Alliance for Transportation Electrification

Making Electricity More Affordable with Electric Vehicles

July 2025

Issue Brief

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About ATE

The Alliance for Transportation Electrification (ATE) is North America's largest 501(c)(6) EV trade association representing over fifty member companies dedicated to expanding safe, dependable, affordable, and accessible electric transportation technology.

Attributions

This paper was supported and informed by members of the ATE Rate Design Task Force. The task force consists of over thirty members representing industry stakeholders with extensive rate design expertise. The Rate Design Task Force was set up in 2020 to examine the evolution of rate design and demand charge structures for electric vehicles. The group works to develop consistent high-level principles for rate design consideration and draft narrative language to support member utilities EV proposals and engagement with intervenors.

Abstract

As electric utility costs rise due to factors such as inflation, grid modernization, and growing electricity demand, regulators and utilities face mounting pressure to mitigate rate impacts for consumers—particularly those most vulnerable to energy cost burdens. This Issue Brief from the Alliance for Transportation Electrification (ATE) examines how electrification, especially electric vehicles (EVs), can counterbalance rising utility costs when EV load is managed efficiently. Drawing from foundational ratemaking principles and recent utility case studies, the paper demonstrates that increased electricity sales from EV charging—when aligned with off-peak or excess capacity periods—can generate additional utility revenue without proportional cost increases, thereby reducing rates for all customers. The analysis also explores how managed charging strategies, appropriate rate designs, and targeted utility programs can maximize these benefits. By evaluating real-world data from high EV penetration markets, this paper provides a compelling case for regulators to support utility EV programs as a tool for enhancing electric affordability, grid efficiency, and equitable decarbonization.

Introduction

The electric utility industry in the United States is under almost unprecedented scrutiny as customer bills have increased significantly in most areas of the country over the past several years.[1] The increased monthly cost of electricity has had an especially deleterious effect on low-income Americans and those living in areas with a high energy burden.[2,3] The cost increases have a variety of causes but are fundamentally due to increased cost pressures on electric utilities which are then carried through in customer rates.

There are several drivers for increased utility costs including inflation, supply chain issues, economic growth, accelerated load growth driven by data centers, AI specific data centers, and broader electrification. These drivers are further compounded by the need to replace aging equipment, grid hardening for resilience, wildfire mitigation and environmental compliance, and in some cases federal and state directives for the use of certain energy resources.[4] While many of these cost pressures are not new, they have become particularly acute for many utilities. These trends are expected to continue at least to some degree.

Utility regulatory commissions are faced with the unhappy but necessary prospect of allowing utilities to recover their prudently incurred costs. To deny the recovery of these costs in rates would violate substantial federal and state legal precedent and make it difficult for utilities to raise capital to maintain the reliability and safety of our electric systems. At the same time regulators must recognize and work to mitigate the burden these rate increases place on customers.

This issue brief focuses on one of the major trends in the energy sphere affecting costs going forward – electrification. When done the right way, certain elements of electrification can mitigate rate impacts and result in lower monthly customer bills than may result otherwise. This is especially true of electrification in the transportation sector and the development of electric vehicle (EV) markets.

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[1] U.S. Energy Information Administration. (2025). U.S. electricity prices continue steady increase. Retrieved from https://www.eia.gov/todayinenergy/detail.php?id=65284

[2] American Council for an Energy Efficient Economy. (2024). Low-Income Households Spend Nearly 20% of Income on Home Energy and Auto Fuel Costs. Retrieved from https://www.aceee.org/blog-post/2024/05/low-income-households-spend-nearly-20-income-home-energy-and-auto-fuel-costs;

[3] Federal Reserve Bank of Minneapolis. (2023). Rising household energy costs affect lower-income and non-White residents most. Retrieved from https://www.minneapolisfed.org/article/2023/rising-household-energy-costs-affect-lower-income-and-non-white-residents-most

[4] Iacurci, Greg. (2025). Why electricity prices are surging for U.S. households. *CNBC.* https://www.cnbc.com/2025/06/21/why-electricity-prices-are-surging-for-us-households.html

The goal of this brief is to help regulators, utilities and industry stakeholders understand how transportation electrification, when accompanied by programs to promote the efficient use of EVs, can help achieve greater affordability of electricity by lowering customer rates.[5] It is the intent of ATE, its members, and the ATE Rate Design Task Force that the findings presented here would encourage state utility commissions to approve programs proposed by their electric utilities that support consumer adoption of EVs and the most efficient use of utility resources to manage their integration with the electric distribution system. These include programs that help customers access EVs by easing the installation of reliable charging infrastructure, enable and incentivize managed charging, afford beneficial tariffs and rates, and streamline and accelerate interconnection and energization of electric vehicle supply infrastructure.

