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Increase Adoption of Emerging Clean Energy Technologies through Procurement

Additional submitted attachment is included below.

March 13, 2017

Mr. Nicholas Blair
California Energy Commission
Energy Research and Development Division 1516 Ninth Street, MS-51
Sacramento, CA 95814-5512

**RE: CalCEF Response to the Electric Program Investment Charge Request for Comments:
Increase Adoption of Emerging Clean Energy Technologies through Procurement**

The California Clean Energy Fund (CalCEF) is pleased to provide the attached response to the California Energy Commission's Request for Comment: Increase Adoption of Emerging Clean Energy Technologies through Procurement.

CalCEF has tremendous expertise in supporting the efforts of clean energy entrepreneurs in making the leap from prototype to pilot scale demonstration of their technologies. As one of the leading, early-stage, clean energy investors, CalCEF has invested heavily in some of the most promising clean energy companies and its initial capital investment of \$22.7 million generated more than \$1.5 billion in additional rounds of investment in some of California's greatest advanced energy success stories, including Tesla. Additionally, CalCEF is the driving force behind *New Energy Nexus*—which is accelerating clean energy innovation, startup ecosystems, and collaboration among accelerators, startups, companies, and investors and one of the organization's principal programs is *Free Electrons*, an international accelerator program.

Questions:

1. (For all groups) What are barriers that large-scale customers face when procuring emerging energy technology solutions? Would projects funded from this solicitation help address those barriers? If not, what specific changes would you recommend to help ensure the resulting projects meet large-scale customer procurement needs?

Large-scale customers face numerous barriers when procuring emerging energy technology solutions, including:

- Oftentimes, large scale customers are not routinely exposed to emerging energy technology solutions, and others have little experience in vetting the appropriateness of these proposed solutions to their particular energy use profile. Other times, customers are exposed to many multiple, apparently competitive early stage innovations that are uncertified or undemonstrated by a trusted institutional partner. Customers are also dependent on the claims of early-stage technology solutions when trying to understand the costs and benefits of a new technology or product, which is oftentimes beyond the risk level many customers are willing to accept. Customers also have little reliable information on reliability or safety. Developing a common framework- certification, demonstration, value propositions-- to compare cost and benefit of various technologies should be an objective.
- Emerging energy technology innovations will produce more reliable and useful results and outcomes when teamed with reliable demonstration partners, including utilities, ports, military, local and regional agencies and other large institutional customers. Innovators that are able to collaborate with institutional demonstration partners will develop more reliable and robust data collection plans, while also providing a prospective early stage customer relationship. Projects funded by this solicitation should prioritize such teaming arrangements and encourage teams in applications for support.

Similarly, regular “Voice of the Customer” events should be a required task for early stage innovations to showcase demonstration projects to large scale customers.

- Large scale customers face difficulties in demonstrating an acceptable and low risk IRR for early stage technologies, which is an impediment to financing projects. Incentives, grants and credits are not standardized, and often are unreliable from a timing perspective. Creating and maintaining reliable incentive programs that reduce cost and risk is increasingly critical.
- Similarly, ready access to smaller incentives—rather than large scale demonstration grants—can often provide enough resources for early stage technologies to commission a prototype or demonstration-scale model with a prospective institutional customer. Creating incentive programs that make available smaller, limited investments—ala the \$150,000 California Sustainable Energy Entrepreneur Development (CalSEED) Initiative--can prompt institutional customers to a limited, no cost demonstration of an early stage technology.

2. (For all groups) What are specific recommendations you can provide for improving the purpose of the solicitation outlined in this RFC? Please explain the rationale behind the recommendations.

