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Comments of EPRI for EPIC 5

Attached please find EPRI's comments for EPIC 5.

Additional submitted attachment is included below.



June 18, 2026

California Energy Commission
715 P Street
Sacramento, CA 95814

Subject: 25-EPIC-01; Electric Program Investment Charge 2026–2030 Investment Plan (EPIC 5)

To Whom it May Concern:

Thank you for the opportunity to respond to the Electric Program Investment Charge 2026-2030 Investment Plan (EPIC 5). Founded in 1972, the Electric Power Research Institute (EPRI) is the world's pre-eminent independent, non-profit energy research and development organization, with offices around the world. EPRI's trusted experts collaborate with more than 450 companies in forty-five countries, driving innovation to ensure the public has clean, safe, reliable, and affordable access to electricity across the globe.

For more than 36 years, EPRI's electric transportation team has led the utility transition to transportation electrification, working with electric utilities to launch various electric vehicle (EV) programs, provide EV sales and load forecasts, develop key EV grid integration and other key industry standards, and provide technical insights and resources for utilities on all areas related to EVs.

In 2023, EPRI launched the EVs2Scale2030™ Initiative to ensure that utilities would be prepared for the volume of EV service requests as EV load reaches scale, thus ensuring a reliable and more affordable EV transition for all EV customers.¹ Through collaboration across the utility industry with leading fleet operators, the auto and trucking industry, charging providers, and in coordination with federal agencies and labs, EPRI gained extensive insight and data into the challenges in electrifying EVs.² In response, EPRI developed several key tools that address these challenges and enable utilities to plan for the coming EV load at scale. Our comments below highlight these tools that are intended for public use and for the public good.

At the public workshop the California Energy Commission (CEC) held on June 11, 2026 for EPIC 5, the CEC presented three key topic areas in which EPRI's EV tools can help to address the gaps identified. These three topic areas include the following:

1. *Strategic Electrification of Emerging Transportation End-Uses*
2. *Accelerating Grid Connection of Clean Resources and Beneficial Loads*
3. *Data and Planning Tools for Grid Infrastructure Investments and Coordinating Customer Decisions*

Topic 1: Strategic Electrification of Emerging Transportation End-Uses

Under this topic area, the CEC noted that:

¹ To learn more visit www.epri.com/evs2scale2030.

² EPRI's EVS2Scale2030 Board consisted of utilities (Ameren, ComEd, GRE, LCRA, SMUD, Southern Company, Xcel Energy), utility associations (APPA, EEL, NRECA), NARUC (Commissioner Peretick of the MI PSC), trucking groups (Auto Alliance for Innovation, Amazon, Caterpillar, Daimler Truck), the Alliance for Transportation Electrification (ATE) and the DOE's Joint Office. Participating utilities from California included SMUD, PG&E, and SCE.

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- Large majority of EV adoption to date is concentrated in the light-duty on-road segment where certain customer types have disproportionately higher adoption rates.
- Emerging vehicle types such as autonomous vehicles (Avs), advanced air mobility, ports, off-road equipment, rail, medium- and heavy-duty vehicles, and emerging customer types such as rural/low-income/renters will introduce unique load profiles and customer needs, and will introduce electricity demand in potentially unprepared locations.

To address these gaps, the CEC proposed the below activity and/or research:

1. Research load profiles, behavior, and expected locations of emerging end-uses to inform grid planning.

Over the past three years, EPRI has been collecting data from automakers, utilities, national labs, and other entities to be able to collect load shapes from many different segments and locations. EPRI is in the process of developing a load shape library that will be available in Q4 2026. The load shape library will show load shapes for different vehicle segments (light-duty, public charging, school bus, transit bus, class 8 vehicles, other medium- and heavy-duty, etc), different regions in the U.S., different days (weekend vs. weekday), location (depot charging, public charging, workplace charging, etc), and where possible, the seasonal variability. EPRI is currently determining which of these profiles will be available for the public good, and thus available to all the California utilities. EPRI has collected a considerable amount of data through the data collection effort of the EVs2Scale2030™ Initiative and in building the eRoadMAP tool; however, EPRI welcomes additional data from the CEC that would help solidify robust representation of EV segments in California. EPRI plans to develop opportunities for public and industry input into this load shape library, thus ensuring that the library is comprehensive in addressing multiple EV segments.