Drivers of Transportation Electrification

Why has transportation electrification become a significant trend? The most important driver for electrification is the economic benefit to consumers. While in some cases, the upfront cost of an EV is higher than a similar internal combustion engine (ICE) vehicle, the upfront costs of EVs continue coming closer to parity with ICE vehicles. However, the total cost of ownership (TCO) for an EV over the life of the vehicle is considerably lower than ICE counterparts.

A recent analysis by Atlas Public Policy Group looked at four different classes of vehicles over a period of 8 years and found the TCO was lower for the similar EV model.[6] Savings for electric fuel compared to gasoline are particularly significant as are average maintenance costs. Performance relative to price point also offers better value for EV technology in addition to driver friendly features typically not available in standard ICE models. As we examine in this paper, the economic benefit of EV adoption extends beyond the individual purchaser, potentially reducing electric costs borne by all utility customers. The same economic benefit is found in other forms of electrification as well.

Another broad driver of electrification is the environmental benefit of reduced combustion technology dependency for transportation and other uses. As electric power generation continues to get cleaner, substituting electricity for combustion fuels can substantially

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[5] ATE is planning a follow-on to this Issue Brief that will focus on how these rate reductions can be measured by state commissions and utilities – specifically looking at measuring the marginal revenues and marginal costs of utility investments in transportation electrification.

[6] Atlas Public Policy (2025) Comparing the Total Cost of Ownership of the Most Popular Vehicles in the United States: 2025 Update. Retrieved from https://atlaspolicy.com/wp-content/uploads/2025/07/Comparing-the-Cost-of-Owning-the-Most-Popular-Vehicles-in-the-United-States-2025-Update.pdf

reduce carbon dioxide and other harmful emissions. EVs have been shown to substantially lower environmental impacts compared to internal combustion engines.[7] The same is true for electric heat pumps versus gas furnaces.[8] Accordingly, many governments find incentivizing electrification a cost-effective strategy to protect environmental quality and public health.

Many states encourage electrification through tax incentives, subsidization, goals, targets, and other mechanisms to achieve environmental and economic goals. Twenty-three states plus the District of Columbia have carbon reduction goals and targets.[9] In some cases, state commissions require their jurisdictional utilities to file Transportation Electrification Plans (TEP) which include utility programs to support and prepare for EV market development and integrating EV load. To date, U.S. utilities have proposed and secured commission approvals for over $5.3 billion in investments in EV programs and services.[10]

Electrification Implications for Utility Rates

As demonstrated in the following Sections, when more electricity is used by customers during time periods that have lower marginal costs, with all other factors held constant, rates for all customers can be expected to decline. Even when other factors are not constant, the added utility revenue from increased consumption during low-cost periods can create financial "breathing room" that mitigates or avoids rate increases. In most cases, environmental benefits will come with the cost savings resulting in beneficial electrification.[11] All forms of electrification can have this effect, but it is especially pronounced for EVs when charged off peak or in coincidence with excess renewable generation.

