



# **ELECTRIC VEHICLE REIMBURSEMENT RATE FOR COLORADO STATE EMPLOYEES**

**An Analysis of Residential Electricity Rates for Home Charging**

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**August 2021**



**ATLAS**  
PUBLIC POLICY

WASHINGTON, DC USA

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# Acknowledgments

Atlas Public Policy thanks the Colorado Energy Office for providing the funding which made this research possible.

Atlas Public Policy appreciates the guidance, feedback, and review from all contributors; however, their contributions to and review of this work does not imply any endorsement of the report's content or conclusions. Any mistakes or errors are solely attributable to the authors.

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# Executive Summary

The Colorado Energy Office tasked Atlas Public Policy (Atlas) to conduct an analysis that will inform a state policy allowing employees to be reimbursed for electricity used for State-issued electric vehicles (EVs) charged at home. This report recommends a per kilowatt-hour reimbursement rate and estimates bill impacts to EV drivers and their agencies.

Atlas focused our rate analysis on a standard volumetric rate, a dollar-per-kilowatt hour (\$/kWh) rate for each unit of electricity consumed. Atlas also conducted a forward-looking analysis on time-of-use (TOU) rates to analyze how these rates could impact the State's reimbursement rate. In contrast to the standard rate, TOU rates charge customers a different \$/kWh depending on the time of day a customer uses electricity. Typically, these rates have the more expensive "on-peak" periods, which align with times during the day where demand is high and supply is tight, and "off-peak" periods, where the grid faces fewer constraints and the cost to deliver electricity is lower. The recommended \$/kWh reimbursement rate is based on non-TOU residential rates because TOU rates are still relatively new, and most State employees will be charging on standard rates in the near term. The potential implications of State employees switching to TOU rates are discussed in Appendix A.

While Atlas initially set out to develop a single reimbursement rate, our analysis of the rates of nine electric utilities with the greatest share of EVs registered within their service territories revealed the spread in rates among the utilities was wide. As a result, Atlas recommends a reimbursement rate of \$0.1289/kWh, with an \$0.0636/kWh adder for EV drivers in Black Hills Energy's service territory. Having a reimbursement rate and a separate adder for Black Hills Energy customers enables the State to reimburse EV drivers without significantly over- or under-reimbursing any driver. As a part of the reimbursement rate, Atlas also recommends that the State revisit this analysis annually to account for frequently updated rates, a changing distribution of where State employees charge their vehicles, and whether customers are charging under TOU rate schedules. By refreshing this analysis periodically, the State can help to ensure that its reimbursement rate accounts for these factors.



## Reimbursement Rate

- Set to highest, non-Black Hills Energy rate with an adder for EV drivers in Black Hills Energy service territory
- Rate: \$0.1289/kWh + \$0.0636/kWh for Black Hills Energy ratepayers



## Annual Rate Refresh

- Update analysis annually to ensure State reimbursement rate reflects changing rates
- Re-evaluate time-of-use rates with statewide shift away from standard rates

# Methodology

This section describes Atlas's process for determining the cost to charge an EV across different utilities. First, Atlas identified relevant utilities in Colorado based on where State-owned light-duty vehicles are located. Then, Atlas calculated the marginal cost of electricity under each utility's residential standard rate. Finally, Atlas calculated the monthly bill impacts to EV drivers and their agencies under different potential reimbursement rates.

## Selecting Utilities to Evaluate

To create a reimbursement rate that accurately reflects the charging costs EV drivers incur while charging their vehicles at home, Atlas used the Colorado State Fleet Fiscal Year 2020 Inventory provided by State Fleet Management to identify the number of the State's light-duty vehicles registered in each utility service territory. The analysis only included light-duty vehicles; medium- and heavy-duty vehicles are generally not take-home vehicles and are less likely to be electrified in the near-term. While some employees may live in a different utility service territory from where their vehicle is registered, the registration location provides an appropriate proxy of where State employees live and likely charge their vehicles.