The CEC also proposed that additional research activity be performed on the behavior of vehicles. This could include how the vehicles drive once converted to electric (e.g. perhaps there are more return to depot vehicles to be able to charge, or shorter range trips, etc.) but also the charging behavior. One of the key tools that EPRI developed as part of the EVs2Scale2030™ Initiative was the eRoadMAP tool. This tool shows the need for proactive planning for EV load – and in particular, the medium and heavy-duty “hotspots” and larger load from light-duty EV charging plazas.³ The unique tool leverages the most comprehensive dataset that exists today that combines vehicle location and vehicle behavior data, including actual fleet plans from MHD EV customers, to show where and when EV load is likely to occur at a very granular level (0.28 square miles). EPRI continues to add in new datasets and update vehicle behavior as data is shared with EPRI from our data partners. This allows utilities to plan specific circuit-level grid upgrades in the most efficient way possible, helping to ensure affordability for all customers. This tool is also available to the public, and therefore all California utilities, via www.eroadmap.com. While EPRI continues to update data sets with vehicle behavior, fleet insights, and technological changes, CEC has access into additional data sets that would enhance eRoadMAP in California. EPRI would like to work with the CEC to continue to improve on the eRoadMAP representation of California now and in future years.

2. Explore planning innovations like strategic co-location with other large loads or generation to share infrastructure.

³ eRoadMAP and technical documentation can be found here: <https://eroadmap.epri.com/>

For this research area, EPRI's eRoadMAP tool can also be helpful to the CEC and California utilities. As noted above, the tool shows where and when EV loads are anticipated to occur down to a very granular level of 0.28 square miles. The tool has already been cited in 17 different state and regulatory proceedings across the U.S., and is being incorporated into utilities' distribution planning processes and scenario planning processes. To further leverage the value of the tool, multiple utilities requested that EPRI add in building load to eRoadMAP as well, in order to create a holistic tool that shows overall load growth. The addition of buildings will be made public in the tool in Q4 2026. EPRI could add data center load as well.

As the industry's leading planning tool, eRoadMAP could be leveraged by the CEC to build upon as an innovative planning tool to show the overlapping pending loads and where load growth will exceed existing capacity, paving the way for understanding which areas of the grid will need to be upgraded, or where areas could be well-served by battery storage, flexible service connections, or other creative solutions. Additional layers could also include non-load specific layers, such as layers that help identify priority areas such as concentrations of multi-unit dwellings where public charging is likely to be needed, or areas subject to more extreme climate impacts such as flood zones or wildfires.

Topic 2: Accelerating Grid Connection of Clean Resources and Beneficial Loads

Under this topic area, the CEC noted that the challenge is as follows: the growing number and size of requests to connect to the electric grid are causing lengthy delays and costly grid upgrades; large requests can necessitate grid upgrades that are costly and may take years to construct.

To address this challenge, the following research topics were proposed:

- Innovations in bridging solutions for fast grid connections.
- Technology alternatives to new lines and rights-of-way
- Data and planning tools for grid infrastructure investments and coordinating customer decisions
- Pre-commercial grid tech incubator

EPRI developed an industry-leading solution that is already being used today to resolve these challenges identified by the CEC. Under this research area, EPRI's GridFAST tool should be examined as a data and planning tool that enables efficient and accelerated grid connections, helping to identify the grid infrastructure investments needed to be able to serve the coming customer load. GridFAST is a data exchange platform that connects EV customers and utilities in advance of the service request so that critical EV charging plans can be shared and utilities can begin to plan for these loads in distribution and transmission planning processes.⁴ Not only does GridFAST match and connect EV customers and utilities early on in the energization process, but utilities also provide load hosting capacity information through the tool so that EV customers can understand potential costs and timing related to any grid upgrades needed, and prioritize which sites to energize first, if needed. This helps to coordinate customer decisions across multiple sites and locations within a service territory, and also throughout California. Since October 2025, more than 60 utilities and 32 customers are using the tool, demonstrating the wide need for such a tool. In California alone, there are 8 utilities using the tool, and more than 300 projects have been shared through the site. For example, Caltrans has shared all of their depots that they plan to electrify with utilities around the state, enabling this early data to reach the utilities so they can begin planning for any necessary grid upgrades and understand any capacity constraints as well.

⁴ EPRI's GridFAST tool can be found here: <https://www.gridfast.com/about?url=home>.

In developing the tool, EPRI interviewed more than 17 EV customers and utilities to understand the pain points with grid interconnection from both the customer and utility points of view, and wrote a comprehensive report summarizing these 15 main challenges.⁵ In addition, EPRI examined various utility service requests and led a collaborative process on developing a common service application.

While the tool is currently focused on connecting EV customers to utilities, EPRI has considered modifying the tool to also collect larger building loads, data center loads, and more. EPRI is discussing this modification with several utilities, including a few in California.

A key feature of both the eRoadMAP tool and the GridFAST tool is that they both link to load hosting capacity maps for utilities. Currently, both tools feature 23 hosting capacity maps, with 6 more under development between partnerships with EPRI and utilities. Specific to California, EPRI's tools have load hosting capacity maps from PG&E, SCE, and LADWP, with a map from SMUD also in development. EPRI works with utilities to ensure that these maps are displayed in a manner that is helpful to the customer, yet also provides a layer of security for the utility if needed.

