**California Energy Commission**
**March 17, 2025 Business Meeting**
**Backup Materials for California Clean Energy Fund DBA CALCEF Ventures**

The following backup materials for the above-referenced agenda item are available as described below:

1. Proposed Resolution, attached below.
2. Project Summaries and California Environmental Quality Act (CEQA) Analysis for Proposed Concept Small Grant Awards Under the California Sustainable Energy Entrepreneur Development (CalSEED) Initiative, Agreement No. 300-15-007(attached below)

**RESOLUTION NO: 25-0317-12**

**STATE OF CALIFORNIA**

**STATE ENERGY RESOURCES**
**CONSERVATION AND DEVELOPMENT COMMISSION**

**RESOLUTION: California Clean Energy Fund DBA CALCEF Ventures**

**WHEREAS**, pursuant to Public Resources Code section 25710 et seq. the State Energy Resources Conservation and Development Commission ("CEC") is authorized to establish and administer the Electric Program Investment Charge ("EPIC") Program; and

**WHEREAS**, the CEC has recognized that California's electricity ratepayers benefit from energy research, development and demonstration ("RD&D") activities conducted by individuals, small businesses, academics and small non-profit institutions; and

**WHEREAS**, the CEC has created the California Sustainable Energy Entrepreneur Development ("CalSEED") Initiative within the EPIC Program to provide funding for the aforementioned public interest RD&D activities**;** and

**WHEREAS**, New Energy Nexus dba California Clean Energy Fund or CalCEF Ventures ("CalCEF") is the administrator of the CalSEED Initiative under CEC Agreement Number 300-15-007 and is responsible for soliciting grant applications, recommending grant awards to the CEC, and managing approved grant projects; and

**WHEREAS,** CalCEF, in compliance with its duties under Agreement Number 300-15-007, in 2024 held a competitive solicitation, and as a result has proposed to CEC small grant projects for funding; and

**WHEREAS,** CEC staff has reviewed the small grant projects CalCEF has proposed, and recommends the following 8 small grant projects for funding:

1. $500,000 is being requested for the Passive Heat-Absorbing Shade Technology project with ThermoShade Solutions Inc., a project to install a high-tech passive cooling shade panel at two pilot sites that creates a shady space that feels up to 20°F cooler than under a basic awning.; and

2. $500,000 is being requested for the Metal-Organic Framework-Based Critical Metal Recovery System project with SunChem, Inc., a project to further develop a low-cost precision nano filtration device that could more cheaply recycle metals critical to clean energy applications, like copper and gold, from any complex water mixtures, but primarily those from e-waste; and

3. $500,000 is being requested for the Advanced Potassium-Ion Battery Storage project with Project K Energy, Inc., a project to demonstrate potassium-ion

batteries in a single layer pouch cell form factor and optimize design of a multi-layer pouch cell form factor; and

4. $500,000 is being requested for the Scalable Aerogel Insulation Manufacturing Process project with Westwood Aerogel Co., a project to design and build a first-generation manufacturing line using a novel manufacturing process to automate the process and increase the rate of manufacture for aerogel insulation material; and

5. $500,000 is being requested for the Optimizing Subsea Energy Storage for Offshore Wind Integration project with RCAM Technologies, Inc. dba Sperra, a project to advance a subsea energy storage technology that utilizes water pressure differences and can be easily co-located with future OSW plants; and

6. $500,000 is being requested for the Compressed CO2 Energy Storage System for Urban Grid Resilience and Renewables Adoption project with Activated Energy, LLC, a project to develop a prototype long duration energy storage system comprising high- and low-pressure CO2 storage tanks, compressors, scroll expanders and associated plumbing for gas transfer; and

7. $500,000 is being requested for the Integrated Cathode Material Regeneration and Purification for Battery Reuse project with ExPost Technology, Inc., a project to set up an end-to-end direct recycling line to recycle and recover cathode active materials at the scale of 10Kg/batch; and

8. $500,000 is being requested for the Advancing Circular Chemical Recycling for Battery Supply Chains with Scaled Electrolysis Systems project with Aepnus Technology Inc., a project to scale up an electrolyzer pilot system designed to recycle a common chemical waste from battery manufacturing back into valuable reagents, such as sulfuric acid and caustic soda by fourfold; and

**WHEREAS,** CEC staff has reviewed the projects and determined that each project is exempt from the California Environmental Quality Act, as described in CEC staff's "Project Summaries and California Environmental Quality Act (CEQA) Analysis For Proposed Prototype Small Grant Awards Under the California Sustainable Energy Entrepreneur Development (CalSEED) Initiative" Memorandum ("Memorandum"), a document that is included in the backup materials to this Business Meeting item.