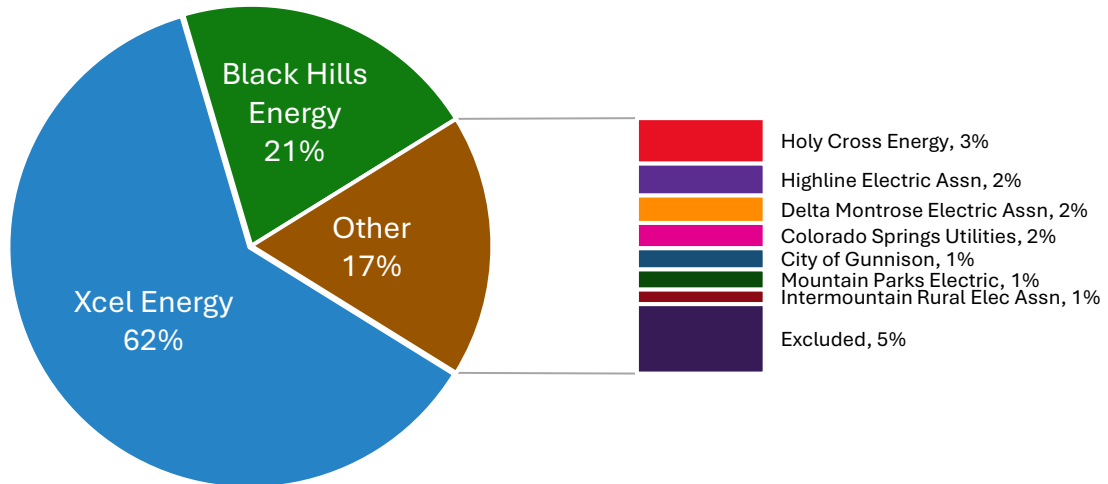
Nine utilities cover over 95 percent of the State's light-duty fleet, while the remaining five percent of vehicles are registered in 18 different utility service territories. Atlas focused on the nine utilities that had at least one percent of the nearly 1,900 state-owned light-duty vehicle registrations. Atlas omitted utilities with fewer than 19 vehicles, or one percent of the fleet, to focus on the utilities that currently have the largest share of state vehicles registered in their service territories. A periodic update of this portion of the analysis will ensure the analysis considers additional utilities as the state registers an increasing number of EVs. For the purposes of this analysis, Atlas included the State's investor-owned utilities (IOUs), Black Hills Energy and Xcel Energy, as well as the following cooperative and municipal utilities:

- City of Gunnison
- Colorado Springs Utilities
- Delta-Montrose Electric Association
- Highline Electric Association
- Holy Cross Energy
- Intermountain Rural Electric Association
- Mountain Parks Electric



This study refers to these entities as the “Analyzed Utilities” for the remainder of the report.

Figure 1: Colorado’s Light-Duty State Fleet by Utility Service Territory



This figure shows the breakdown of State-owned vehicles in Colorado by electric utility.

## Standard Rate Calculation

This section establishes the methodology Atlas utilized to calculate the cost to charge an EV, based on standard, non-TOU rates for the Analyzed Utilities. Included in this section are both the rate calculations used, as well as the assumptions made on overall consumption. The rates used in this analysis are the most up-to-date rates posted on each utility’s website. For a complete rate breakdown, including rates and the related effective dates, see Appendix B.

For the Analyzed Utilities, Atlas identified standard residential rates, including all applicable riders, cost adjustments, taxes, and franchise fees.<sup>1</sup> Riders and cost adjustments differ significantly between utilities. For a complete breakdown of riders this analysis considered, see Appendix C. Atlas omitted Xcel Energy’s Revenue Decoupling Adjustment Pilot because the program is set to expire at the end of 2023.