The importance of finding reasonable means of reducing electric rates and monthly consumer costs cannot be overstated. The cost pressures noted above are not going away – if anything those pressures will intensify. Significantly growing demand coupled with

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[7] U.S. Environmental Protection Agency. (2025). Electric Vehicle Myths. Retrieved from https://www.epa.gov/greenvehicles/electric-vehicle-myths#Myth1

[8] Glavinskas, Vanessa. (2024). They save both money and energy. Should you buy a heat pump? Retrieved from https://vitalsigns.edf.org/story/they-save-both-money-and-energy-should-you-buy-heat-pump

[9] Center for Climate and Energy Solutions. (2024). U.S. State Greenhouse Gas Emissions Targets. Retrieved from https://www.c2es.org/document/greenhouse-gas-emissions-targets/

[10] Edison Electric Institute. (2024). Electric Transportation Issues and Policy. Retrieved from https://www.eei.org/issues-and-policy/electric-transportation

[11] Regulatory Assistance Project. (2018). *Beneficial Electrification*. Retrieved from https://www.raponline.org/toolkit/beneficial-electrification/

inflation, continuing supply chain issues, grid modernization, wildfire mitigation, the need for increased resilience, and other factors will mean continued cost pressures for utilities.

How Rates are Determined

A Brief Introduction

In the early 20th century when state regulatory commissions were formed, there were no guidelines or textbooks on how to regulate utility rates and much of it was by trial and error. Some commissions tried to assess fair market value of utility assets while others relied on the original costs of those assets. In its landmark decision in *Federal Power Commission v. Hope Natural Gas Co.*, the Supreme Court decided that while establishing "just and reasonable" rates requires a balancing of investor and consumer interests, the method by which rates were determined is irrelevant. [12] Stating, "[it] is not the theory but the impact of the rate order which counts".[13] With this ruling the court implicitly permitted rate setting based on depreciated original cost. This approach, which was found preferable because it was much easier to implement than other methods, became the de facto standard across the country. The *Hope* decision gave guidance to regulatory commissions on acceptable practices, but there was still substantial variation in how rates were set.

A definitive set of practices for state regulatory commissions to follow didn't come until 1961, when James C. Bonbright published "Principles of Public Utility Rates", which discussed the theory and practice of cost-of-service ("CoS") ratemaking.[14] The Bonbright tome became the standard for a practice "manual" that was adopted by state regulatory commissions to set utility rates. Bonbright defined CoS as the capital and operating costs the utility incurs in providing service to customers within its regulated service territory. In most cases, capital costs are measured by the historical (or "embedded") costs incurred by the utility, and deemed to be prudent, when the relevant capital cost was incurred.

Utilities as a matter of practice are allowed to earn a return on the equity portion of such capital investments at a level set by state regulatory commissions and allowed to recover the interest costs of any debt incurred. State regulatory commissions also control the relative portion of debt and equity in the utility's capital structure. All operating costs, also

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[12] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944). Retrieved from https://www.loc.gov/item/usrep320591/

[13] Ibid.

[14] Bonbright, J. C. (1961). *Principles of Public Utility Rates*. Columbia University Press. Retrieved from https://lawcat.berkeley.edu/record/1152339

known as expense costs, must also be reviewed and approved by state regulatory commissions and are generally recovered as pass-throughs without a markup.

The Bonbright principles developed the first strong rationale for cost of service as the basis for utility rates. It further described how cost of service ratemaking should be implemented to achieve the proper investor/customer balance. Bonbright established five main principles for utility ratemaking.

1. Sufficiency to attract investment.
2. Fairness among and between customers.
3. Efficiency, encouraging consumption and discouraging waste through proper price signals.
4. Acceptability to customers.
5. Consistence with public policy objectives.

These principles are important to understand because they lead to the simple but important conclusion that utility rates are in part science and in part art. Satisfying all the Bonbright principles is difficult and the subject of substantial debate and interpretation by state regulatory commissions in utility rate cases. While it would be easier if there were precise rules and measures, the fact is that practices change over time and vary amongst state commissions, and even between utilities within a single state.

For the purposes of this paper in promoting an understanding of how electrification, properly implemented, can reduce rates and customer bills, we will greatly simplify the methods by which customer rates are determined. If more precision and a detailed explanation are desired, there are several good references that describe the ratemaking process, summarized here, in more detail.[15][16][17]

Setting Utility Rates

There are two major determinants of customer rates – costs incurred by the utility and sales. At the most basic level, rates are costs divided by sales. But of course, not all customers pay the same rates – costs are allocated distinctly among customer classes to reflect the differing costs in serving their unique needs. The first step in determining

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[15] Cawley, James H. and Kennard, Norman, J. (2018) A Guide to Utility Ratemaking, 2018 Update. https://www.puc.pa.gov/General/publications_reports/pdf/Ratemaking_Guide2018.pdf