In 2016 CalCEF—in partnership with the California Energy Commission, Berkeley Lab, UC Davis, UC San Diego, CleanTech Open and Grant Farm—launched the CalSEED Initiative, a \$33-million professional and fund development program for early-stage clean-energy entrepreneurs and innovators. CalSEED offers early stage innovators two important elements of success: First, funding, as a Prototype Awardee of \$150,000 and a subsequent Concept Awardee of \$450,000, for early stage TRL 1-5 companies with no debt or equity dilution, and second, access to a powerful network of technical and industry experts, investors prospective partners and utilities.

Through its work managing CalSEED, CalCEF has identified strategies and tactics to quickly and successfully develop, launch and administer investment in early stage cleantech companies while successfully managing a large team of technical service providers, and has created the state’s most robust effort at marrying public and private resources to move companies through the valley of death and towards successful commercialization.

Some initial lessons learned that could be instructive in the Cal-Test Bed Program:

- A successful Cal-Test Bed program will be managed by an organization with a demonstrated capacity to execute quickly and prioritize positive results for California’s innovation community in a timely manner. CalCEF successfully launched CalSEED within 120 days of contract execution with the California Energy Commission, requiring a massive mobilization of resources by CalCEF and intense coordination of multiple public and private institutional partners, including IOUs and state and federal agencies.
- With ambitious outreach by CalCEF to California’s energy innovation community, CalSEED received 331 completed applications during a four week application window that closed on February 10, highlighting high demand for these types of early stage cleantech support programs and oversubscription for the program of more 33 TIMES available funding.
- Applicants to the CalSEED program were overwhelmingly from California. However, the program allows for international start-ups and domestic, non-California companies to apply for support so long as they establish a business presence in California, an

important component to attracting new businesses and maintaining the state's "best and brightest" reputation in emerging clean technology. Cal-Test Bed should similarly support the attraction of talent to California in this way.

- CalSEED places a priority on "Equity" -- supporting technologies that are able to produce more equitable benefits for California ratepayers and Disadvantaged Area Communities (DAC). Cal-Test Bed should similarly favor technologies and innovations that are capable of demonstrating how they support the concept of "equity" in innovation.
- CalCEF urges CEC to directly relate the Cal-Test Bed program to both CalSEED and the Regional Energy Innovation Clusters to best build upon significant five-year CEC investment in these two programs and engage the innovation communities represented in both programs directly in the Cal-Test Bed program itself. Directly connecting all three efforts would amplify and leverage both the operational experiences of the participants in CalSEED and Regional Energy Innovation Clusters as well as affirm an accelerated pathway for promising early stage companies to participate in SEED, find support at the Regional Clusters, and access valuable test bed resources in a single, unified effort.

3. (For all groups) Are there existing efforts that complement the groups identified in this RFC? What specific changes to this proposed solicitation would you suggest to best leverage these existing efforts?

CalCEF has helped develop, launch and manage several efforts that could complement the Cal-Test Bed Program.

CalCEF is the lead organization in *SuperCharge US: Institute for Advanced Battery Manufacturing*, an historic and unprecedented collaboration of 241 members, partners and collaborators from 37 states with a shared vision to invest in the American workforce and expand the infrastructure necessary to achieve U.S. global leadership in advanced battery manufacturing. Designed by the nation's two leading advanced battery industry consortiums—CalCEF's CalCharge Initiative and the New York Battery and Energy Storage Technology Consortium (NY-BEST)—SuperCharge US is a proposed five-year, \$459 million partnership of leading businesses, universities, community colleges, labor unions, workforce development organizations, national laboratories, and federal, state, and local government agencies. The initiative has attracted \$389 million in cost share, including more than \$44 million from 19 of the nation's leading colleges and universities—Cornell, Rochester Institute of Technology, UC Berkeley, University of Maryland, North Carolina State, and Stanford—and support from more than 50 large and SME businesses in the U.S. energy storage supply chain, including Johnson Controls, Bosch, FMC Corp., Eastman Kodak, Duke Energy, BAE Systems, General Electric, Solvay, and Consolidated Edison. The primary activity of SuperCharge US is the coordination of late-stage RD&D at *SuperCharge Manufacturing Test Centers*, a network of 12 open-access, public-private partnership test facilities—including the Battery Prototyping Center at Rochester Institute, Energy Innovation and Advanced Manufacturing Center at Eastman Business Park, the Maryland NanoCenter, and the NY-BEST Test and Commercialization Center—dedicated to Manufacturing Readiness Level (MRL) 4 through MRL 7 manufacturing innovation. These Centers pursue two critical SuperCharge US objectives: driving down battery costs to \$60 per kWh for vehicle applications and \$0.04 per kWh per cycle for electric grid applications. SuperCharge US also includes a new state-of-the-art test facility—SuperCharge Battery Frontier—in the Bay Area, California, which will include offices for administration and incubation and acceleration space for innovators and entrepreneurs.