Franchise fees vary throughout the state, with some ratepayers not paying any fee and others paying up to four percent. Atlas assumed a set franchise fee of three percent, the rate that is present in several populous areas of the state, including Denver. In assuming a franchise fee of three percent, the rates outlined in this analysis may be lower, higher, or the actual price that customers pay. However, as described in Rate Analysis Results on page

8, the cost associated with this franchise fee is minimal on a per vehicle basis. Beyond the franchise fee, Atlas assumed an average tax rate of 3.956 percent, representing a weighted average of municipal and county taxes based on the number of State light-duty vehicles registered in each municipality or county.<sup>2</sup>

Where available, Atlas included both summer and non-summer rates, and calculated a weighted average based on the duration of the summer season, as identified in the utilities' tariffs.<sup>1</sup> Additionally, for three utilities that offer tiered rates,<sup>2</sup> Atlas assumed that the incremental load of an EV will fall entirely in the higher tier. Black Hills Energy and Xcel Energy's higher tier begins at 500 kWh, while Highline Electric's higher tier begins at 750 kWh. This assumption is based on a 2019 study from Navigant that showed the average consumption of residential Xcel Energy customers in both summer and non-summer months surpassed 700 kWh.<sup>3</sup> Adding a battery electric vehicle (BEV) that drives 10,000 miles per year could add an additional 275 kWh per month, which for most customers, would fall entirely in the higher tier. Atlas conducted a sensitivity analysis on this assumption in Appendix D.

The dollar per kWh (\$/kWh) rate is the sum of the generation rate, riders, taxes, and the franchise fee. Equation 1 below shows the rate calculation for standard rates.

### Equation 1: Standard Rate Calculation

$$TotalRate = GenerationRate \times (1 + TaxRate + FranchiseFee) + Riders$$

## Estimating Bill Impacts

Atlas assessed the impact of different potential reimbursement rates on State employees' monthly electricity bills using vehicle miles traveled (VMT) data provided by State Fleet Management. Bill impacts are based on BEVs as opposed to plug-in hybrids (PHEVs) to focus on the drivers that will be most impacted by over or under reimbursement. PHEVs tend to use less electricity than BEVs because they use a combination of gas and electric power. The percentage of VMT on electricity depends on driving and charging behavior but

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<sup>1</sup> Atlas accounted for how long different rates are applicable by season and weighted accordingly. For example, for a utility with a summer rate applicable from June 1<sup>st</sup> through September 30<sup>th</sup>, we weighted the utility's winter rate to account for the fact that it is not effective for 50 percent of the calendar year.

<sup>2</sup> Tiered rates base electricity charge customers based on how much electricity they consume. Consumption over the so-called baseline allowance is charged at a different rate or tier.

<sup>3</sup> This study can be retrieved at [https://www.xcelenergy.com/staticfiles/xcel-responsive/Company/Rates%20&%20Regulations/Regulatory%20Filings/TOU/19AL-XXXXE\\_Attachment%20BAT-3\\_RE-TOU%20Evaluation%20Report%202%20Final\\_November%202019.pdf](https://www.xcelenergy.com/staticfiles/xcel-responsive/Company/Rates%20&%20Regulations/Regulatory%20Filings/TOU/19AL-XXXXE_Attachment%20BAT-3_RE-TOU%20Evaluation%20Report%202%20Final_November%202019.pdf).

generally ranges from 25 to 75 percent. See Appendix E for the estimated bill impacts for PHEV drivers. Atlas assessed the monthly bill impact for an average BEV driver as well as a driver in the 75<sup>th</sup> and 90<sup>th</sup> percentile in terms of annual VMT. On average, light-duty State vehicles travel 9,912 miles per year, while 75 percent of vehicles travel less than 12,806 miles per year, and 90 percent of vehicles travel less than 16,847 miles per year. Atlas assumed an average efficiency of three miles-per-kilowatt-hour,<sup>4</sup> yielding a monthly charging load of 275 kWh for an average, 356 kWh for a 75th percentile, and 468 kWh for a 90th percentile driver, respectively.