**THEREFORE, BE IT RESOLVED**, that the CEC adopts CEC staff's CEQA findings contained in the Memorandum for the 8 small grant projects; and

**FURTHER BE IT RESOLVED**, that the CEC approves the 8 small grant projects for a total of $4,000,000; and

**FURTHER BE IT RESOLVED**, that the CEC directs CalCEF to execute grant agreements with the approved awardees pursuant to the requirements of Agreement Number 300-15-007.

## ***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 17, 2025.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

_____
Kristine Banaag
Secretariat

**State of California** **California Natural Resources Agency**

**M e m o r a n d u m**

**To:** Chair David Hochschild
Vice-Chair Siva Gunda
Commissioner Noemí Gallardo
Commissioner Nancy Skinner
Commissioner Andrew McAllister

Date: March 17, 2025

**From:** Lindsey Fransen
Program and Project Supervisor

**Telephone:** (916) 908-7495

**Subject: PROJECT SUMMARIES AND CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS FOR PROPOSED PROTOTYPE SMALL GRANT AWARDS UNDER THE CALIFORNIA SUSTAINABLE ENERGY ENTREPRENEUR DEVELOPMENT (CALSEED) INITIATIVE**

New Energy Nexus dba California Clean Energy Fund or CalCEF Ventures (CalCEF) is the administrator of the Energy Commission's CalSEED Initiative under Agreement No. 300-15-007. The CalSEED Initiative awards small grants in the form of "Concept Awards" or "Prototype Awards" and provides access to business and technical services for entrepreneurs seeking to develop a technical feasibility case for their technologies.

In August 2024, CalCEF initiated the Series B Business Plan Competition to determine which eligible CalSEED Concept Award Winners held the greatest commercial potential and merit Prototype Award funding. The Business Plan Competition was coordinated with Cleantech Open (CTO). Over the summer of 2024, CalSEED Concept Awardees participated in CTO's Western Region Accelerator, where they received tools and insights to develop an 8-10 page Business Plan. This business plan was the basis of the Business Plan Competition application package. To be eligible for entering the Business Plan Competition, companies must have been in good standing with their CalSEED Concept award (timely deliverables, progress reports and invoicing) and they must have completed CTO.

CalSEED Concept Award Winners can defer competing for a Prototype Award until they are ready with sufficient progress on their Concept Award. In 2024, a total of 21 companies competed in the Business Plan Competition, with 7 from CalSEED Cohort 5 and 14 companies from Cohort 6. Each company submitted a business plan and presented a live pitch. As a result of the competition, 8 projects are being proposed for $500,000 per project in "Prototype Award" grant funding at the March 17, 2025 Energy Commission Business Meeting.

I am the Supervisor of the Technology to Market unit in the Technology Innovation and Entrepreneurship Branch of the Energy Research and Development Division of the California Energy Commission. I have reviewed the project information and CEQA compliance forms submitted by each applicant. Below are project summaries and CEQA analysis for each proposed project:

## Prototype Awards

### 1. Project Title: Passive Heat-Absorbing Shade Technology

**Applicant:** ThermoShade Solutions Inc.
**Subcontractors and Vendors:** TBD

**Project Summary:** The goal of this project is to install at two pilot sites a high-tech passive cooling shade panel that creates a shady space that feels up to 20°F cooler than under a basic awning. The project will collect meaningful data to validate ThermoShade's benefits to customers and prepare to scale up manufacturing for a commercial launch. The first pilot will test ThermoShade panels as a plug-and-play kit to add onto an existing bus shelter design. The second pilot will test ThermoShade's cooling panel system on a built-for-purpose structure on a dairy farm. Most of the panel assembly will take place offsite and the Thermoshade team will work closely with Fresno State University to ensure that installation does not cause any disruption.

**CEQA Exemption Status:** 14 CCR 15301 "Existing Facilities", 14 CCR 15303 "New Construction or Conversion of Small Structures", 14 CCR 15311 "Accessory Structures"

**Reason Why Project is Exempt:** This project is exempt because project activities are limited to installations of cooling shade panels at existing sites that involve negligible or no expansion of existing or former use of the sites. The panels will be assembled at an existing facility off-site; there will be minimal construction activities onsite with no permanent changes to land or buildings. Neither the panel systems nor the base structures use hazardous materials. The base structure will use commonly used building materials, primarily aluminum structural tubing. The salt-hydrate phase change material in the cooling panels has been certified by the manufacturer as non-toxic and non-flammable for use in building construction per EN13501-1.

