DOCKETED	
Docket Number:	22-ERDD-02
Project Title:	Climate Innovation Program
TN #:	247788
Document Title:	Lawrence Berkeley National Laboratory Comments - Climate Innovation Program
Description:	N/A
Filer:	System
Organization:	Lawrence Berkeley National Laboratory
Submitter Role:	Public Agency
Submission Date:	11/29/2022 3:46:09 PM
Docketed Date:	11/29/2022

Comment Received From: Lawrence Berkeley National Laboratory
Submitted On: 11/29/2022
Docket Number: 22-ERDD-02

Comments of Lawrence Berkeley National Laboratory - Climate Innovation Program

Additional submitted attachment is included below.

BERKELEY LAB

November 29, 2022

Anthony Ng
Manager - Energy Deployment and Market Facilitation Branch
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: Climate Innovation Program (Docket: 22-ERDD-02)
Lawrence Berkeley National Laboratory Comments

Dear Mr. Ng,

The Climate Innovation Program discussed at the November 15 workshop represents an exciting opportunity for California to accelerate the commercialization of innovative climate mitigation and resilience technologies and solutions. Berkeley Lab appreciates the Commission's early leadership in supporting entrepreneurship through programs like the California Sustainable Energy Entrepreneur Development (CalSEED) Initiative and innovation clusters such as Cyclotron Road and welcomes this new initiative to rapidly commercialize affordable, scalable climate solutions. In addition to the recommendations we shared at the workshop, Berkeley Lab appreciates the opportunity to share written responses to the specific questions you posed in the workshop.

1. **What criteria should the CEC use to evaluate eligible technologies?** Berkeley Lab agrees with the prioritization criteria you listed.

Berkeley Lab believes that the criteria outlined in AB 209 and suggested by staff are helpful to enabling the state to accelerate solutions to its climate mitigation and adaptation goals and doing so at lower cost. We suggest that the proposed criteria on capital availability be more clearly defined. Some disruptive technologies lacking clear or demonstrated access to scale-up capital may nevertheless offer enormous potential benefits and may be deserving of investment. The Lab agrees with the suggestion that the state carefully consider a technology's path to scale. In light of experiences learned from the loss of solar manufacturing leadership, it is important that policies to promote at-scale manufacturing – whether through traditional means or through coordination with initiatives like the Climate Catalyst Fund – be in place to complement early stage investment incentives.

2. **What is your top-priority technology topic where you believe the most funding and emphasis should be placed because it could have the most**

significant impact (and why)?

Please see response to #4.

3. **What important gaps are not being addressed by other funding programs?**

The Commission has an opportunity to address both a programmatic gap and substantive policy area gaps.

While programs like CalTestBed provide entrepreneurs access to research facilities to demonstrate new technologies and entrepreneurship programs (incubators, lab-embedded entrepreneurship programs) offer entrepreneurs the time and resources to innovate, there is a programmatic gap in helping entrepreneurs and young companies access expertise resident in the state's universities and national laboratories.

Entrepreneurs can benefit greatly from expertise at the national laboratories in the "last mile" of translating research breakthroughs into market-ready solutions. The development of viable products may require, for example, significant techno-economic analysis or detailed understandings of environmental or socio-economic impacts as well as the production of prototypes and development and demonstration of scaled-up processes. AB 209 Section 25625.2(2)(B)(2) offers entrepreneurs a welcome, much-needed opportunity to collaborate with researchers at UC facilities, both campuses and laboratories, to overcome such gaps. We appreciate the staff's clarification in the workshop that the term "UC facility" encompasses participation by UC-managed national laboratories.

There is also a substantive policy area gap, particularly for solutions addressing many climate adaptation/resilience challenges. The Commission may find it helpful to look to the Strategic Growth Council's (SGC) Climate Change Research Program which provided much-needed and helpful investments in research in substantive areas outside of those funded by the mitigation technologies supported by EPIC or PIER. This program invited and enabled broad participation across the California research community and its awards supported work in many areas where funding for research has been limited or uneven. As examples, SGC mitigation-focused research focused on solutions such as using farm soils to advance carbon mineralization, management of natural lands, and production of biochar to reduce methane emissions. Adaptation-focused research covered topics such as protecting communities against extreme heat or assessing the impacts of sea level rise on toxic material liberation at hazardous waste sites. Products and services addressing challenges such as these could benefit from investment under the Climate Innovation Program.

4. **What other suggestions would you like the CEC to consider in the development of this program?**

The technology areas identified in the legislation all represent important areas deserving of priority by the Commission. In keeping with the broad language in AB 209, Berkeley Lab would

recommend that the Commission retain maximum flexibility to determine eligible climate-related or regenerative agriculture technologies.

The Cyclotron Road entrepreneurship program, Berkeley Lab's widely-replicated lab-embedded entrepreneurship program, has supported 65 companies that have raised $900m in follow-on funding and hired more than 900 employees since its inception in 2015. A significant factor in this success is the program's focus on the talent, passion and capabilities of the entrepreneurs themselves, rather than on identified technologies. Given the breadth of the climate crisis, Berkeley Lab's own programs have supported work on a wide range of promising low-carbon solutions. Acknowledging the statutory requirements, maintaining flexibility will maximize the Commission's opportunity to identify critical gaps and support the most promising innovations.

Following are examples of technologies that offer significant potential to advance carbon neutrality and other objectives identified in AB 209:

Advancing a Circular Economy that Recycles Carbon Wastes into Valuable Products. California generates a huge amount of forest, farm and municipal carbon waste that could be converted into useful, durable products capable of sequestering carbon. California's bioscience sector is the world leader in pioneering technologies to develop bio-based products that replaced products based on petroleum (our Advanced Biofuels and Bioproducts Process Demonstration Unit, has supported more than 70 companies in the bioeconomy sector, resulting in the launch of more than 15 products available in the marketplace today, many of which advance climate change mitigation or resilience objectives). Examples include

- Conversion of biomass to intermediates or products
- Design and production of bio-based products (chemicals, fabrics, materials, etc.) that improve upon and replace petroleum-based ones,
- recyclable plastics,

Sustainable Agriculture. New innovations in agriculture offer the opportunity to reduce net carbon emissions, enhance soil productivity and provide farmers new markets and tools to reduce traditional input costs. Examples include

- pesticide replacements,
- enzymes for manufacturing
- low-carbon nitrogen fertilizer production.

Carbon Removal. The latest Scoping Plan draft acknowledges the need for significant carbon removal. New technologies are needed to efficiently capture carbon dioxide and other greenhouse gasses, convert them to usable products, and where utilization is not possible, safely and securely sequester carbon. Examples include

- Energy-efficient, affordable capture
- Low-cost, scalable measurement of soil carbon
- Mineralization technologies
- Ocean-based carbon removal
- Geologic storage

- Removal of criteria and other pollutants from carbon waste streams

Berkeley Lab appreciates the Commission's long-standing leadership in climate innovation and the opportunity to share our perspectives. If we can be of assistance to the Commission, please do not hesitate to contact me.

Jim Hawley
Director, State and External Relations
Lawrence Berkeley National Laboratory