## Rate Analysis Results

This section outlines the steps rate and bill considerations Atlas examined and, ultimately, proposes a recommended reimbursement rate for the State. This section includes the following:

1. **Cost to Charge an EV:** an overview of the marginal cost of electricity in each utility's service territory.
2. **Discussion of Potential Reimbursement Rates:** three potential reimbursement rates and the bill impacts for EV drivers charging under each rate.
3. **Recommended Reimbursement Rate:** a standard dollar-per-kilowatt-hour rate to reimburse EV drivers for at-home charging.

## Cost to Charge an EV

Among the Analyzed Utilities, the cost to charge an EV on a standard rate ranges from less than \$0.09/kWh for Highline Electric Association to more than \$0.19/kWh for Black Hills Energy. In Xcel Energy's service territory, which accounts for nearly 65 percent of light-duty State vehicles, it costs just under \$0.13/kWh to charge an EV.

Table 1 provides the cost to charge an EV under the standard rate for each of the Analyzed Utilities and provides the weighted average cost, excluding Black Hills Energy which represents a significant outlier. Notably, the weighted average cost is lower than the cost to charge an EV in both Intermountain Rural Electric Association and Xcel Energy.

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<sup>4</sup> Atlas's assumption is intended to approximate average efficiency across a wide range of light-duty electric vehicles. According to the U.S. Department of Energy (fuelconomy.gov), the efficiency of currently available electric vehicles ranges from two to four miles-per-kilowatt-hour. Smaller sedans, such as the Chevrolet Bolt and Nissan Leaf, achieve closer to four miles-per-kilowatt-hour while larger vehicles, such as the Ford F-150 Lightning, achieve closer to two miles-per-kilowatt-hour.



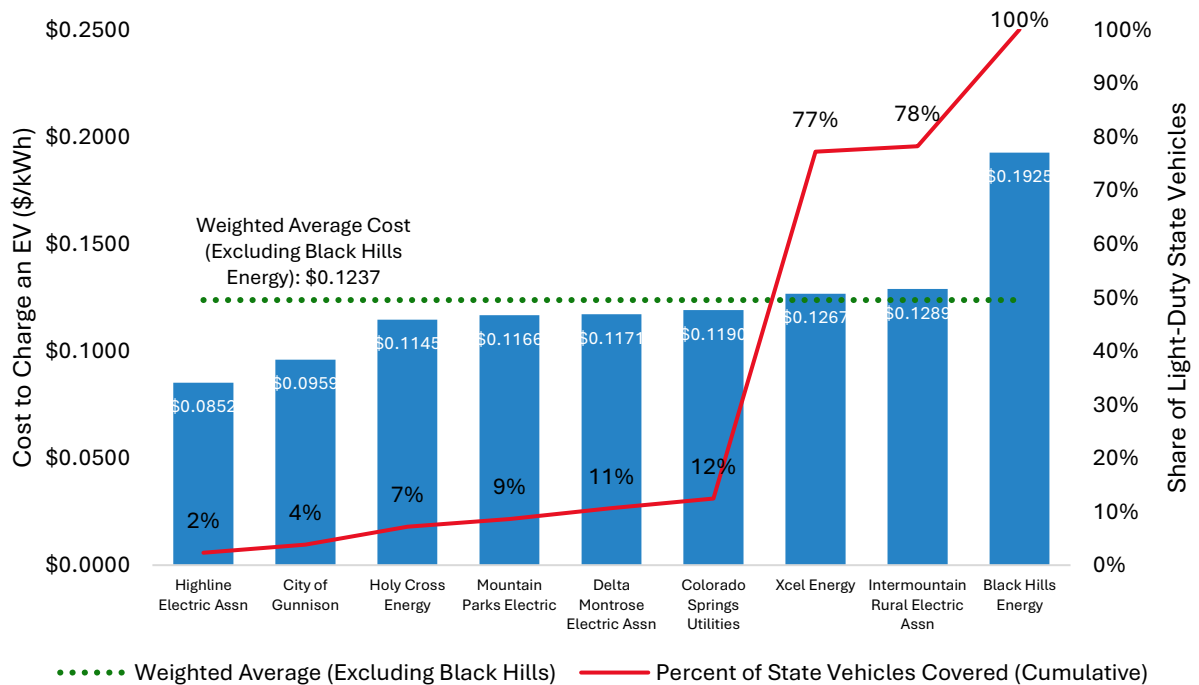
## Electric Vehicle Reimbursement Rate for Colorado State Employees

