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Comment Received From: Peter Alstone
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Recommended Topic - Microgrid Performance and Siting Analysis

Please see the attached document describing a suggestion for EPIC research.

Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION

CALIFORNIA NATURAL RESOURCES AGENCY

Electric Program Investment Charge 2026–2030 (EPIC 5) Research Concept Proposal Form

The California Energy Commission (CEC) is currently soliciting research concept ideas and other input for the Electric Program Investment Charge 2026–2030 (EPIC 5) Investment Plan. For those who would like to submit an idea for consideration, please complete this form and submit it to the CEC by **August 8, 2025**. More information about EPIC 5 is available below.

To submit the form, please visit the e-commenting link: https://efiling.energy.ca.gov/EComment/ECommentSelectProceeding.aspx and select the Docket **25-EPIC-01**. Enter your contact information and then use the "choose file" button at the bottom of the page to upload and submit the completed form. Thank you in advance for your input.

1. Please provide the name, email, and phone number of the best person to contact should the CEC have additional questions regarding the research concept:

Peter Alstone.
Peter.Alstone@humboldt.edu
(707)-826-4345

2. Please provide the name of the contact person's organization or affiliation:

Faculty Scientist at the Schatz Energy Research Center

3. Please provide a brief description of the proposed concept that you would like the CEC to consider as part of the EPIC 5 Investment Plan. What is the purpose of the concept, and what would it seek to do? Why are EPIC funds needed to support the concept?

Concept: Analyze community microgrid performance and benefits to support decisions for future deployment.

Purpose and Goals: The project would involve data analysis on existing and proposed large-scale microgrids in California to assess the capabilities of the systems for supporting reliability, increasing local hosting capacity, and providing services to the utility system through reduced costs. This data analysis would

inform a siting analysis that considers the potential role of future microgrids across a specific utility area. Working in collaboration with a distribution utility partner, the project team would develop and pilot test a method for considering the role of large-scale microgrids to serve loads in sections of the distribution system that have needs related to reliability, resilience, and/or local hosting capacity. The estimated cost of microgrid systems can be compared in this analysis to traditional grid upgrades (reconductoring, hardening, undergrounding) that would otherwise be needed to provide adequate service. The outcome would be a siting analysis tool that identifies locations where microgrids are a least-cost option for serving energy needs.

Why EPIC? EPIC funds are needed for this work to create a publicly accessible framework for understanding the performance and benefits of microgrids, many of which have been funded with ratepayer funds. If microgrids can provide an alternative pathway for least-cost, best-fit utility upgrades on the distribution system, they could help reduce upward pressure on rates. Developing a robust understanding of these dynamics, and working to deploy that understanding in an analysis of the utility system, is a good use of public R&D funds.

4. In accordance with Senate Bill 96[i], please describe how the proposed concept will "lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory energy goals." For example, what technical and/or market barriers or customer pain points would the proposed concept address that would lead to increased adoption of clean energy technology or innovation? Where possible, please provide specific cost and performance targets that need to be met for increased industry and consumer acceptance. For scientific analysis and tools, provide more information on what data and information gaps the proposed concept would help fill, and which specific parties or end users would benefit from the results, and for what purpose(s)?

Overcoming barriers: This project would overcome knowledge barriers to scaling up community microgrids in California. There is currently a lack of widespread understanding about the performance of these systems and how they may work at scale. A data-driven approach to estimating the cost and performance of the systems, then applied to the real utility system, would fill a gap in knowledge. The outcomes would be useful for utility planners, regulators, and microgrid developers. All of these parties currently are acting in an information environment without good understanding of the factors being studied in this concept.

The cost and performance targets that are relevant for microgrids are in comparison to traditional upgrades that they may replace. Collaboration with a utility partner to make these comparisons, and identifying a pathway for producing publicly available results of them, is a key aspect of the work.

5. Please describe the anticipated outcomes if this research concept is successful, either fully or partially. For example, to what extent would the research reduce technology or ratepayer costs and/or increase performance to improve the overall value proposition of the technology? What is the potential of the innovation at scale? How will the innovation lead to ratepayer benefits in alignment with EPIC's guiding principles to improve safety,[ii] reliability,[iii] affordability,[iv] environmental sustainability,[v] and equity?[vi]

Outcomes: The key value proposition for this work would be creating actionable and data-driven insights related to the relative costs of community microgrids compared to alternative and conventional approaches for supporting reliability and hosting capacity for new loads and DER. This is an important question for guiding investments in distribution system capacity and hardening, which are major drivers for prospective cost increases in the coming decades. Filling the knowledge gap is valuable regardless of the outcome. If microgrids are found to be highly promising and least-cost alternatives across a range of locations, there are large potential gains to ratepayers from reduced costs to achieve California energy goals. Or, if microgrids are found to be a more niche application, the work will be important for identifying these and also identifying the necessary advances in microgrid technology that would be required for more widespread use. One possible outcome, if it is allowed by the regulator, is a screening tool or map that identifies promising locations for large-scale microgrids to enhance service and reduce the cost of utility operations to ratepayers. Another possible outcome is that the analysis can better inform development of alternative business models for developing and owning different parts of a microgrid (the switchgear, controls, battery, and generation), depending on the revenue and benefits streams that are available.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.

