Driving Affordable Rates with EVs

Colorado

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Over the past 14 years, electric vehicle drivers in Colorado saved all electricity customers $186 million by paying more for electricity than it cost utilities to serve.

Evaluating the impact of electric vehicles (EVs) on the road today can help us understand their effect on the grid and how they might shape the power system in the future. This analysis examines utility costs versus revenues from EVs between 2011 and 2024 in Colorado. When we also include the cost of utility EV programs, EV owners have contributed approximately **$135.3 million**[1] more in revenues than in costs.

The widespread benefits EVs provide to utility customers are complemented by other societal benefits. EVs are responsible for far fewer greenhouse gases and local air pollutants than conventional vehicles[a] and become cleaner as more renewable electricity is added to the grid. In addition, EVs are generally much cheaper to operate than conventional vehicles, providing drivers relief from inflationary and volatile gasoline prices.[b]

Consumer demand for EVs continues to grow. By the end of 2024, more than 176,000 EVs were on the road in Colorado.[c] This transition has been accelerated by increasingly compelling vehicle offerings, complemented by public actions and supportive policies in recent years.[d] The new electricity load and flexible demand represented by these vehicles have major implications for our future energy system. This analysis demonstrates that electric vehicles have and can continue to put downward pressure on rates, saving everyone money, especially when they charge during hours of the day when there is less demand on the grid.

Electric Vehicles Can Improve Affordability

Recent growth in EV adoption has raised the question of how EVs affect the electricity rates paid by all households, including those that do not own EVs. Determining the effect of EVs on rates requires comparing electric utility revenues from EV charging against utility costs associated with serving EV load. If the utility revenues from EVs exceed the incremental utility system costs, then EV adoption can put downward pressure on electricity rates and save all electricity customers money. Conversely, if the costs are greater than the revenues, non-EV owners could end up paying more for their electricity. This effect holds true even for utilities without revenue decoupling, where additional revenue from EVs will eventually be accounted for in subsequent rate cases, helping minimize the need to raise rates. Even during the time between rate cases, the revenue from EVs may be used to offset higher costs in other areas, delaying the need for rate increases.[2]

Multiple forward-looking studies have predicted that utility revenues will exceed costs with future electrification.[e] This analysis confirms that work, using real-world data to evaluate utility system revenues and costs associated with EVs purchased from 2011 to 2024 in Colorado. Specifically, this analysis tracks revenues and costs associated with over 176,000 battery electric and plug-in hybrid EVs sold between 2011 and 2024 in Colorado.[f] For each year, Synapse analyzed the electricity rates that EV owners pay compared to the marginal cost of providing that electricity (generation, transmission, and distribution costs) plus the expenditures associated with utility EV programs. We gathered cost and rate data from numerous sources to inform this analysis,

[1] All dollar values are in 2025 real dollars.

[2] Colorado does not currently have full electric rate revenue decoupling.

including from RTOs, filed tariffs, and published marginal cost values. We also use a database of EV program expenditures,[g] assuming that these investments will be paid off over 10 years.