Table 1: Cost to Charge an EV Under Standard Rates

Utility	Share of State Vehicles	Cost to Charge an EV
Xcel Energy	64.7%	\$0.1267
Black Hills Energy	21.8%	\$0.1925
Holy Cross Energy	3.3%	\$0.1145
Highline Electric Assn	2.3%	\$0.0852
Delta Montrose Electric Assn	2.0%	\$0.1171
Colorado Springs Utilities	1.8%	\$0.1190
City of Gunnison	1.5%	\$0.0959
Mountain Parks Electric	1.5%	\$0.1166
Intermountain Rural Electric Association	1.1%	\$0.1289
<b>Weighted Average Cost (Excluding Black Hills Energy)</b>		<b>\$0.1237</b>

Figure 2 shows the percentage of drivers that would be fully reimbursed under a standard rate at different reimbursement rates. The weighted average rate of \$0.1237/kWh would fully reimburse just 12 percent of drivers but would fall less than half a cent short per kWh of reimbursing 78 percent of drivers. A reimbursement rate of \$0.1289, equal to Intermountain Rural Electric Association's standard rate, would fully reimburse 78 percent of State employees charging on a standard rate. The state would need a reimbursement rate of \$0.1925, equal to Black Hills Energy's standard rate, to fully reimburse 100 percent of State employees charging EVs on a standard rate.

Figure 2: Charging Costs and Coverage of Potential Reimbursement Rates by Utility Service Territory (Standard Rates)



This figure presents the cost to charge an EV and the share of State light-duty vehicles at or below that cost in each utility service territory. A reimbursement rate set equal to a given utility's rate would fully reimburse the share of state vehicles at or below that utility's rate. The weighted average is weighted based on the share of State light-duty vehicles registered in each utility's service territory, excluding Black Hills Energy.

## Discussion of Potential Reimbursement Rates

Atlas was tasked with developing a reimbursement rate that would fully reimburse as many drivers as possible while minimizing costs to the State. Atlas was directed to err on the side of over-reimbursement rather than under-reimbursement in order to encourage more drivers to switch to EVs in line with the State's climate goals.

As evidenced in *Cost to Charge an EV* on page 8, Black Hills Energy's rate presents a challenge as it exceeds the next highest utility's by nearly 50 percent. These high rates are further complicated by Black Hills Energy accounting for nearly a quarter of light-duty State vehicles.

Further, even in excluding Black Hills Energy from consideration, the weighted average rate would not fully reimburse State EV drivers in Intermountain Rural Electric Association and

Xcel Energy's service territories, which together represent over 65 percent of light-duty State vehicles.

To account for Black Hills Energy's rate and an Average Weighted Rate (exclusive of Black Hills Energy) that would not fully reimburse EV drivers in Intermountain Rural Electric Association and Xcel Energy's service territory, Atlas considered three potential reimbursement rates:

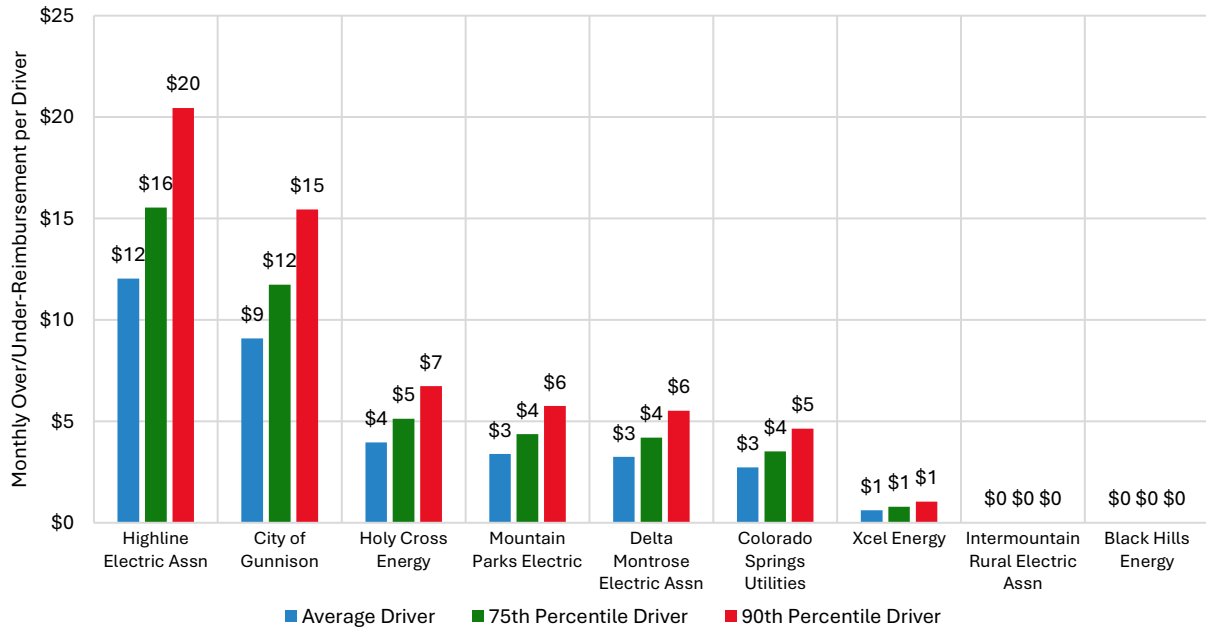
1. **Adjusted Reimbursement Rate with a Black Hills Energy Adder, \$0.1289/kWh + \$0.0636/kWh:** Set to the highest rate among the Analyzed Utilities, excluding Black Hills Energy with an adjustment equal to Black Hills Energy's non-TOU residential rate for drivers charging in the utility's service territory.
2. **Weighted Average Reimbursement Rate, \$0.1387/kWh:** Set to the weighted average of non-TOU residential rates (including Black Hills Energy).
3. **Maximum Reimbursement Rate, \$0.1925/kWh:** Set to Black Hills Energy's non-TOU residential rate.

The Adjusted Reimbursement Rate with a Black Hills Energy Adder aims to account for Black Hills Energy's significantly higher rate by setting a separate reimbursement rate for these customers. Using two different reimbursement rates could pose administrative challenges for the State but would more accurately reflect the variation in the cost to charge an EV across different utilities. Atlas considered a base rate equal to the Intermountain Rural Electric Association rate, the second-highest overall rate from Table 1, with an adjustment equal to the difference between the cost to charge an EV in Black Hills Energy's service territory and the base rate. This decision ensured that all drivers are fully reimbursed. Setting the base rate equal to a weighted average (excluding Black Hills Energy) would only save the State \$0.0052/kWh but would mean that more than 65 percent of EV drivers would not be fully reimbursed.

Under the Adjusted Reimbursement Rate with a Black Hills Energy Adder, all EV drivers would be fully reimbursed, and excess reimbursement would be significantly reduced compared to the Maximum Rate. This reimbursement rate would fully cover the cost to charge an EV for customers of Black Hills Energy and Intermountain Rural Electric Association's service territories. Excess reimbursement in other utility service territories would range from \$1 to \$12 per month for average drivers and \$1 to \$20 per month for high-mileage drivers. EV drivers in Xcel Energy's service territory, representing 65 percent of light-duty state vehicles, would be over-reimbursed by just \$1 per month on average (see Figure 3).