[16] Jamison, Mark A. (1996). Rate of Return: Regulation. *Public Utility Research Center*. University of Florida. https://bear.warrington.ufl.edu/centers/purc/docs/papers/0528_jamison_rate_of_return.pdf

[17] NARUC. (2024). Basics of Utility Accounting and Ratemaking for Regulators – 2024. Retrieved from https://maxxwww.naruc.org/forms/store/ProductFormPublic/rti-the-basics-of-utility-accounting-and-ratemaking-2024

customer rates is for the utility to make a rate case filing that includes the costs which they believe they are entitled to recover, a proposed allocation of those costs by customer class, and forecasted sales for the period in which the rates will remain in effect.

After assessing the utility's case and hearing from intervening parties, the state regulatory commission must accept, reject, or modify the utility's proposals. In some cases, utilities may also seek an adjustment to rates to recover the costs of programs. For example, utilities might request a rate increase to cover the costs of an EV program which will provide for the installation of new EV charging stations or incentives to third parties to install such stations. In this example, the marginal cost of the program and the customer class or classes to whom the cost will be allocated are determined by regulators and rates are adjusted accordingly.

The costs that a utility submits in a general rate case that it proposes as the amount it has the right to recover is known as the revenue requirement. Revenue requirements are determined by the following formula:

Revenue Requirement = (Rate Base x Allowed Return) + Operating Expenses + Annual Depreciation + Taxes

Where:

Rate Base is the historical (or "embedded") costs of capital assets constructed by the utility to provide service to its customers, and may include generation, transmission, and distribution assets.

Allowed Return is the weighted average of the costs of debt incurred by the utility in constructing assets and the return allowed on the costs of equity sold by the utility to finance its operations. The percentage of debt vs. equity in the utility's overall capital structure is also determined in the general rate case.

Operating Expenses are the costs of administration and general expenses not used for plant construction and may, for example, include labor, supplies, and fuel.

Annual Depreciation is the annual accounting charge for wear, tear, and obsolescence of assets.

Taxes are those taxes paid directly by the utility.

While it is an often-contentious process in a general rate case, once the revenue requirement has been determined and accepted by the commission, the next step is to determine how the revenue requirement is to be recovered from customers.

Customer Classes

Every utility may define its customer classes differently, and not all utilities will have the same customer classes – but generally classes are defined as either residential, commercial, or industrial. Commercial and industrial classes may be further sub-divided by size (kWh) or peak demand (kW). Some utilities may have agricultural classes, transportation classes, or others. The basic objective, based primarily on cost-of-service regulation and the Bonbright Principles, is to divide customers into classes that have similar cost profiles, and then allocate the revenue requirement to a customer class based on the proportion of total costs attributable to each class. This process is also subject to debate within the rate case and allocations may include other objectives deemed important by the Commissions.

Once a per class revenue requirement is assigned, a rate design is then established to determine how to recover the class revenue requirement from members of the class. The primary objectives of rate design are efficiency and fairness. Rates should be designed so that customers that impose higher costs on the utility pay more, and they should be fair so that no customer is unduly burdened.

For residential customers, this may mean tiered rates so that users with different load profiles pay different rates according to their usage. For commercial and industrial customers, it may mean that demand charges are imposed so that customers who contribute more to peak demand pay more than those who contribute less.[18] For all customer classes, rates based on time of use may be imposed so that customers pay more for

Rate Variation by Service Type

Rates may vary for distinct types of utility service – e.g., generation, transmission, or distribution. For utilities not owning generation, the costs of power may be just a pass-through to customers, or customers may have contracted for their own generation service. In such cases, the general ratemaking process is the same, but the focus is on transmission and/or distribution costs of the utility. Also, generation, transmission and distribution costs may be distributed differently to customer classes and even within customer classes.

[18] A more detailed analysis and discussion on the imposition of demand charges may be found in the ATE Issue Brief entitled Alliance for Transportation Electrification. (2022). Rate Design for EV Fast Charging: Demand Charges. Retrieved from https://evtransportationalliance.org/wp-content/uploads/2022/06/Rate.Design.TF_.Demand-Charge-Paper-Final-5.25.22.pdf

electricity used at times when the utility's costs to produce and deliver electricity are higher.

