

# Memorandum

To: Chair David Hochschild  
Commissioner Karen Douglas  
Commissioner Patty Monahan  
Commissioner Andrew McAllister

Date: January 26, 2021

From: Eleanor Oliver

Telephone: (916) 445-5377

Subject: **CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS FOR PROPOSED SUBAWARDS UNDER THE CALIFORNIA SUSTAINABLE ENERGY ENTREPRENEUR DEVELOPMENT (CALSEED) INITIATIVE, AGREEMENT NO. 300-15-007**

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

In August 2020, CalSEED initiated the third Prototype Award Plan Competition to determine which eligible CalSEED Concept Award winners have the greatest technical and commercial potential to merit Prototype Award funding. The Prototype Award Business Plan Competition resulted in six projects being proposed for prototype awards. The proposed awardees are: Takachar, Inc., Icarus RT, Inc., ReJoule, Inc., EnZinc, Inc., SiLi-ion, Inc., and Antora Energy, Inc. These proposed awards will provide follow-on funding of up to \$450,000 to the most successful of the entrepreneurs and researchers whose energy innovations show significant potential impact and commercial potential.

I am an Associate Energy Specialist in the Energy Research and Development Division of the California Energy Commission. I have reviewed the CEQA compliance forms submitted by each applicant. Below is my CEQA analysis for each proposed project:

**1. PROJECT TITLE: DECENTRALIZED CONVERSION OF PLANT-BASED RESIDUES INTO BIOPRODUCTS**

**Applicant:** Takachar, Inc.

**Principal Investigator:** Kevin Kung

**Project Summary:** The goal of this project is to design and demonstrate a prototype of a portable, low cost technology that processes crop and forest residues into precursors that can be used for water and air filtration media. This innovation will reduce energy consumption in rural areas and will also generate power from process heat that can be used for local agricultural and industrial applications. This project will continue prototyping efforts withing an existing laboratory facility at UC Berkeley. A bench-scale equipment measuring 4' by 4' in footprint will be set up within the laboratory. The team will purchase various biomass,

such as wood chips and walnut shells, from existing commercial vendors in California. The torrefaction experiment will be conducted under good ventilation. The outputs will be primarily biochar, as well as flue gas consisting of CO<sub>2</sub> and steam. The project will assemble and conduct a portable prototype field test onsite, carried on the back of pick-up trucks, at 23 Gulch in the Jackson State Forest, Mendocino County. The field test will be a modification of existing timber harvest plan for CAL FIRE. Over the course of the grant, the research is expected to generate around 800 kg of biochar, as well as around 2,000 kg of CO<sub>2</sub> and steam. Noise or odor issues are not expected.

**CEQA Exemption Status:** 14 CCR 15306 “Basic Data Collection”

**Reason Why Project is Exempt:** This project is exempt under CEQA because the project is limited to data collection from the development and testing of a small portable prototype that will process biomass to biochar and flue gas and will result in energy generation and reduced energy consumption. The technology will first be prototyped and tested within an existing facility without making any alterations to the facility or its surroundings and without altering the existing use of the facility. The prototype will then be field tested in a state forest. All equipment and byproducts will be carried away after the end of the testing. The project involves no construction activities and is not expected to generate noise, odors, or hazardous materials. The project will, therefore, result in no significant impact on the environment.

## **2. PROJECT TITLE: HYBRID PHOTOVOLTAIC/THERMAL (PVT) ADVANCED SOLAR PLUS STORAGE SYSTEM**

**Applicant:** Icarus RT, Inc.

**Principal Investigator:** Mark Anderson

**Project Summary:** The goal of this project is to demonstrate a low-cost hybrid solar photovoltaic/thermal system co-located with commercial and larger Solar PV arrays that has the potential to increase power availability 25%, and reduce costs by more than 50% over current systems. The system collects and stores hot water for on-demand domestic hot water and/or power. The Icarus system uses an Organic Rankine Cycle (ORC) to convert stored thermal waste heat to usable power during peak demand evening hours and nighttime.

**CEQA Exemption Status:** 14 CCR 15301 “Existing Facilities”; 14 CCR 15303 “New Construction or Conversion of Small Structures”, 14 CCR 15311 “Minor Structures Accessory to Existing Facilities”; Pub. Resources Code section 21080.35

**Reason Why Project is Exempt:** This project will install an approximately 100 kW solar photovoltaic carport system and water tanks along with associated electrical conduits and controls over an existing parking lot at a multi-family housing complex in National City, CA. The system will require concrete pads to install the water tanks and the project will require some trenching to install small bore hot water and electrical lines to the housing complex. The carport solar PV system installation is therefore statutorily exempt under Public Resources Code section 21080.35 as the installation of a solar energy system at an existing parking lot. This project as a whole is also categorically exempt from environmental review pursuant to CEQA Guidelines section 15301 as minor alterations to an existing facility that involves no expansion of an existing or former use at the site. The project is also categorically exempt pursuant to CEQA Guidelines section 15303 as the construction and

location of new, small structures. The project is also categorically exempt pursuant to CEQA Guidelines section 15311 as the construction of minor structures appurtenant to existing facilities. The project, when considered as a whole, will not result in a cumulative impact that is significant on the environment.

