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WattEV Megawatt Charging Solid-state Transformer Technology

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:

Michael Ganny
grants@wattev.com
949-916-2751

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

WattEV

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?

Solid-state transformer technology, despite its decade-long promise of replacing inductive transformers, has remained largely in research and laboratory settings, failing to reach volume production. This stagnation is primarily due to limitations in technology and the scarcity of high-voltage transistor components.

In 2024, WattEV's subsidiary, Charge America, received a $5 million CEC grant to develop and implement three megawatt chargers utilizing solid-state technology. This development and product design has been a collaborative effort with Microchip Technology Inc., a prominent leader in analog and power semiconductors. The initial

three units employ discrete 3,300-volt transistors. However, the use of discrete devices is not conducive to industrialization and volume production. To address this, Charge America has partnered with Microchip to engineer half-bridge modules from discrete transistors. These modules can be directly mounted onto cold plates, enabling the industrialization and volume production of the 1.2MW solid-state medium voltage rectifier designed by Charge America.

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)?

This EPIC 5 proposal seeks to re-engineer the technology developed under the existing grant, incorporating these new half-bridge modules, and to certify the product for volume production. WattEV anticipates a significant surge in electric heavy-duty truck adoption, equipped with megawatt charging capabilities, starting in late 2026. The successful development and production of the proposed technology will represent a major milestone in large-scale innovation, significantly enhancing the safety, reliability, and affordability of the transition to megawatt charging, ultimately contributing to environmental sustainability.

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]

Enabling Industrialization and Volume Production: The proposed development work, to be undertaken by Charge America with Microchip Technology Inc. is crucial for making solid state transformer technology affordable. While the initial megawatt chargers use discrete transistors, which

are not suitable for industrialization and volume production, Charge America will work with Microchip to create **half-bridge modules** out of these discrete transistors. These modules can be mounted directly on cold plates, which **allows for the industrialization and volume production** of their 1.2MW solid state medium voltage rectifier. The ability to move from research and labs to volume production is a key factor in achieving affordability, as it typically drives down per-unit costs.

Improving Affordability of Megawatt Charging Transition: The proposal for EPIC 5 aims to redesign the technology using these new half-bridge modules and **certify the product for volume production**. This development is specifically highlighted as a major achievement towards innovation at scale that will improve the **affordability of transition to megawatt charging**.

Initial Investment for Future Affordability and Scale: WattEV, through its Charge America subsidiary, was awarded a **$5 million CEC grant in 2024** to develop and deploy three megawatt chargers utilizing solid state technology. This grant represents an upfront taxpayer investment.

Leading to Environmental Sustainability and Reduced Societal Costs: The widespread adoption of electric heavy-duty trucks, supported by affordable megawatt charging, **"results in environmental sustainability"**. Environmental sustainability, through reduced emissions and pollution, can lead to significant long-term societal benefits. These benefits often include **reduced public health issues** (e.g., respiratory illnesses due to air pollution) and **decreased environmental remediation costs**, which are ultimately borne by the public and, by extension, **taxpayers**. Therefore, the initial taxpayer investment in making megawatt charging affordable is an investment in a cleaner environment, potentially **mitigating future public expenditures related to pollution and health impacts**. The new proposal under EPIC 5 facilitates an "innovation at scale" that makes a critical transition more economically viable, thereby accelerating the move towards a cleaner transportation sector that can result in long-term savings for taxpayers through avoided societal and environmental costs.

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

7.

Major Project Focus	Quantified Project Benefits
Land Footprint	40% reduction in size of MCS installation space required
Cost	50% cost reduction in site construction, including significant reduction in required materials
Refueling Efficiency	75% increased efficiency due to pull-through charging at scale, and interoperability protocols that reduce stress on grid during peak hours
Site Design	35% increased accessibility due to pull-through charging at scale
Design & Utility Connection	50% reduction in overall system power losses
MCS migration by OEMs	60% increased access to OEMs migrating to higher charging rates

8. 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.

WattEV used the Argonne National Laboratory's Alternative Fuel Life-Cycle Environmental and Economic Transportation tool to determine all vehicle emissions reduction per MCS charger.

9. 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.

Supporting Widespread Adoption: WattEV anticipates that the adoption of electric heavy-duty trucks will begin in volume in late 2026, coinciding with the availability of trucks capable of megawatt charging. The development of this technology, particularly its emphasis on affordability, is therefore vital for

facilitating this large-scale transition and ensuring that megawatt charging is not cost-prohibitive for widespread use.

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