### 2. Project Title: MOF-Based Critical Metal Recovery System

**Applicant:** SunChem, Inc.
**Subcontractors and Vendors:** TBD

**Project Summary:** This goal of this project is to further develop a low-cost precision Nano Filtration device that can continuously capture critical metals, especially those used in e-waste, like copper and gold, from any complex water mixtures. The key components of this innovation are the Nano Filter, a metal-organic framework (MOF)/polymer composite that is packed into a bed column, and an environmentally benign leaching formulation. The fully integrated critical metal recovery process does not employ any harsh acids. During the initial year of the Prototype Award, SunChem will synthesize 10-kg batches of highly porous material for gold uptake, the processing of 200 kg of e-waste as provided from industry partners, and purification of a maximum of 90 g of gold and 28 kg of copper from the feedstock. These project tasks will all occur at Lawrence Berkeley National Laboratory (LBNL). In year 2 of the project, a pilot location at a small facility will be established to further validate the prototype.

**CEQA Exemption Status:** 14 CCR 15301 "Existing Facilities"

**Reason Why Project is Exempt:** This project is exempt because project activities are limited to the further development of, and collection of data regarding, a filtration device that captures metals from water mixtures. The project will take place at two locations- at an existing facility at Lawrence Berkeley National Laboratory for initial project activities and at a currently unidentified existing facility for year 2 activities. At most, the unidentified existing facility would need modifications of an added fume hood and certain HVAC and electricity modifications. These modifications are contemplated in 14 CCR 15301 ("interior or exterior alterations involving…electrical conveyances"; "addition of safety protection devices for use…in conjunction with existing structures, facilities, or mechanical equipment."). The project will result in negligible or no expansion of existing or former use of either site.

The filtration process used in this project requires chemical inputs found commonly in household products and non-hazardous salts. Byproducts of the process can include metal ions from the input material, which may be considered hazardous. Most of the project work will be conducted at LBNL, an existing facility that has rigorous protocols for human health and safety and hazardous waste disposal, requiring only the installation of small new equipment. The unidentified existing facility will only be selected if it is properly set up to manage and dispose of any hazardous waste. The potentially hazardous metal ions will be managed using a commercial ion exchange system and no metal ions will be released into the environment.

### 3. Project Title: Advanced Potassium-Ion Battery Storage

**Applicant:** Project K Energy, Inc.
**Subcontractors and Vendors:** TBD

**Project Summary:** The goal of this project is to demonstrate Project K Energy's potassium-ion batteries in a single layer pouch cell form factor and optimize design of a multi-layer pouch cell form factor. This improves on Project K's demonstration of these batteries in coin cell form factor during its CalSEED Concept Award. Project K also hopes to increase cycle and calendar life of the batteries and collect data that can be used to market its product to end-use customers and investors. Project K's batteries have the potential to be cheaper, safer, more efficient, and better performing in low temperatures than conventional lithium-ion batteries while achieving comparable energy density and cycle life.

**CEQA Exemption Status:** 14 CCR 15306 "Data Collection", 14 CCR 15301 "Existing Facilities"

**Reason Why Project is Exempt:** This project is exempt because project activities are limited to the development and testing of potassium-ion batteries at an existing shared facility with negligible or no expansion of existing or former use. The project is small in scale due to the small number of battery cells that will be manufactured. Waste generation will be minimal and any hazardous material associated with the separation method and generation of battery cells will occur within this shared facility that is equipped to safely handle and dispose of these materials.

### 4. Project Title: Scalable Aerogel Insulation Manufacturing Process

**Applicant:** Westwood Aerogel Co.

**Subcontractors and Vendors:** TBD

**Project Summary:** The goal of this project is to design and build a first-generation manufacturing line to produce Westwood Aerogel's insulation materials. This line will automate the process and increase the rate of manufacture of insulation material, lowering its cost and driving broader adoption in the construction industry. Aerogels are a class of ultra-lightweight materials composed of silica (the same material as glass) and consisting of up to 99.8% air. Insulation panels made with this material are 90% more thermally efficient than extruded and expanded polystyrene panels and 250% more thermally efficient than mineral wool insulation.

**CEQA Exemption Status:** 14 CCR 15306 "Data Collection", 14 CCR 15301 "Existing Facilities"

**Reason Why Project is Exempt:** This project is exempt because it is limited to modifying existing manufacturing equipment at an existing LBNL lab to produce aerogel materials and validating the performance of the materials. The project involves negligible or no expansion of existing or former use of the site. LBNL is equipped for these activities and all potentially hazardous waste will be handled and disposed of in accordance with national laboratory safety protocols.

## 5. PROJECT TITLE: OPTIMIZING SUBSEA ENERGY STORAGE FOR OFFSHORE WIND INTEGRATION

**Applicant:** RCAM Technologies, Inc. dba Sperra
**Subcontractors and Vendors:** TBD

**Project Summary:** The goal of this project is to advance subsea pumped storage hydropower (SPSH) technology. SPSH uses 20–30m 3D-printed concrete spheres, placed 500–2000m deep, to store energy by pumping water out and recovering it as ocean pressure forces water back in. This project will specifically develop detailed material models of low-carbon 3D printed concrete material including hydration heat evolution, water permeability, and interlayer bond strength; use the updated material property data as inputs to optimize SPSH storage sphere designs and manufacturing processes; and develop non-destructive testing methods for quality control of SPSH structures. This information will be used to develop small-scale and full-scale prototypes in future projects. Due to the difficulty of locating conventional battery storage systems in marine environments as will be needed for California's planned offshore wind plants, this project will help develop a more suitable energy storage technology that will improve the value proposition of future OSW plants.