In addition, earlier this year CalCEF's CalCharge program—in partnership with CalPine, Inc.—launched the "Los Esteros Energy Test Storage Test Bed" program at the Los Esteros Critical

Energy Facility in San Jose, California. This facility offers early stage battery and energy storage companies to test and validate their technology in real-world conditions while responding to real world electricity markets—in partnership with the largest generator of electricity from natural gas and geothermal in the United States.

CalCEF also recently launched “Battery Lab,” a public-private partnership with Berkeley Lab. Battery Lab enables early stage battery test equipment technologies to access equipment and expertise to develop next generation battery and energy storage technologies.

4. (For all groups) Are the proposed funding amounts identified in this RFC appropriate for the work requested? Please explain the rationale behind the recommendations, and, if applicable, what would the expected cost be to adequately test and evaluate the technology types identified in this draft solicitation?

CalCEF requires additional details as to key assumptions for the \$12M proposed for Group 1: Cal-Test Bed. Is this an annual disbursement, or a single five year program? CalCEF would argue that, given the HIGH DEGREE OF OVERSUBSCRIPTION for the similarly placed CalSEED Initiative, that at least \$15M-\$20M is available to support a robust statewide network of test bed facilities for a 4 to 5 year period.

5. (For Group 1) Should the Energy Commission require test bed locations in both Northern and Southern California? Please explain the rationale behind the recommendations.

Test bed facilities should be available in multiple locations throughout the state of California, providing more equitable access and a broader array of services. At least one test bed facility should be available in each of the 4 Regional Energy Innovation Clusters, and in some cases, where appropriate, there could be multiple test bed facilities in each region. When possible, test bed facilities should be “related to” the existing Regional Energy Innovation Clusters to strengthen and build upon the early stage clean energy ecosystem in California. Some Regional Energy Innovation Clusters can provide test bed facilities of their own – for instance, BlueTechValley at CSU Fresno maintains a robust irrigation energy test bed facility in Fresno.

An element of a successful Cal-Test Bed program should be to support a Cal-Test Bed Navigation Directory that summarizes all public and private test bed facilities in the state of California across a broad range of clean energy technologies, regardless of whether a distinct Test Bed is included in the funding regime for this program specifically. At a minimum, this would be an invaluable resource for the state and provide a capacity to refer early stage technology companies to multiple prospective test beds, regardless of the receipt of a voucher.

6. (Groups 1 and 2) Are there additional technologies we should consider or technologies we should remove from the lists provided in this RFC? Please explain the rationale behind the recommendations.

CEC should expand eligible technologies to more closely mirror the range and diversity of technologies identified in the EPIC 3-year Funding Plan and the CalSEED Initiative itself. The list as developed seems needlessly narrow and we encourage CEC to work with the successful Awardee of Group 1 to target a more broad group of Test Bed partners to serve a more diverse set of prospective applicants.

The 331 February CalSEED applicants represent a diverse array of technologies that also

require access to test bed facilities in California. Energy generation, water, electric vehicles, transportation and agriculture technologies that meet EPIC guidelines should be included as eligible technology categories.

Categories of Technology