### **3. PROJECT TITLE: SAFE, LOW-COST, LIGHT ENERGY STORAGE**

**Applicant:** EnZinc, Inc.

**Principal Investigator:** Michael Burz

**Project Summary:** The goal of this project is to validate and prototype an innovative battery chemistry that combines a proprietary zinc sponge anode with nickel, silver, or carbon cathodes for different applications. This battery technology is anticipated to match the performance of Lithium-ion while achieving the much lower price point of lead-acid batteries and will be safer than both chemistries. This project will build and test a prototype e-bike battery with a potential e-bike manufacturer/customer to demonstrate its advantages. The battery will be developed in EnZinc's existing fully equipped lab at the Richmond Field Station in Richmond, CA and field tested in Southern California.

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

**Reason Why Project is Exempt:** This project is exempt under CEQA because the project is limited to the development and testing of an innovative battery technology in an existing laboratory and subsequent field testing. The technology and resulting prototype cell and battery uses primarily non-toxic fully recyclable materials in relatively small quantities (less than 2kg per battery). Materials will be disposed of according to applicable safety and disposal methods. The cell size (50mm X 50mm), cell number (approximately 400 for both development and battery use), and cell weight (approximately 100 grams) coupled with the lab centered process will not cause a significant effect on the environment. The project involves no construction activities and will not expand any existing or former use of the laboratory site. The project will, therefore, result in no significant impact on the environment.

### **4. PROJECT TITLE: FAST BATTERY DIAGNOSTICS**

**Applicant:** Rejoule, Inc.

**Principal Investigator:** Steven Chung

**Project Summary:** The goal of the project is to develop a portable battery diagnostic system that can be embedded in an EV battery pack management system to continuously monitor battery health while detecting and preventing thermal runaway. This battery diagnostic technology is more accurate and faster than competitors and will be able to self-calibrate based on the individual battery pack characteristics which vary depending on the EV model and year. The project will leverage existing methodologies of testing, analyzing, and modeling battery cells and modules (< 100V), and apply them to high voltage battery packs (typically >200V). The project team will do various scale-up and integration activities with hardware and software, battery testing and modeling activities, and channel partnership and productization activities.

**CEQA Exemption Status:** 14 CCR 15301 “Existing Facilities”, 14 CCR 15306 “Basic Data Collection”

**Reason Why Project is Exempt:** This project is exempt under CEQA because the project is limited to the development and testing of a prototype battery diagnostic system inside an existing laboratory. Testing will be performed on electric vehicles or batteries, which makes no noise and requires no construction. Any byproducts/emissions of battery cycling and testing are extremely limited and will be confined to the lab and will not contribute to air/water/gas/noise pollution. The project is an extension of the lab research and development already being performed at the same facility by the same researchers. The project involves no construction activities and will not expand any existing or former use of the laboratory site. The project will, therefore, result in no significant impact on the environment.

## **5. PROJECT TITLE: SILICON-CARBON POWER**

**Applicant:** SiLi-ion, Inc.

**Principal Investigator:** Giorgio Nava

**Project Summary:** The goal of this project is to continue the development of commercial lithium-ion batteries by developing a silicon-carbon composite which will be used in place of graphite as an anode material. This innovation is a “drop-in” additive for Li-ion batteries that enables improvement in battery performance and can instantly integrate with current battery manufacturing line – no retooling or modifications needed. It uses silicon raw powders and is processed using commodity chemicals such as acetylene. The main byproducts are carbonaceous compounds generated by the decomposition of acetylene in a furnace. The CE-CERT and UCR facilities where the activity will take place are equipped to ensure proper handling of these byproducts. End-products are an additive that can improve battery capacity even at small level of addition into current formulations. Over the course of the grant, the project is expected to process more than a few dozen kilograms of material.