Load Forecasting

The last step in the process of designing rates is load forecasting – i.e., what are the utility's expected sales within each customer class. There are two general types of load forecasting, top-down or bottom-up. Top-down forecasting generally relies on economic forecasts of the service area and perhaps econometric analysis of businesses and industries within the region. It is the method most often relied upon and deemed sufficient during times of relatively steady load growth. Bottom-up forecasting relies on looking at individual distribution system assets, businesses being established in the service area, and construction activity. Many utilities are beginning to incorporate bottom-up methods into their forecasting approaches.

As pointed out above, not every customer within a customer class will pay the same rate, but the objective of the ratemaking process is that applying rates to forecasted sales - applying the approved rate designs - yields a total revenue requirement equal or close to that which was determined in the most recent rate case. If the revenue yielded is not what was expected, the utility may need to go back to the commission to readjust its rate. This is usually done through an annual true-up mechanism, either through an automatic methodology agreed upon, or through a case-specific, annual approval.

Impact of New Load

While ratemaking is considerably more complicated than just dividing total costs by total sales, it is possible to draw some conclusions as to how increases in costs to the utility because of new loads may affect rates. The way rates are determined suggests that rates within a customer class will increase when marginal utility investments are made and have higher costs than any associated increase in marginal revenues from increased sales. For the same reason, when marginal investments are made in response to increased sales, and the revenues from those sales exceed the marginal cost of investment, rates will decline over time through the defined course of the utilities regulatory rate setting process.

It is important to recognize that the decline in rates discussed here is not an automatic or instantaneous phenomenon. As utilities can only adjust rates with regulatory approval, it can take longer for changes in costs and consumption patterns to be reflected in prices than might be seen in non-regulated markets. Also, some jurisdictions have "decoupled" revenues from sales. Even then, the effects described here will be realized when rates are adjusted. Here, we use the term "decline in rates" as shorthand for the concept that, in the utility's next rate proceeding, increased consumption that produces revenue more than the cost of marginal investment will result in rates that are lower than they might be otherwise.

Comparing the cost increases associated with new technologies and new load with additional revenue generated, and determining its impact on customers is a part of a utilities cost-benefit analysis. There are many commonly used methods to conduct cost-benefit analysis. A detailed assessment of cost-benefit analysis applied to electrification is beyond the scope of this paper, except to say that it is an available tool for state commissions in analyzing proposed utility electrification and EV programs.

Rates Versus Bills

Rates are not the same as bills, and rate reductions do not always result in lower monthly bills. While rates and usage are the primary determinants of a customer's monthly bill, other costs are often included. Utilities typically have "riders" or "trackers" to recover costs out of direct control of the utility, or for expenditures related to regulatory requirements. There are also taxes to be paid by the consumer and there may be franchise fees charged by local governments. Consequently, a reduction in rates may lower monthly bills, but only if all else is equal from month to month, including usage. But **a reduction in rates will result in a lower monthly bill than would have occurred without the rate reduction.**

How do EVs Interact with the Grid?

In a typical residential home, EV charging demand represents significant addition to the homes load profile. The load demand for charging a single passenger car is often compared to a heat pump added to a home. A fleet of medium-heavy-duty (MHD) vehicles can require a load demand equal to the size of a major office building. These increases are meaningful additions to a local distribution system. Depending on system age and design, additional utility investment may be required to accommodate this new demand with the addition of a relatively small number of EVs. This is especially true when multiple EVs may be added to a single feeder.

A key question for utilities is when this additional demand appears on the system. Managing for peak load time, when demand for electricity is at its highest levels, is the primary driver of utility costs. If electric loads are anticipated to be added during peak load periods, the costs of adding or purchasing additional generating capacity or investing in distribution system upgrades can be significant. If these expenses outweigh the additional revenues received by the utility to cover those costs rates would rise for all customers.

