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Grid-Connected, Local Microgrids to Enable Building Electrification

The following attachment provides ProspectSV's concept for the EPIC 5 Investment Plan.

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:

   Carolyn Weisman, carolyn.weisman@prospectsv.org (408) 320-5366

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

   Prospect Silicon Valley, https://www.prospectsv.org/

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?

   The concept we are proposing involves employing grid-connected, local microgrids to enhance the capacity of existing electrical systems and avoid timely and costly service upgrades. This concept offers additional benefits including backup power during grid events, peak load reduction, and the ability to manage a site's overall grid consumption. There is an opportunity for the CEC to support the development of cost-effective solutions that reduce the need for service upgrades, which are becoming more and more prevalent as buildings switch out gas-fired equipment with electric.

4. In accordance with Senate Bill 96[1], 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)?

   This concept addresses multiple technical and market barriers that would help increase adoption of clean energy technology and innovation.

   One of the technical challenges is the ability to dynamically manage a site's existing electrical loads to keep the total load below capacity wherever possible. Current, similar systems typically operate by tapping into a battery during short peak load periods when the total power demand is greater than the capacity of the existing service. Once load falls below the incoming service capacity and supplemental power is no longer needed, the battery turns off and recharges using utility power. In this case, if the system is not sized correctly, the battery could run out and trip the main circuit breaker. This concept addresses this challenge by categorizing loads into critical vs. non-critical, and balancing those loads during peak demand periods to prolong battery life and maintain functionality at the site.

   A significant market barrier is cost. Depending on the scale of electrification upgrades, sites often require the installation of additional electrical equipment or replacement of existing equipment with that of a higher capacity. Increased demand can require new or upsized electrical panels, wires, circuit breakers and transformers. Even the incoming utility service may require upsizing to provide the higher capacity needed to serve additional electrical loads. The cost of new equipment as well as upsizing a utility service can be a major expense. Additionally, the time required to complete these service upgrades can significantly delay a project. This concept addresses these barriers by decreasing or eliminating the need for service upgrades altogether. In addition to being cheaper than a traditional service upgrade, solutions developed under this concept would need to be cost competitive with currently available battery and smart panel systems.

[1] 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.

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,[2] reliability,[3] affordability,[4] environmental sustainability,[5] and equity?[6]

   If successful, this research would provide critical insights into the performance of new technologies and best practices for deployment. A key outcome will be reducing the frequency of electrical service upgrades, which are often a major barrier to electrification. By demonstrating reliable, cost-effective methods, the project will lower both technology and ratepayer costs and improve the overall performance of electrification solutions. The approach has broad applicability across multiple building types, including multifamily housing, commercial properties, and other sectors that face similar infrastructure limitations. At scale, this innovation can accelerate the adoption of electrification measures by making them viable for a much larger share of California's building stock.

   Innovation spurred by this concept will lead to ratepayer benefits that align with EPIC's guiding principles in the following ways:

   - **Safety**: Ensures solutions are deployed in ways that maintain safe operation and reduce strain on electrical infrastructure. Solutions developed under this concept may also provide safety benefits through increased resiliency (see below). For example, buildings can operate as a

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

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

[4] 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.

[5] 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.

[6] 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.

microgrid during grid events to continue to support critical equipment loads (e.g., heating, refrigeration, lighting, etc.).

- **Reliability**: Enables buildings to continue operation during grid events.

- **Affordability**: Reduces upfront and long-term costs by minimizing the need for service upgrades and by enabling demand response capabilities that lower peak energy charges.

- **Environmental Sustainability**: Accelerates deeper electrification of the California building stock, allowing more buildings to transition from gas-fired equipment to electric.

- **Equity**: Expands access to electrification for underserved communities and buildings that might otherwise be excluded due to infrastructure or cost barriers. It can also provide tenants greater control over their energy use and costs.

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

   Metrics / Indicators to evaluate the impacts:

   - Avoidance of service upgrades
   - Cost savings (avoided cost of service upgrades, demand charges)
   - Load management – peak demand reduction
   - Backup power – system operation during outages / grid events
   - Grid utilization – dependence on the grid vs. battery
   - Emissions reductions – CO2e avoided through electrification enabled by solution

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.

   Apartments are 29% of the housing in California, and 50% or more of housing built every year in California since 2009. In California, apartment units were typically built with 30A electrical service in the 1940s-1960s, and 60A service in the 1970s to present day construction, with the 100A service needed for a completely electrified apartment with in-unit laundry rarely available.

   For more information, see: Fournier, E. D., Cudd, R., Smithies, S., & Pincetl, S. (2024). Quantifying the electric service panel capacities of California's residential

buildings. Energy Policy, 192, 114238.
https://doi.org/10.1016/j.enpol.2024.114238

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:[7]
    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.

    The proposed concept supports two of the Strategic Goals: Distributed Energy Resource (DER) Integration and Building Decarbonization.

    DER Integration: A local, grid-connected microgrid supports DER integration through coordination of the battery storage and potential on-site renewable generation (PV). This concept enables buildings to participate in demand response and grid services, which can reduce strain on the grid during peak periods. Research in this area will provide valuable insights into opportunities for cost-effective solutions for DER integration.

    Building Decarbonization: Costly and time-consuming service upgrades are a significant barrier to electrifying buildings. Millions of homes and thousands of commercial buildings might potentially face this problem as California moves to electrify its entire building stock. By employing grid-connected, local microgrids to increase effective electrical capacity, this project directly removes that barrier, enabling widespread electrification of buildings that are currently served by gas-fired equipment. At scale, this approach could accelerate decarbonization across multiple sectors of California's building stock.

[7] 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

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