DOCKETED	
Docket Number:	25-EPIC-01
Project Title:	Electric Program Investment Charge 2026–2030 Investment Plan (EPIC 5)
TN #:	265468
Document Title:	TRC Comments - Managing Electric Panel Upgrade Decisions in California Multifamily Buildings
Description:	N/A
Filer:	System
Organization:	TRC
Submitter Role:	Public
Submission Date:	8/8/2025 1:54:48 PM
Docketed Date:	8/8/2025

Comment Received From: TRC
Submitted On: 8/8/2025
Docket Number: 25-EPIC-01

Managing Electric Panel Upgrade Decisions in California Multifamily Buildings

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:*

   Michael Mutmansky, mmutmansky@trccompanies.com, (916) 844-1093

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

   TRC

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?*

   Managing Electric Panel Upgrade Decisions in California Multifamily Buildings

   To meet the state's climate and clean air goals requires converting buildings to clean, electric appliances. But the conventional path to building electrification often triggers electrical service upsizing. Electrical service upsizing, including panel upsizing, is expensive and time consuming for the property owner. Obtaining an electrical service increase from the energy utility can cause delays in the range of weeks to years,

effectively preventing electrification. Electrical service increases are also expensive for utilities and ratepayers.

Multifamily housing comprises approximately 35 percent of all the housing units in the state and there are considerable barriers that can discourage property owners from electrifying the stock of existing multifamily housing, from high costs, limited electrical infrastructure, to the issue of split incentives. While some of these barriers can be reduced through incentives and other program activities, comprehensive changes to the electrical distribution system in the building are often prohibitively expensive.

The impact of electrifying multifamily tenant buildings is felt in the electrical feed to each unit, but there is also a cumulative impact on the building distribution system, transformer sizing, service entrance and feed from the utility on the street. The impact of the costs to the broader building electrical system can defeat the prospect of an electrification push in the building and could make any movement toward electrifying the structure very difficult to achieve, even with considerable incentive money.

There are approximately 6.4 million rental units in California with approximately 50 percent of these built before 1978. The California Energy Commission has found that approximately 88% of the energy consumption in these units is comprised of space heating and water heating end uses. A recent potential study performed by Stopwaste.Org found that the savings potential for rental housing is approximately 700 GWh and 55 million therms in savings possible through efficiency measures alone. Adding decarbonization measures to these residences (installing heat pump water and space heaters) will incur a potential electricity penalty of 1137 GWh in electricity consumption and an additional savings of 100 million therms per year. Of these savings multifamily housing (those buildings with more than 5 rental units) comprises approximately 50% of the totals. Electrification projects in these buildings will likely include an electrical engineer who can analyze the existing electrical distribution system, the potential new electrical loads, and make design decisions on sizing of the wiring and equipment necessary to properly electrify the building. This process is much more formalized than for single family and will normally include design documents, specifications, contractor bidding, site walkthroughs, and inspections.

Due to the complexity of electrical systems in mixed-use and high-rise multifamily buildings, projects meeting the need in this concept area will likely include:

1) Decision-trees providing guidance on upgrading electrical service versus alternatives for managing available panel and service capacity to electrify multifamily tenant buildings.

2) Design a solution for property owners, electrical designers, utilities, regulators, and policy makers, to minimize unnecessary and costly tenant electrical service upsizes and the subsequent building electrical infrastructure changes required due to building electrification while enabling rapid electrical conversion.

3) Leverage census data and other sources to provide insight to program developers, regulators, and municipalities on the portfolio level savings opportunities and impacts of multifamily electrification efforts.

4) Reference and extend work being done by the California Panel Optimization Work & Electrical Reassessments (POWER) Group facilitated by Build It Green (BIG), and CalNEXT.

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)?*

   Multifamily housing is potentially much more complicated and expensive to decarbonize than small single family dwellings because the electrical distribution systems in the buildings do not typically have complete load separation until the meter bank; beyond which the electrical service to each unit is likely to be segregated from the other units.

   The geometry of typical MF buildings will typically drive electrical service upgrade costs to be much higher per unit than single family housing. At the electrical service entrance to a typical multifamily building, there is commonly large switchgear, distribution buss bars, transformers, and other equipment that will require resizing and potentially replacement

when undergoing an electrification effort. In addition, the prospect of adding electric vehicle (EV) charging adds cost and complexity to an already expensive and complex effort. Furthermore, at the grid edge, the cumulative impact of many electrical service upgrades imposes stress on an already strained grid.