Utilities develop capacity to meet the highest peaks of electricity demand, creating periods of excess available capacity throughout the day. In many utility systems, these periods of excess capacity occur overnight. However, systems with a substantial number of renewable resources, may also have excess renewable generation capacity during the day or early evening hours. Thoughtfully designed rates and programs can encourage EV customers to charge during these times increasing utilization of utility assets.[19] The result is a better cost-benefit scenario for the utility and customers.

The interaction of EVs with the grid is dependent on the use case for EV charging. For personal EV owners in the residential class of customers, one of the defining features of EVs is that they are typically used during the day for trips to and from work and errand-running. Thus, residential customers are more likely to charge at night, during off-peak hours – particularly when they are incentivized to do so. Consumer surveys confirm that residential customers are more likely to charge at night, during off-peak hours – particularly when they are incentivized to do so.[20]

It must be noted that in some cases marginal costs may exceed marginal revenues. For example, large commercial class direct current fast charging (DCFC) stations may require significant distribution system upgrades and may not recover sufficient revenue to recoup those costs within desired timelines. But for residential and some commercial class charging customers, incremental capital costs to the utility will be low as new capacity will not likely be needed if charging is efficiently managed. Revenues from additional sales to charge EVs will outweigh additional costs.

It is important to note that this does not guarantee that customer bills will go down. As noted above, rates and bills are subject to many influences. However, as EV load demand continues to grow, it does change the relative scales of expenditures and revenues. When total revenues increase more than costs, this creates downward pressure on overall rate impacts for all customers. Meaning that **rate increases that may be necessary to address rising costs overall will be less than they otherwise would have been.**

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[19] While there may be fuel costs incurred to operate thermal generation, these will be modest compared to the cost of increasing overall capacity; if the new load is served by existing non-fuel-using renewable generation such as wind and solar then fuel costs will not be a factor.

[20] Plug In America. (2023). 2023 Q4 quarterly survey — home charging. Retrieved July 24, 2025, from https://pluginamerica.org/wp-content/uploads/2024/01/2023.12-Q4-Quarterly-Survey-Home-Charging.pdf

Realizing Savings Through Managed Charging

Realizing rate impact benefits with EVs is highly dependent on charging EVs during low-cost periods when there is excess available capacity. There are many ways to encourage EV customer charging behavior. While many EV drivers may charge at night as a matter of habit and convenience, there are means to incentivize charging patterns that avoid additional costs to the grid. Utility efforts to influence customer EV charging behavior are achieved with both *passive* and *active* managed charging programs.

Passive managed charging programs rely on rate structures and other incentives to influence when customers charge their EVs. In this model, utilities use time-varying (time-of-use, or TOU) rates or other incentive structures to encourage EV owners to charge during specific time windows that serve the utility's needs. These programs are called *passive* because they rely on voluntary action taken by the customer based on financial incentives, with no other involvement to influence or control charging. Passive managed charging programs can include whole-home time-of-use rates, EV-specific time-of-use rates, or other approaches such as off-peak incentives.

Active managed charging refers to the utility or a third-party vendor actively managing an EV's charging on the customer's behalf. In this model, a customer plugs their vehicle into a charger and the utility or vendor sends commands to the charger or the vehicle to start, slow or stop charging at the time of the utility's choosing. These programs are called *active* because the utility is actively controlling the vehicle's charging. Active managed charging can include demand response events and other real-time dynamic load shaping programs, optimized to deliver a variety of grid benefits. As the scale of EV ownership and managed charging programs increases, new demand peaks can emerge. Active managed programs can solve this problem by spreading these loads more evenly across all off-peak hours.

There are many Commission-approved pilot programs currently evaluating the optimal ways to achieve off-peak use. Scale is critical to realizing marginal revenues and marginal costs and utilities must work to maximize participation in managed charging programs to achieve these benefits. ATE will be issuing another white paper in 2025 examining the best practices for increasing customer participation in managed charging programs.[21] The strategies detailed in the forthcoming paper can be used to help realize the rate impact benefits described herein.

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[21] Alliance for Transportation Electrification. (August 2025) Best Practices for Customer Engagement in Managed Charging Programs. To be published at ate-ev.org.