Qualitative metrics:

- Regulator, utility planner, and stakeholder trust in the understanding of microgrid performance, costs, and potential applications

- Public access to data and knowledge to inform further development of distributed resources that include local microgrids.

Quantitative metrics:

- Number of communities with actionable information about potential microgrid development for their location (want to increase)
- The precision or error in estimates of cost-benefit ratios for prospective microgrid projects (want to decrease)
- The capacity of increased loads due to electrification that can be managed by strategic investment in microgrids serving a load pocket (want to increase)
- The capacity of increased DER that can be managed by strategic investment in microgrids serving a local area (want to increase)

7. Please provide references to any information provided in the form that supports the research concept's merits. This can include references to cost targets, technical potential, market barriers, equity benefits, etc.

Identifying the need for better information on microgrid performance to inform policymaking: https://smartgrid.ieee.org/bulletins/may-2023/overcoming-barriers-to-microgrid-development-a-review-of-policies-and-regulations

CPUC Public Advocates position on need for microgrids to serve ratepayers, which could be informed by this work: https://www.publicadvocates.cpuc.ca.gov/press-room/commentary/240710-microgrids

Analysis of current regulatory landscape for microgrids identifying shortcomings and market barriers, which may be overcome through better analysis of the capabilities of the systems: https://perkinscoie.com/insights/article/cpuc-closes-years-long-microgrids-proceeding-limiting-grid-distributed-energy

Proof-of-concept for model showing DER as a non-wires alternative. The proposed project would provide real-world data to support transition of these concepts from the academic literature to real utility planning decisions: https://www.sciencedirect.com/science/article/pii/S0378779624004073

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:[vii]
    a. Transportation Electrification

b. Distributed Energy Resource Integration
c. Building Decarbonization
d. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas
e. Climate Adaptation

Please describe in as much detail as possible how your proposed concept would support these goals.

Transportation Electrification: This work would assess how microgrids can support serving local load growth (including through transportation electrification).

Distributed Energy Resource Integration: Microgrids are an integration of DER for a specific purpose, to enhance DER and allow them to serve reliability, distribution hosting capacity, and resilience goals (in addition to providing clean energy or supporting transmission capacity, etc.)

Building Decarbonization: This work would assess how microgrids can support serving local load growth (including through building electrification).

Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas: This work would include and focus primarily on analysis of microgrids that can be powered by a mix of clean energy sources.

Climate Adaptation: Microgrids powered by clean energy are an example of a combined mitigation with adaptation technology. They can help communities adapt to wildfire and extreme heat stress on the grid. The proposed project would provide clear comparisons in the cost and performance of these systems compared to alternatives.

About EPIC

The CEC is one of four EPIC administrators, funding research, development, and demonstrations of clean energy technologies and approaches that will benefit electricity ratepayers of California's three largest investor-owned electric utilities.

EPIC is funded by California utility customers under the auspices of the California Public Utilities Commission.

To learn more about EPIC, visit: https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program

EPIC 5 documents and event notices will be posted to: https://www.energy.ca.gov/proceeding/electric-program-investment-charge-2026-2030-investment-plan-epic-5

Subscribe to the EPIC mailing list to stay informed about future opportunities to inform the development of EPIC 5: https://public.govdelivery.com/accounts/CNRA/signup/31897

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i See section (a) (1) of Public Resources Code 25711.5 at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC&sectionNum=25711.5.

ii EPIC innovations should improve the safety of operation of California's electric system in the face of climate change, wildfire, and emerging challenges.

iii EPIC innovations should increase the reliability of California's electric system while continuing to decarbonize California's electric power supply.

iv EPIC innovations should fund electric sector technologies and approaches that lower California electric rates and ratepayer costs and help enable the equitable adoption of clean energy technologies.

v EPIC innovations should continue to reduce greenhouse house gas emissions, criteria pollutant emissions, and the overall environmental impacts of California's electric system, including land and water use.

vi EPIC innovations should increasingly support, benefit, and engage disadvantaged vulnerable California communities (DVC). (D.20-08-046, Ordering Paragraph 1.) DVCs consist of communities in the 25 percent highest scoring census tracts according to the most recent version of the California Communities Environmental Health Screening Tool (CalEnviroScreen), as well as all California tribal lands, census tracts with median household incomes less than 60 percent of state median income, and census tracts that score in the highest 5 percent of Pollution Burden within CalEnviroScreen, but do not receive an overall CalEnviroScreen score due to unreliable public health and socioeconomic data.

vii In 2024 the CPUC adopted five Strategic Goals to guide development of the EPIC 5 Investment Plan. A description of the goals can be seen in Appendix A of CPUC Decision 24-03-007 available at: https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M527/K228/527228647.PDF