EV Charging in Colorado Saves All Electricity Customers Money

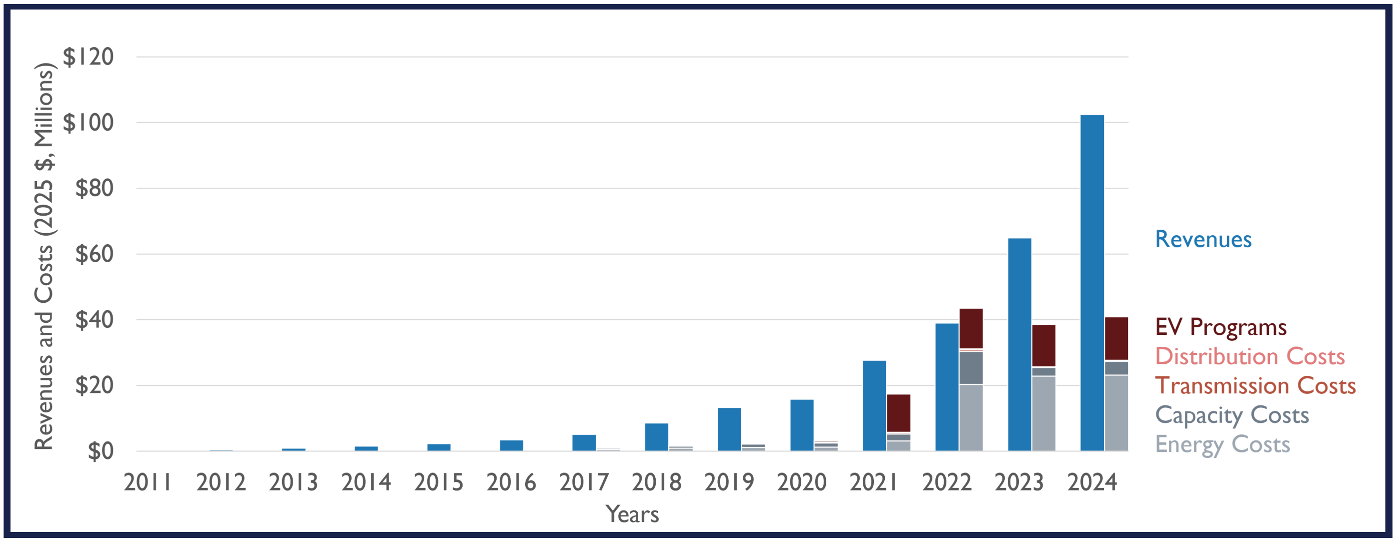
By comparing the revenues generated by EV charging to the utility's marginal cost to serve these EVs, we can construct a picture of whether EVs are creating more revenues than costs (driving down rates for everyone) or creating more costs than revenues (driving up rates for everyone). The results of our analysis indicate that in Colorado,

EVs are leading to downward pressure on electric rates for EV-owners and non-EV owners alike, saving all electricity customers money.

We estimate that EV drivers across Colorado have contributed $186 million more in revenues than associated costs, cumulatively between 2011 and 2024.

As electric vehicle adoption accelerates across the country, utilities are implementing programs to expand charging infrastructure and help accelerate electrification. Our analysis shows that in Colorado, revenues created by EV charging are more than covering the cost of the electricity they use, and the cost of utility transportation electrification programs. When utility spending on EV programs are included in the analysis, EVs contributed $135.3 million more in revenues than costs cumulatively from 2011 to 2024. Figure 1 shows the extent to which revenues from EVs outweigh the generation (energy and capacity), transmission, distribution, and EV program costs for the period 2011-2024.

Figure 1. Total costs versus total revenues of EV charging in Colorado, per year from 2011-2024.



Note: Avoided transmission and distribution costs, which were used to estimate total transmission and distribution costs associated with new EV load, are lower in Colorado relative to other states.[h]

Tracking EV Adoption Across Colorado

In 2011, which was the first year of our analysis, roughly 100 EVs were on the road in Colorado. By 2024, the number of EVs surpassed 176,000[i] –more than a 1,500-fold increase from 2011.[j] As can be seen in Figure 2, EV adoption rates have accelerated rapidly in recent years; this trend is also evident in the revenues and costs, which closely track EV adoption.