Studies On Rate Impacts of EVs

Previous sections of this paper articulated the theoretical basis for EV load management programs providing rate benefits for all customers. This section examines studies that have evaluated this impact b established programs. These include studies by Synapse Energy Economics, the Public Staff of the California Public Utilities Commission, and Lawrence Berkeley National Laboratory. The studies have focused on areas with significant EV market penetration and serve as a useful model for other markets as EV adoption continues to grow in all markets.

Synapse Energy Economics

Synapse Energy Economics (Synapse) is a research and consulting firm headquartered in Cambridge, Massachusetts, focused on the intersection of energy, economics, and the environment. Synapse has conducted several studies looking at the rate impacts of EV market penetration and conducted some of the first studies on this subject in California. These studies were completed in 2019 with updates in 2020 and 2022.[22] Commissioned by the Natural Resources Defense Council (NRDC) in 2024, Synapse updated their research with an examination of EV rate impacts in Colorado, California, Illinois, New Jersey, New Mexico, and Virginia respectively and cumulatively.[23] This was followed by additional studies on the "Rate Impact of Future Vehicle and Building Electrification" in Colorado, New Jersey and New Mexico.[24]

With respect to California specifically, each of these studies evaluated the utility system revenues and costs associated with EVs in the service territories of Pacific Gas & Electric (PG&E) and Southern California Edison (SCE). Synapse analyzed the electricity rates that EV owners pay compared to the marginal cost of electricity plus the expenditures associated with utility EV infrastructure capital programs. The research found that based on available load data at the time of examination, serving EV load demand in California required very few system upgrades. When averaged across all EV customers in the utilities' service territories, the cost associated with all upgrades averages less than $17 per vehicle.

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[22] Synapse Energy Economics. (2018). Rate design for electric vehicles in California. Retrieved from https://www.synapse-energy.com/rate-design-electric-vehicles-california
[23] Synapse Energy Economics. (n.d.). EVs are driving rates down. Retrieved from https://www.synapse-energy.com/evs-are-driving-rates-down
[24] Synapse Energy Economics. (2025). *Rate impact of future vehicle and building electrification*. Retrieved from https://www.synapse-energy.com/rate-impact-future-vehicle-and-building-electrification

Synapse then compared the revenues from EVs charging load to the cost of needed system upgrades. From 2012 through 2018, in the two utility service territories with the most EVs in the United States, EV load contributed $584 million more in revenue than associated costs during this period.[25] These outcomes were consistently reflected in Synapse' updates to the analysis in 2020 and 2022. In the 2022 analysis, Synapse added San Diego Gas & Electric (SDG&E) and found $1.7 billion in total savings across the three utilities between 2012 and 2021. Synapse ascribed the key reason for these savings to EV drivers charging during off-peak periods.[26]

Synapse repeated these studies in 2024 and 2025 with additional states. While revenues from EV load sales are predictability smaller in states with lower EV adoption, Synapse determined that EV adoption results in net positive revenues for utilities and mitigates rate increase impacts for all electric customers. Stating in their summary findings "*The results of our analysis indicate that, across all regions in the United States,* ***EVs have increased utility revenues more than they have increased utility costs, leading to downward pressure on electric rates for EV-owners and non-EV owners alike."***[27] *(emphasis added)*

Public Advocates Office – California Public Utilities Commission

The California Public Advocates Office (Cal Advocates) of the California Public Utilities Commission (CPUC) published a report in August 2023 on the rate impacts of EVs. This report examined the cost and revenue impacts of meeting California's EV goals at the three major investor-owned utilities – PG&E, SCE and SDG&E with consideration of passenger vehicle EVs as well as MHD.[28] The Cal Advocates considered the costs which will need to be incurred to meet California's EV targets using a Distribution Grid Electrification Model (DGEM). The results indicated that the total cost of upgrading the IOUs' distribution grids by 2035 for increased load demand (including but not exclusive to EV load demand) will be approximately $26 billion.

