

2025 Distribution Grid Electrification Model Q&A

The California Public Advocates Office has developed its [2025 Distribution Grid Electrification Model \(DGEM 2025\)](#) to estimate the cost of upgrading California's electric distribution grids to support the state's electrification goals.

Building on our [2023 DGEM study](#), this updated analysis evaluates nine future scenarios that vary by the pace of building electrification and by how consumers charge electric vehicles (EVs). The analysis can inform how these factors could affect future grid costs and electricity rates, and identify opportunities to manage costs while supporting California's clean energy transition.

Below is a Q&A highlighting some of the main takeaways of the DGEM 2025 study.

What is electrification, and why is the Public Advocates Office studying its impact on the electric grid?

Electrification refers to replacing fossil-fuel-powered technologies – such as gas furnaces, water heaters, and vehicles – with electric alternatives. As California moves toward its clean energy and climate goals, this transition will significantly increase demand for electricity and require upgrades to local distribution grids.

The Public Advocates Office developed the DGEM 2025 study to estimate the cost of these upgrades and understand how electrification could affect electric rates. This updated study expands upon our DGEM 2023 study with updated cost data, refined assumptions, and nine modeling scenarios reflecting different patterns of building and vehicle electrification.

Why does this study matter for California ratepayers?

Electrification will transform how Californians use and pay for energy. Understanding grid upgrade costs and their impact on rates is critical for ensuring an affordable, reliable, and equitable transition. The DGEM 2025 analysis helps identify where strategic planning – such as managing EV charging or coordinating building electrification – can save billions in infrastructure costs and help keep rates stable for all customers.

How much will it cost to upgrade the grid for electrification?

Under our central scenario, about \$25 billion in distribution grid upgrades are needed for the three large investor-owned utilities (PG&E, SCE, and SDG&E) through 2040, with a range of \$17-38 billion depending on how building electrification (including new electric appliances in buildings) and EV adoption unfold.

How will these upgrades affect electric rates?

Electrification is projected to exert modest downward pressure on rates – roughly -0.2 to -4.5 cents per kWh by 2040. This occurs because while infrastructure investment costs will increase, higher electricity use will spread fixed costs across more kilowatt-hours. However, this downward pressure on rates is

dependent on utilities avoiding overbuilding and on actual load growth aligning with expectations.

What role does EV charging behavior play in grid costs?

EV charging patterns are among the most influential factors on grid costs. Mass adoption of managed charging – encouraging EVs to charge during off-peak hours – could reduce grid upgrade costs by \$5 to \$18 billion by 2040. The scale of these savings depends on default charging behaviors and how utilities implement managed-charging programs.

How does building electrification affect grid costs?

Varying the adoption rate of electric building appliances (such as electric water heaters and space heating systems) changes costs by about \$3.4 billion across scenarios in 2040, and has minimal effect on rates (less than 0.6 cents per kWh). However, the future pace of building electrification is highly uncertain, and unpredictable future trends, such as the adoption of newly emerging lower-power appliances, including 120V heat pump water heaters, could lead to outcomes outside our modeled range.

How do the 2025 results compare to the 2023 DGEM study?

DGEM 2023 projected \$26 billion in costs by 2035. DGEM 2025 estimates only \$14 billion by that year under the same assumptions – largely because of updated infrastructure cost data.

How certain are these projections?

Results depend on many assumptions about technology adoption, grid design, and consumer behavior. The model is not meant to provide definitive forecasts but to inform ongoing discussions about how best to meet California's electrification and climate goals affordably.

We welcome input on our findings and modeling approach to help refine future analyses and ensure that planning efforts reflect the best available data.

What data is used in the model?

DGEM 2025 uses data provided by all three major California investor-owned utilities (PG&E, SCE, and SDG&E) which describes electricity consumption in recent years and infrastructure ratings and connections. The model also uses forecasts of future electricity consumption from the California Energy Commission, and vehicle location data from the California Department of Motor Vehicles.

Where can I learn more?

The full DGEM 2025 report, slides, and supplemental materials are available on the Public Advocates Office website here: <https://www.publicadvocates.cpuc.ca.gov/press-room/reports-and-analyses/distribution-grid-electrification-model-2025>.