Figure 2. Cumulative EV on the road in Colorado, 2011-2024

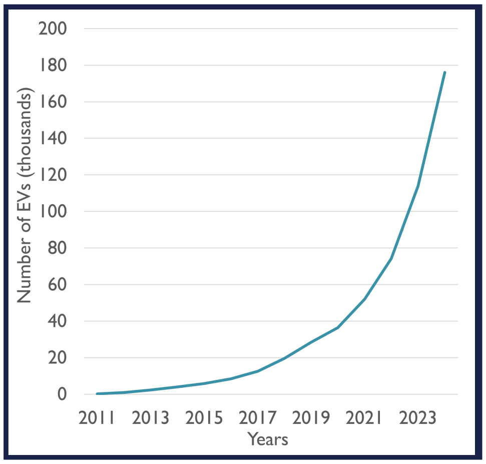
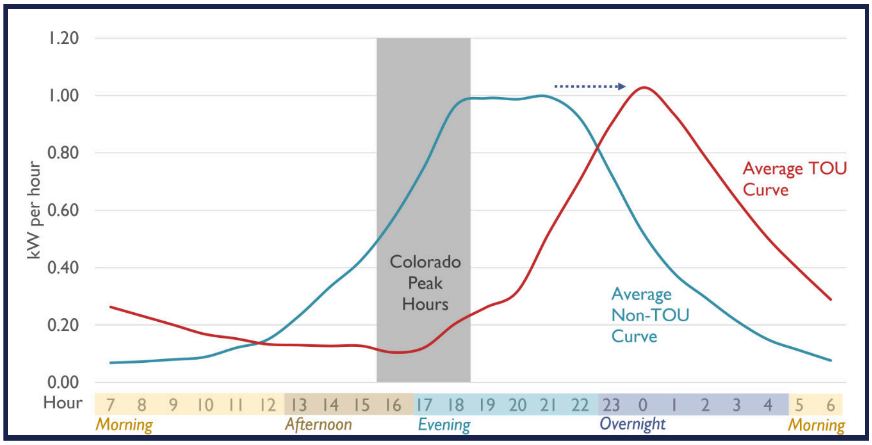


Figure 3. Typical non-TOU EV charging curve versus a representative TOU EV charging curve, with Colorado peak hours



Note: Figure 2 includes new EV sales and vehicle replacement of older vehicles.

EV Charging Patterns and Time-of-Use Charging

The time of day that EV charging occurs is a significant determinant of grid impacts and costs. If vehicles charge when demand is already high and electricity is the most expensive, EV load could exacerbate grid conditions, leading to more expensive generation coming online and potentially additional infrastructure investments. If EVs can take advantage of low overnight demand or plentiful solar power in the daytime, they can improve the economic and environmental performance of the power system.

Time-of-use (TOU) rates affect the costs that customers pay depending on when they use electricity and can incentivize consumers to use electricity when it is least expensive for everyone (e.g., when there is less overall demand on the grid). Figure 3, below, shows a representative daily charging curve for EVs on TOU rates alongside DOE's national average charging curves for EV owners not on TOU rates. The grey shaded area represents the hours in Colorado when the electric system peaks[k] and when electricity tends to be most expensive.

As Figure 3 shows, the price signals provided by the TOU rates shifts typical EV charging from times of peak use to overnight periods, when demand is typically low. This shift reduces costs to EV owners and operators for charging their vehicles, while also more efficiently using electricity infrastructure and reducing costs for everyone.

In Spring of 2022, Xcel Energy began transitioning Colorado residential customers onto a TOU rate,[l] and Colorado's other investor-utility, Black Hills Energy also began offering a TOU rate for residential EV customers in the same year.[m] TOU rates, especially rates designed specifically for EVs, are beneficial for both utilities and customers. Since these rates encourage customers to charge primarily during off-peak hours, they help reduce the need for costly grid upgrades, thereby helping to improve affordability.

For this analysis, from 2011 to 2022, we assumed that the majority of EVs were charged at home and mostly in the early evening at the end of the workday,[n] because TOU rates were not yet widely implemented in Colorado. Even with sub-optimal charging patterns during this period, EVs still helped all electricity customers save money. In 2023 and 2024, when TOU rates became the default in Colorado, we assumed that most EVs charged overnight and outside peak hours, consistent with TOU charging patterns,[o] reducing overall costs and further improving electricity affordability.

EVs Can Continue to Put Downward Pressure on Rates and Improve Affordability

EVs can provide substantial emissions reductions while also helping to reduce electricity rates for all customers by using the system more efficiently. Utilities can help maximize benefits for both EV drivers and non-EV drivers alike by encouraging EV customers to enroll in TOU rates and charge during off-peak periods. In addition, utility investments that facilitate the deployment of charging infrastructure can accelerate the EV market, growing the potential benefits from widespread EV adoption.