The Cal Advocates acknowledge that as the cost of providing service – including the costs to upgrade the system – are recovered across more units of electricity sold, electrification

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[25] Synapse Energy Economics. (2019). Electric vehicles are driving electric rates down (Report No. 18-122). Retrieved from https://www.synapse-energy.com/sites/default/files/EV-Impacts-June-2019-18-122.pdf

[26] Synapse Energy Economics. (2022). Electric vehicle impacts: December 2022 (Report No. 21-032). Retrieved from https://www.synapse-energy.com/sites/default/files/EV-Impacts-December-2022-21-032.pdf

[27] Synapse Energy Economics. (2023). Electric vehicles are driving rates down [Factsheet]. https://www.synapseenergy.com/sites/default/files/Electric%20Vehicles%20Are%20Driving%20Rates%20Down%20Factsheet.pdf

[28] Public Advocates Office. (2023) Distribution Grid Electrification Model (DGEM)– Study and Report. Retrieved from https://www.publicadvocates.cpuc.ca.gov/-/media/cal-advocates-website/files/press-room/reports-and-analyses/230824-public-advocates-distribution-grid-electrification-model-study-and-report.pdf

may cause downward pressure on electricity rates across California. However, they emphasize that this scenario is contingent upon myriad factors, including planning and forecasting to avoid overbuilding grid infrastructure and whether ratepayers pay for costs beyond their traditional responsibilities. With these conditions they summarily conclude the following,

> *"…all other costs being equal, upward pressure on rates due to increased infrastructure costs due to electrification is more than offset by downward pressure on rates due to the increased consumption of electricity resulting from electrification.* ***All ratepayers, even those who cannot (or choose not to) electrify, could financially benefit from electrification****."*[29] *(emphasis added)*

The Cal Advocates did not explicitly state what additional revenues would result from the additional EV load exclusively, but rate reduction estimates for electrification overall ranged from about 0.01 $/kWh to 0.06 $/kWh by 2035.

Lawrence Berkeley National Laboratory

In 2023 Lawrence Berkeley National Lab (LBNL) published "Quantifying the Financial Impacts of Electric Vehicles on Utility Ratepayers and Shareholders" which looked at rate impacts of EV related load growth.[30] In its analysis, LBNL assumed utility financial and operational characteristics representing a generic summer-peaking, vertically integrated investor-owned utility (IOU). EV impacts on key utility financial drivers (i.e., retail sales, peak demand, and costs) were characterized across a range of analytical scenarios using bounded but reasonable values. LBNL found that EVs can provide financial benefits to ratepayers through lower rates and to IOU shareholders through increased investments and earnings.

LBNL found that the degree to which there are net benefits or costs to ratepayers and shareholders depends on how EVs are integrated, and whether resulting demand is managed through enabling grid investments and charging strategies. If charging is unmanaged and occurs during peak demand periods there are shareholder benefits resulting from increased revenues but limited benefits to ratepayers. However, when EV load is managed to occur off-peak ratepayers and investors both found to benefit. Over the 20-year projected period of the analysis, utility infrastructure investments that enable greater EV deployment initially cause retail electricity rates to rise ~1.6%. However,

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[29] Ibid. p. ES-2

[30] Satchwell, A., et al. (2023). Quantifying the financial impacts of electric vehicles on utility ratepayers and shareholders (Final Draft report). Lawrence Berkeley National Laboratory. Retrieved from https://eta-publications.lbl.gov/sites/default/files/ev_financial_impacts_final_report_final_draft_02092023.pdf

increases in sales from EV load cause rates to decline approximately 2.9% over the study timeline. The analysis showed that managed charging strategies reduce the incremental annual EV related capital expenditures by 29 to 86 percent, depending on the level of EV adoption.

Conclusion

As demonstrated in this brief, both in theory and real-world experience, overall rate reductions can be achieved through strategic and thoughtful integration of EVs in a distribution system. Regulators should consider these benefits when reviewing utility expenditures and programs that encourage EV adoption, provide incentives for EV charging infrastructure, and encourage off-peak use through load management programs and beneficial electrification tariffs and rates for all customers.

Cost and benefits of electrification can either be considered in a cost-benefit analysis of a proposed utility program separately, or in a general rate case. There are many different methodologies available for such analysis, but the important thing is that regulators are assured that all customers benefit from utility programs and investments.

EV adoption and innovative EV program designs should be considered to meet the coming demand from EV infrastructure. These programs will yield more data and performance insights to demonstrate these benefits. ATE will continue to watch these programs closely with our members and provide more analysis to demonstrate these facts in the future.