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Carla Pinzon

Additional submitted attachment is included below.

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:

   Carla Pinzon
   carla@expandpowertech.com
   954 857 3538

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

   Expand Power Technologies, Inc.

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?

Expand Power proposes further development of PowerGuard, an American Made modular, multi-port, controllable, smart solid state transformer (SST) with shortened lead times that further enables a distributed, resilient, and reliable grid for California.

   1. PowerGuard's AC and DC multi port capabilities enable extreme flexibility for interconnection and increase penetration of renewables. PowerGuard will act as a power router with universal connectivity,

managing dynamic loads and intermittent sources, integrating renewable energy resources and storage systems, and streamlining interconnection. PowerGuard is modular and flexible to accommodate new, diverse, and location agnostic loads.

2. PowerGuard automatically consolidates various components that would need to be additionally procured and that reduce end-to-end efficiency, saving costs.
3. PowerGuard's flexibility and controllability leads to a dynamic operating range that's customizable with built in smart monitoring, fault detection, and health insights for a more resilient grid. PowerGuard increases safety by collecting data, acting as a diagnostic watchdog for new insights and enabling real time visibility.
4. PowerGuard can be manufactured domestically using well-established supply chains, mitigating national security risks to critical energy infrastructure.
5. The reduced footprint of PowerGuard opens an entirely new realm of possible areas for fast-growing distribution loads.
6. PowerGuard can facilitate microgrids to mitigate grid disturbances and enable faster system response and recovery.

PowerGuard's modular technology can scale in power levels and has a variety of potential use cases and markets within California, including renewable developers, data centers, microgrids for commercial and industrial facilities, EV charging stations, and more.

PowerGuard represents a transformative grid technology with the potential to enable seamless integration of distributed energy resources, increased energy equity, and improved grid resilience; however, there are barriers to deployment including risk-averse customers, limited field validation and the absence of established adoption pathways. EPIC funding is essential to bridge this gap by further supporting PowerGuard's validation and demonstration under real-world operating conditions and interoperability standards that align with California's clean energy and reliability goals. By offsetting the risk, EPIC investment will accelerate market readiness, reduce long-term costs to ratepayers, and enable scalable deployment for a flexible, decarbonized, and resilient electric grid.

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? 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)?

PowerGuard represents a technological breakthrough with the potential to eliminate long-standing barriers to achieving California's energy goals, including 100 percent clean electricity and integration of distributed renewable generation.

Barriers addressed include

1. Limited DER hosting capacity: Today's distribution networks were not designed for high penetrations of solar PV, EV charging, and energy, leading to voltage instability and other issues. PowerGuard provides active voltage regulation, harmonic mitigation, reactive power support, and real-time power quality control.
2. Inefficient renewable integration: Traditional transformers cannot handle native DC coupling from solar arrays, batteries, or fuel cells without additional conversion stages. PowerGuard integrates both AC and DC ports, reducing equipment count, energy losses, and capital cost.
3. Lack of flexibility for electrification loads: Transportation and building electrification require rapid scaling of charging and load management. PowerGuard enables dynamic load control and high-speed communication with grid operators, mitigating demand peaks without extensive infrastructure buildout.
4. Resilience and outage vulnerability: Extreme weather events and wildfires have exposed the limitations of centralized grid architecture. PowerGuard supports autonomous microgrid operation and seamless islanding, reducing outage duration for critical facilities.

A successful demonstration, validation, and characterization project will generate operational datasets on:

1. PowerGuard field performance under high-penetration DER and electrification scenarios.
2. Comparative PowerGuard lifecycle cost, maintenance, and reliability data versus legacy transformers.
3. Analysis of ratepayer cost reduction and resiliency increase

These datasets will be made available to utilities, developers, data centers EV fleet operators, and regulators to inform procurement standards, interconnection policy, and rate design and boost overall SST commercialization.

End users and beneficiaries include

1. Utilities: Avoid costly feeder/substation upgrades, enhance resilience, and meet renewable portfolio standards while maintaining grid stability.
2. Commercial/Industrial Customers: Reduce downtime and energy costs through on-site power quality and microgrid capability.
3. DER Integrators, Data Centers, & EV Infrastructure Providers: Simplify interconnection, reduce hardware costs, and accelerate deployment timelines.
4. Ratepayers: Benefit from lower system upgrade costs, improved reliability, and faster integration of clean energy resources.

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]

This research will further demonstrate PowerGuard's compact, modular, high-efficiency, bidirectional power conversion platform technology capable of directly interfacing with and controlling renewables, battery energy storage, data centers, and EV charging systems, achieving California's energy goals and allowing for more equitable, safe, sustainable distribution.

At scale, success can fundamentally reshape how electricity is moved, managed, and monetized across the grid, with accelerated electrification, increased grid resiliency and flexibility, and reduced emissions.

Ratepayer benefits in alignment with EPIC's guiding principles include:

1. Safety: Fast fault detection and isolation reduce fire and equipment damage risks.
2. Affordability: Lower upgrade and operating costs for utilities and customers reduce bills over time.
3. Environmental sustainability: Higher efficiency and direct DER coupling reduce GHG emissions and wasted power losses.
4. Equity: More cost-effective DER and EV charging integration increases access to clean energy in underserved communities.

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

Metrics to be evaluated or adherence to California's energy goals include

1. Customer adoption readiness: Positive feedback from California utilities, site hosts, and operators on interoperability, ease of deployment, and operational performance.
2. Equity advancement: Number of projects enabled in disadvantaged or underserved communities where cost barriers previously prevented DER or EV infrastructure deployment.
3. Environmental impact: Estimated GHG emissions avoided due to reduced losses and increased renewable utilization.
4. Deployment time reduction: Reduction in average time from application to energized service.
5. Resilience improvement: Measured reduction in outage duration and frequency during grid disturbances.
6. Physical footprint reduction: Decrease in required space vs. equivalent transformer + other components system.
7. Weight reduction: Reduction in total weight for equivalent capacity.

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.

Expand Power TEA, LCA, and CRM
expandpower.com

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.

PowerGuard directly supports multiple strategic goals:

a. Transportation Electrification: PowerGuard enables cost-effective deployment of high-power DC fast charging by directly interfacing with the medium-voltage grid and EV chargers, reducing conversion losses, cutting installation costs, and doubling charging capacity per site footprint. This

accelerates California's transition to zero-emission vehicles and supports widespread adoption in both urban and underserved rural communities.

b. Distributed Energy Resource Integration: PowerGuard's grid-friendly, real-time voltage and frequency control and mulit-port capabilities enables higher penetration of distributed solar, wind, and battery energy storage.

c. Building Decarbonization: By enabling direct DC coupling to solar and storage, PowerGuard improve the economics of electrifying building systems such as HVAC and water heating, particularly in microgrid-enabled campuses, hospitals and other campuses, and multifamily developments.

d. Achieving 100 Percent Net-Zero Carbon Emissions: PowerGuard deployment reduces grid losses, enables full utilization of clean DER generation, and supports flexible demand response programs, directly contributing to California's statutory clean energy and climate goals.

e. Climate Adaptation: PowerGuard provides fast fault isolation and adaptive power routing with smart monitoring, improving grid resilience during extreme weather events and wildfires.

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