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Vortx Comments - Electric Program Investment Charge 2026â€“2030 (EPIC 5) Research Concept Proposal Form

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:
    - Tim Victor
    - tim@vortx.us
    - 314-276-2030

2. Please provide the name of the contact person's organization or affiliation:
    - Vortx, LLC

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?
    - Vortx proposes research and demonstration of a modular AC/DC power platform that simplifies the interconnection of behind-the-meter Distributed Energy Resources (DERs). The platform enables direct DC integration of solar, storage, and EV charging, while operating in a non-export mode to streamline utility approval. EPIC funding would support prototyping, certification, and pilot demonstrations at fleet depots and commercial facilities to validate reductions in cost and interconnection timelines.

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)?
    - The proposed concept addresses two critical barriers slowing California's energy transition:
        - **Interconnection Delays:** Current DER projects face 16–28 month approval timelines due to complex export studies under Rule 21 and Rule 29.
        - **High Project Costs:** Most microgrids are "snowflake" designs, requiring custom engineering and site-specific switchgear.
    - The proposed modular AC/DC platform enables **non-export, standardized DER interconnection**, reducing both regulatory burden and engineering complexity. This leads to:
        - **50% faster interconnection timelines** by eliminating the need for export studies.
        - **8–10% higher round-trip efficiency** by reducing unnecessary AC-DC conversions.
        - **≥20% CapEx savings** from standardized, replicable designs.
    - This research also addresses **data and information gaps** by documenting:
        - Comparative efficiency and cost performance between AC- and DC-coupled systems.
        - Utility approval pathways for standardized non-export systems.
        - Replicability metrics across different facility types (fleets, schools, data centers).
    - End users include California fleets, schools, and commercial facilities seeking lower-cost clean energy; utilities seeking faster DER adoption without reliability risks; and regulators evaluating scalable non-export solutions.

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]
    - If successful, this research will:
        - Lower technology and ratepayer costs by reducing both CapEx (equipment and installation) and OpEx (energy losses).
        - Increase DER performance through efficiency gains and modular N+1 reliability.
        - Improve overall value proposition by shortening project timelines, reducing soft costs, and enabling easier retrofits at existing facilities.
        - Scale Potential: Applicable across EV depots, commercial campuses, industrial facilities, and resilience hubs statewide.
    - Alignment with EPIC principles:
        - Safety & Reliability: Modular redundancy improves uptime; non-export operation avoids backfeed risks.
        - Affordability: Standardization lowers engineering and installation costs.
        - Environmental Sustainability: Increases renewable penetration and storage utilization.
        - Equity: Simplifies deployment in schools and disadvantaged communities that lack capacity for complex, bespoke projects.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.
    - Timeline: Average reduction in months for interconnection approval vs. baseline.
    - Cost: Installed cost per kW and kWh vs. AC-coupled benchmarks.
    - Performance: Round-trip efficiency (%) and annual kWh delivered to load.
    - Reliability: Hours of critical load served during outages; N+1 redundancy achieved.
    - Scalability: Number of replicable deployments without major redesign.

- Equity: Share of deployments in disadvantaged communities or public facilities.

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.
    - Wood Mackenzie C&I Solar Update (2023): Notes high cost and "snowflake" nature of C&I solar+storage projects, limiting scale.
    - CPUC Rule 21 / LADWP Rule 29: Document existing interconnection delays and export study requirements.
    - NREL Research (DC-Coupled vs. AC-Coupled PV+Storage): Demonstrates 8–13% efficiency gains with DC architectures.
    - CEC EPIC and EPIC-funded pilots: Highlight need for replicable, plug-and-play DER systems.
    - DOE/NREL microgrid cost studies: Quantify CapEx savings from modularity and standardization.

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:[vii]
    - Transportation Electrification
    - Distributed Energy Resource Integration
    - Building Decarbonization
    - Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas
    - Climate Adaptation

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

    - The proposed modular AC/DC platform directly advances California's EPIC 5 strategic goals by addressing systemic barriers to DER adoption. For Transportation Electrification, the platform enables scalable fleet and depot charging by integrating solar and storage without triggering long interconnection delays. By operating in non-export mode and standardizing the electrical backbone, fleet operators can add clean energy capacity in months rather than years. This accelerates the transition to zero-emission vehicles while reducing demand on the utility grid during peak hours.
    - For Distributed Energy Resource Integration and Building Decarbonization, the concept simplifies how solar, storage, and flexible loads connect behind the meter. Most commercial projects

today are custom designs with high engineering costs; our approach standardizes the process, lowering costs and shortening timelines. This makes it easier for small and medium-sized businesses, schools, and municipal facilities to decarbonize their buildings with on-site DERs.

- The platform also supports Achieving Net-Zero Emissions by unlocking faster and more cost-effective deployment of renewables and storage at scale. By increasing efficiency (8–10% gains compared to AC-coupled systems) and reducing project soft costs, the concept improves the economics of clean energy and broadens access for ratepayers. In addition, by enabling modular and replicable system designs, it supports the coordinated role of gas by providing a non-fossil backup pathway for resilience.
- Finally, for Climate Adaptation, the standardized architecture provides a foundation for resilient microgrids that can be deployed at critical sites such as schools, health centers, and community hubs. These facilities can maintain power during outages, protecting vulnerable populations. By reducing costs and streamlining interconnection, the platform makes resilience strategies more accessible to disadvantaged communities, ensuring equity as California adapts to a changing climate.

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