization. This project will design and build an automated manufacturing line at low-rate initial production for membrane packets; 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 March 9, 2022.
AYE:
NAY:
ABSENT:
ABSTAIN:

Liza Lopez
Secretariat