**CEQA Exemption Status:** 14 CCR 15306 "Data Collection", 14 CCR 15301 "Existing Facilities", 14 CCR 15061 (b)(3) "Common Sense Exemption"

**Reason Why Project is Exempt:** This project is exempt because project activities are limited to the development and testing of low-carbon 3D printed concrete material taking place in an existing laboratory with negligible or no expansion of existing or former use of the site. The project will conduct engineering studies and numerical modeling activities at Sperra's existing facility at the Port of Los Angeles. There will be no construction, installation or similar activities that might have an effect on the environment. No direct environmental impacts are expected to result from this project scope.

## 6. Project Title: Compressed CO2 Energy Storage System for Urban Grid Resilience and Renewables Adoption

**Applicant:** Activated Energy, LLC
**Subcontractors and Vendors:** TBD

**Project Summary:** The goal of this project is to develop a prototype long duration energy storage system comprising high- and low-pressure CO2 storage tanks, compressors, scroll expanders and associated plumbing for gas transfer. The prototype will be built on a mobile skid to permit transportation to investor-owned utility companies for characterization and testing. Assembly for the mobile platform will occur at Activated Energy's facilities. Activities include system performance characterization (round-trip efficiency, system operational logistics) when integrated with utility provider under real world conditions.

**CEQA Exemption Status:** 14 CCR 15306 "Data Collection", 14 CCR 15301 "Existing Facilities", 14 CCR 15311 "Accessory Structures"

**Reason Why Project is Exempt:** This project is exempt because project activities are limited to the design, build, and testing of a prototype long duration energy storage system at existing facilities with negligible or no expansion of existing or former use of the sites. The prototype system does not contain or generate any hazardous energy materials and will not generate excessive noise. The system is primarily built from commercially available parts, with measures for sensing carbon dioxide with safety interlocks to limit accidental carbon dioxide emissions. Additionally, the prototype will be only temporarily placed and tested at existing utility facilities and can be transported back to Activated Energy's facilities afterwards and disassembled.

## 7. Project Title: Integrated Cathode Material Regeneration and Purification for Battery Reuse

**Applicant:** ExPost Technology, Inc.
**Subcontractors and Vendors:** TBD

**Project Summary:** The goal of this project is to set up an end-to-end direct recycling line to recycle and recover cathode active materials at the scale of 10kg/batch. The core technology behind ExPost's process is called PRIME—Purification and Regeneration Integrated Materials Engineering. PRIME involves the removal of impurities (purification) and replenishment of the lithium inventory (regeneration or relithiation) in the cathode active material in a single process step within a reactor at near ambient condition.

**CEQA Exemption Status:** 14 CCR 15306 "Data Collection", 14 CCR 15301 "Existing Facilities"

**Reason Why Project is Exempt:** This project is exempt because project activities are limited to upgrading an existing facility to recycle materials from scrapped lithium-ion batteries. Changes to the facility will include an electrical power upgrade and safety enhancements such as the installation of a dust control unit, negative pressure room, and sound-proof enclosure for noise-generating equipment. Small quantities of de-energized batteries and chemicals will be handled as part of this project. The project will be performed in accordance with all environmental and safety protocols.

## 8. Project Title: Advancing Circular Chemical Recycling for Battery Supply Chains with Scaled Electrolysis Systems

**Applicant:** Aepnus Technology Inc.
**Subcontractors and Vendors:** TBD

**Project Summary:** The goal of this project is to scale up Aepnus Technology's electrolyzer pilot system by fourfold. The electrolyzer system recycles a common chemical waste (sodium sulfate) from battery manufacturing back into valuable reagents, such as sulfuric acid and caustic soda. The pilot system will be built on a skid-mounted platform in Aepnus's existing commercial warehouse in West Oakland, CA.

**CEQA Exemption Status:** 14 CCR 15306 "Data Collection", 14 CCR 15301 "Existing Facilities"

**Reason Why Project is Exempt:** This project is exempt because project activities are limited to the development and testing of a prototype electrolysis technology designed to recycle waste from battery manufacturing. The project involves no construction, land modification, or alterations to the existing facility where the prototype will be built and housed. The project operates within typical industrial noise levels for an enclosed warehouse space. No odors or air pollutants will be produced, as the electrolysis process is fully contained and involves no combustion or emissions. Hazardous materials will be managed in compliance with existing safety protocols, and all byproducts will be handled and disposed of under current permits without introducing any new environmental risks.