Achieving the state's critical goal of electrifying all buildings will be virtually impossible without instituting smart policies, programs, and practices to minimize electrical service upsizing, while allowing Californians to electrify affordably, comfortably, and conveniently. Typical multifamily buildings cannot be electrified in the same manner as single family homes (where the contractor makes simple load calculations for the new electrical equipment following the NEC and submits a panel load calculation and an electrical one-line diagram to satisfy the inspection process) because the load calculations in larger buildings become much more complex. Three-phase power is often on the property and load balancing is required to ensure the neutral isn't overloaded. The size of the main building electrical service equipment is large and expensive and dangerous to be working with due to the high voltages and potential for considerable harm if not handled appropriately. Projects successfully addressing this concept area will produce a tool, guide or other resource to reduce or overcome these barriers.

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]*

   Successful projects will help property owners, electrical designers, utilities, regulators, and policy makers, minimize unnecessary and costly tenant electrical service upsizes and the subsequent building electrical infrastructure changes required due to building electrification while enabling rapid electrical conversion. Decision-trees could be developed that provide guidance on when it makes sense to upgrade electrical service versus where there are alternatives to manage available panel and service capacity to electrify multifamily tenant buildings. Some work in this area is being done by the California Panel Optimization Work & Electrical Reassessments (POWER) Group facilitated by Build It Green (BIG) and additional emphasis on putting decision tools in the hands of practitioners will accelerate positive market outcomes.

In addition, projects in this concept area will provide utility programs with information necessary to develop targeted measures in support of electrification of existing multifamily residential buildings. California utilities will have a more direct path to electrification programs when panel and service upgrades can be avoided as well as knowing when they may be unavoidable. Since electrical service upgrades can be the highest cost measure for an electrification program, projects in this area will help utilities, third party implementers, and other program administrators make key decisions to determine how much of their program funds need to go towards panel and service upgrades vs paying for electrification technologies.

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

   If an online decision-making tool or guide results from a project in this concept area, tracking user 'end-points' (i.e. results and recommendations from the tool output) would be relatively simple. In this case the metric is the number of avoided panel upgrades and the associated power and energy consequences.

   Another path to a metric would be to require use of a decision tool, guide, or process as a condition of participation in an incentive program.

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.*

   Rental Housing Potential Study by Stopewaste.Org for the California Energy Commission. Publication Number: CEC-LGC-16-001, 2020. https://www.stopwaste.org/sites/default/files/Rental%20Housing%20Potential%20Study_FINAL.pdf

   Multifamily Electrification Readiness Report by Stopwaste.Org. https://www.stopwaste.org/sites/default/files/MF%20Electrification%20Readiness%20Report_FINAL.pdf

   Electrical Panel Upgrade vs. Part Retrofit for Multifamily Property Managers by Momentum Electrical Contractors. https://momentum-electric.com/electrical-panel-upgrade-vs-part-retrofit-strategies-for-multi-family-property-managers/

Multifamily EV Charging: Making it Work in Apartments and Beyond by Electrify News. https://electrifynews.com/news/ev-chargers/multifamily-ev-charging-making-it-work-in-apartments-and-beyond

TECH Public Dataset including residential panel capacity - TECH Public Reporting Home Page (techcleanca.com)

Buildings Baseline Study - https://www.svcleanenergy.org/wp-content/uploads/2020/01/FINALMTV-Buildings-Baseline-Study-Main-Report.pdf

2019 Residential Appliance Saturation Study (ca.gov) https://www.energy.ca.gov/sites/default/files/2021-08/CEC-200-2021-005-ES.pdf

American Community Survey (ACS) (census.gov) https://www.census.gov/programssurveys/acs

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.

This project supports the EPIC-5 goals of Building Decarbonization and Distributed Energy Resource Integration,

1) For end-users through a high-level review of a building's electrical system state before and after a proposed electrification project and the possible impact of load mitigation measures. DER benefits are removal of the need for an electrical service upgrade on the property and associated grid edge capacity relief. Building decarbonization benefits accrue as a result of load shedding and shifting inherent in avoiding a higher capacity panel upgrade.

2) For California utilities and policy makers by showing how utilities can avoid or minimize the impact of electrification by developing program measures geared to incentivize cost effective low power electrification strategies at the portfolio level.

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

---

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