Our analysis indicates that EV adoption in Colorado has put downward pressure on rates. Further implementation of TOU rates and targeted investments in charging infrastructure can accelerate EV adoption, saving money and reducing harmful emissions for EV and non-EV owners alike.

This factsheet is part of a series of state-specific factsheets, based on a national analysis of the rate impact of EVs. More information can be found at: https://www.synapse-energy.com/evs-driving-affordable-rates.

Endnotes

[a] Rocky Mountain Institute (2022). More EVs, Fewer Emissions. Available at: https://rmi.org/insight/more-evs-fewer-emissions.

[b] Taylor, T., Rosenburg, J. (2022). Total Cost of Ownership Analysis. Atlas Public Policy. Available at: https://atlaspolicy.com/wp-content/uploads/2022/01/Total-Cost-of-Ownership-Analysis.pdf

[c] Alliance for Automotive Innovation (2025). Advanced Technology Vehicle Sales Dashboard. Data retrieved December 2025. Available at https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard.

[d] For example, the Colorado Energy Office's 2023 Colorado EV Plan, released in March 2023,, set forth a statewide goal of deploying 940,000 light-duty EVs on the road by 2030. Available at: https://energyoffice.colorado.gov/transportation/ev-education-resources/2023-colorado-ev-plan

[e] For example, see: Public Advocates Office, Distribution Grid Electrification Model – Study and Report, 2023, available at https://www.publicadvocates.cpuc.ca.gov/-/media/cal-advocates-website/files/reports/230824-public-advocates-distribution-grid-electrification-model-study-and-report.pdf, and California Public Utilities Commission, Utility Cost and Affordability of the Grid of the Future: An Evaluation of Electric Costs, Rates, and Equity Issues Pursuant to P.U. Code Section 913.1, 2021. Available at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-banc-whitepaper_final_04302021.pdf

[f] Alliance for Automotive Innovation (2025). Advanced Technology Vehicle Sales Dashboard. Data retrieved December 2025. Available at https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard.

[g] Data on utility expenditures on EV programs was provided to Synapse from Atlas Public Policy (EV Hub) in December 2025. EV programs related exclusively to medium-and-heavy duty vehicles were excluded from the analysis.

[h] Xcel Energy. 2024-2026 Demand-Side Management and Beneficial Electrification Plan. Colorado Public Utilities Commission Proceeding No. 23A-0589EG. Available at: https://xcelnew.my.salesforce.com/sfc/p/#1U0000011ttV/a/R3000000Kd8X/tsa7849pYJn_kKOzv4pVw5RLut0bB.MpSqDoeOkxli4

[i] Alliance for Automotive Innovation (2025). Advanced Technology Vehicle Sales Dashboard. Data retrieved December 2025. Available at https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard.

[j] Assumed survival rates from the EPA's mid-term evaluation of the Light Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards. Oak Ridge National Laboratory, January 2022. Transportation Energy Data Book, Edition 40, Table 3.15. Available at: https://tedb.ornl.gov/data/

[k] System peaks from 2019 – 2024. Peak load data from U.S. Energy Information Administration, form 930.

[l] Colorado Department of Regulatory Agencies, Public Utilities Commission. Understanding The Transition to Time of Use (TOU) Rates on Xcel Energy Electric Bills. Available at: https://puc.colorado.gov/time-of-use-rates.

[m] Black Hills Energy. Black Hills Energy Time of Day Rates Fact Sheet 2025. Available at: https://www.blackhillsenergy.com/sites/blackhillsenergy.com/files/2025-time-of-day-rate-factsheet.pdf

[n] Department of Energy, Alternative Fuels Data Center. Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite. Data retrieved December 2025. Available at: https://afdc.energy.gov/evi-pro-lite

[o] Based on EV charging curves in California. Joint IOU Electric Vehicle Load Research and Charging Infrastructure Cost Report, 10th Report Filed on March 31, 2022. Available at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M464/K783/464783120.PDF