Topic 3: Data and Planning Tools for Grid Infrastructure Investments and Coordinating Customer Decisions

Under this topic area, the CEC noted that the gaps to be addressed are as follows:

- Existing grid planning tools are insufficient for times of rapid load growth, particularly with large loads such as EV charging plazas and data centers
- Uncertainty in when, where, and at what load factor these will materialize creates risk of delays connecting projects if the grid is not ready, or risks of stranded assets if the grid is expanded where not needed.

To address these gaps, the CEC proposed the below activity and/or research:

- Create advanced planning tools such as probabilistic, scenario-based methods and higher granularity forecasts to inform lease regrets infrastructure investment ahead of customer service requests.

Again, EPRI's eRoadMAP tool was created for this exact purpose: to show where and when EV load is likely to occur at a very granular level (0.28 square miles), to be used in utility scenario planning and distribution planning purposes. EPRI continues to work collaboratively with fleets, EVSE providers, national labs, and more to collect data and continue to expand the data within the tool. As noted above as well, EPRI is modifying the tool to include building loads too, and has considered adding in other large loads such as data centers.

EPRI's GridFAST tool also helps to inform bottoms-up forecasts by utilities. Customers are encouraged to enter in projects that are at least one year away from the in-service date, but ideally projects that are 2-3-5+ years away from the energization date as this gives the utility time to plan and build the necessary grid-side infrastructure. The customer is asked to provide as much information about the project as possible, with the ability to update project details over time. For example, a fleet with plans to electrify the entire fleet by 2032 may electrify in stages; these project details and depot locations can be

⁵ Available at: <https://www.epri.com/research/sectors/technology/results/3002026782>

entered into GridFAST, providing the utility with geographical information on where the fleet will be electrifying - and thus which circuit and substation will be impacted – what the load size will be, and what the anticipated load profile might be as well.

Other information that GridFAST asks the customer that is helpful to the utility for building more granular bottoms-up forecasts is as follows: the size of the fleet, the type of vehicles in the fleet, the charging infrastructure that is anticipated to be used, whether or not the customer can leverage optimized charging, whether or not the customer needs all of the power on day 1 of operation, if flexible interconnection is an option for the customer, if the fleet owner owns the property, and other pertinent questions. Based on the customer responses, the customer and utility are presented with a load profile for the project location. The customer also has the ability to upload a load profile if the customer has one available. All customer projects can be easily downloaded into a spreadsheet by the utility and utilized by various utility departments: forecasters, distribution planners, key account executives, and EV managers.

- Explore development of common data frameworks, data dictionaries, and other approaches to facilitated data sharing and improve transparency

With the eRoadMAP tool, EPRI published all of the technical documentation for the tool so that there would be transparency into which datasets were included, the assumptions made around the data, how the tool was created, and more. EPRI plans to do the same as building load is added into the tool. This enables an apples-to-apples comparison of the loads coming for each utility, providing confidence to regulators and governing boards about the grid-side investments needed by each utility.

EPRI's GridFAST tool was created with standardization in mind as well, as that was a dominant request of EV customers to utilities. EPRI even created a common service application that can be adopted by any utility, and can also be modified to work for other large loads too.

With EPRI's eRoadMAP and GridFAST tools, it is key to recognize that both tools have been adopted by utilities and customers around the country, and both tools are continuing to grow in adoption. These tools provide a one-stop-shop for customers, utilities, and other stakeholders to understand the EV load coming (visualize where and when via eRoadMAP, and receive pending load project data via GridFAST) and to receive actionable information and data from the EV load (via GridFAST) to prepare grid-side infrastructure, enabling and empowering key decisions by both customers and utilities. EV customers operating across multiple service territories have a place to enter in all their forthcoming electrification projects in a standardized manner (e.g. PittOhio, Ionna, Caltrans), enabling them to make connections with utilities in advance of the service request going in, receive critical relevant grid information, and prioritize site locations. The entire EV ecosystem of customers and utilities across the country are assisted by these two tools. This ultimately has the effect of benefitting the taxpayers and ratepayers of California as the rest of the U.S. transitions to EVs as well.

As mentioned throughout our comments, EPRI sees many opportunities to partner with the CEC in the further development of these tools. Partnership and further development would not only avoid duplication and confusion, but also leverage the existing work and ensure that funding is maximized to address every gap and challenge identified by the CEC. There are always new vehicle segment gaps being identified by utilities and regulators - as also noted by the CEC - and the data for EVs and large loads is continually improving; these are areas for further development within eRoadMAP and GridFAST. In

addition, new and more specialized use cases with electric driving behavior and charging behavior are continually being identified that are critical to include in the tools. Finally, as noted throughout our comments, the ongoing modification of both tools for building loads and other large loads such as data centers is also an area for partnership and collaboration.

Thank you again for this opportunity to provide comments on the EPIC 5 investment plan. Please direct any questions to Dan Bowermaster, Electric Transportation Program Manager, at dbowermaster@epri.com.

Sincerely,

A handwritten signature in cursive script that reads "Katherine Stainken".

Katherine Stainken
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