**CEQA Exemption Status:** 14 CCR 15301 “Existing Facilities”, 14 CCR 15306 “Basic Data Collection”

**Reason Why Project is Exempt:** This project will develop, test, and produce at pilot-scale, a battery prototype that incorporates a silicon-based additive. Production will take place at two existing facilities- at the Center for Environmental Research & Technology (CE-CERT) and at the University of California Riverside (UCR)- with no alterations needed to the facilities for the project. The material production process is expected to result in little to no waste material. The main byproducts are carbonaceous compounds generated by the decomposition of acetylene in a furnace. These materials can be easily removed from the equipment and disposed of safely. The CE-CERT and UCR facilities where the activity will take place are equipped to ensure proper handling of these byproducts. At the pilot scale, no more than a few dozen kilograms of material will be produced, with very minimal waste involved. The project will not alter any existing or former uses of the CE-CERT and UCR facilities, does not involve any construction or alteration of the environment (e.g. land, water and vegetation) or release of hazardous compounds into the environment or atmosphere. The project will, therefore, result in no significant impact on the environment.

## **6. PROJECT TITLE: INEXPENSIVE, LONG-DURATION ENERGY STORAGE**

**Applicant:** Antora Energy, Inc.

**Principal Investigator:** David Bierman

**Project Summary:** The goal of this project is to prototype an inexpensive thermal energy storage system. By storing energy as heat in inexpensive raw materials and converting that heat back to electricity with high efficiency PV modules exposed to light radiating from the hot storage medium, the technology delivers energy storage for less than \$10/kWh – over an order of magnitude cheaper than Li-ion batteries. The project team will be working with an existing environmental testing facility to characterize the reliability of the TPV cells. The facility has programmable chambers to control for temperature, humidity, pressure, etc. that are regularly used in the electronics industry. Additionally, the project team will be working on better understanding the market for, and impact of, long duration energy storage particularly in CA.

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

**Reason Why Project is Exempt:** This project is exempt under CEQA because the project is limited to the development and testing of a thermal energy storage system at an existing laboratory that is sited, permitted, and experienced with performing these types of tests. The project does not involve any construction activities, will not alter any land and will not expand any existing or former uses of the laboratory. The project will, therefore, result in no significant impact on the environment.

**RESOLUTION NO: 21-0210-9**

**STATE OF CALIFORNIA**

**STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION**

**RESOLUTION - RE: 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**, the California Clean Energy Fund ("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, completed the third CalSEED Prototype Award Plan Competition in August 2020, a competitive solicitation, and as a result has proposed to CEC small grant projects for funding; and

**WHEREAS**, CEC staff has reviewed the projects CalCEF has proposed, and recommends the following 6 small grant projects for funding:

1. \$450,000 is being requested for the "Decentralized Conversion of Plant-Based Residues into Bioproducts" project with Takachar Inc., a project to advance a portable, low-cost technology that produces high-performance filtration media from crop and forest residues for wastewater treatment; and
2. \$450,000 is being requested for the "Hybrid Photovoltaic/Thermal (PVT) Advanced Solar Plus Storage System" project with Icarus RT Inc., a project to demonstrate a low-cost hybrid solar photovoltaic/thermal system co-located with commercial and larger solar PV arrays that have the potential to increase power availability 25 percent and reduce costs by more than 50 percent over current systems; and

3. \$450,000 is being requested for the “Safe, Low-Cost, Light Energy Storage” project with EnZinc Inc., a project to develop and test an innovative battery chemistry that combines a proprietary zinc sponge anode with nickel, silver, or carbon for different applications; and
4. \$450,000 is being requested for the “Fast Battery Diagnostics” project with ReJoule Inc., a project to validate a portable battery diagnostic system that can be embedded in a battery pack management system to continuously monitor battery health without the need for disassembly; and
5. \$450,000 is being requested for the “Silicon-Carbon Power” project with SiLi-ion Inc., a project to continue the development of commercial lithium-ion batteries by developing a silicon-carbon composite which will be used in place of graphite as an anode material; and
6. \$450,000 is being requested for the “Inexpensive, Long-Duration Energy Storage” project with Antora Energy Inc., a project to build an inexpensive thermal energy storage system by storing energy as heat in inexpensive raw materials and converting that heat back to electricity with high-efficiency photovoltaic modules exposed to light radiating from the hot storage medium; and

**WHEREAS**, CEC staff has reviewed the 6 projects and determined that each project is exempt from CEQA, as described in CEC staff’s “California Environmental Quality Act (“CEQA”) Compliance Analysis For Proposed Subawards Under the California Sustainable Energy Entrepreneur Development Initiative, Agreement No. 300-15-007” Memorandum (“Memorandum”) dated January 26, 2021, 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 6 projects; and

**FURTHER BE IT RESOLVED**, that the CEC approves the 6 projects for a total of \$2,700,000; and

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

### **CERTIFICATION**

The undersigned Secretariat to the Commission 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 California Energy Commission held on February 10, 2021.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Cody Goldthrite,  
Secretariat