## Electric Vehicle Reimbursement Rate for Colorado State Employees

Figure 3: Monthly Over-/Under-Reimbursement per Driver under the Adjusted Reimbursement Rate with Black Hills Energy Adder (\$0.1289 + \$0.636)

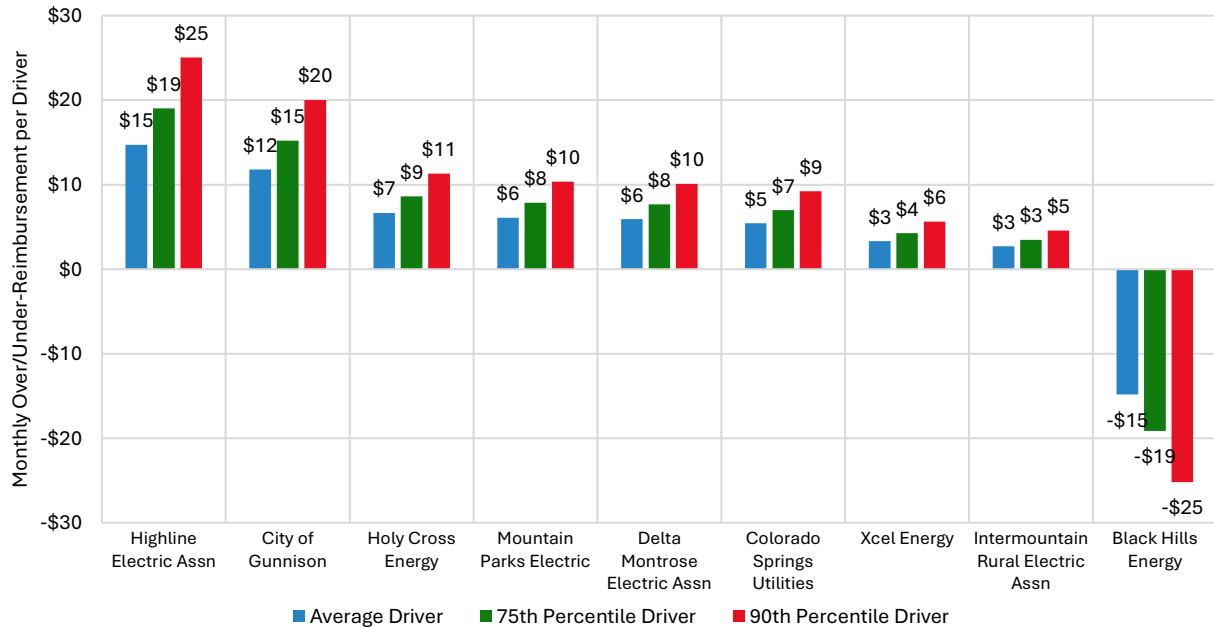


This figure shows how much each customer would be over- or under-reimbursed if Colorado adopted the Adjusted Reimbursement Rate with Black Hills Energy Adder assuming a charging load of 275 kWh per month for an average driver, 356 kWh for the 75<sup>th</sup> percentile, and 468 kWh for the 90<sup>th</sup> percentile.

The Weighted Average Reimbursement Rate, which includes Black Hills Energy's rate, served as a benchmark for the analysis. A weighted average would be simple and cost-effective to implement, but due to Black Hills Energy's high rates, it risks not fully reimbursing a significant number of EV drivers by a large amount. Under a weighted average reimbursement rate, the average EV driver in Black Hills Energy's service territory would be under-reimbursed by \$15 per month using the methodology described in *Estimating Bill Impacts* on page 7. The 90<sup>th</sup> percentile driver would be under-reimbursed by \$25 per month. Simultaneously, a weighted average rate would over-reimburse drivers in all other service territories by \$3 to \$15 per month for an average driver (see Figure 4).

## Electric Vehicle Reimbursement Rate for Colorado State Employees

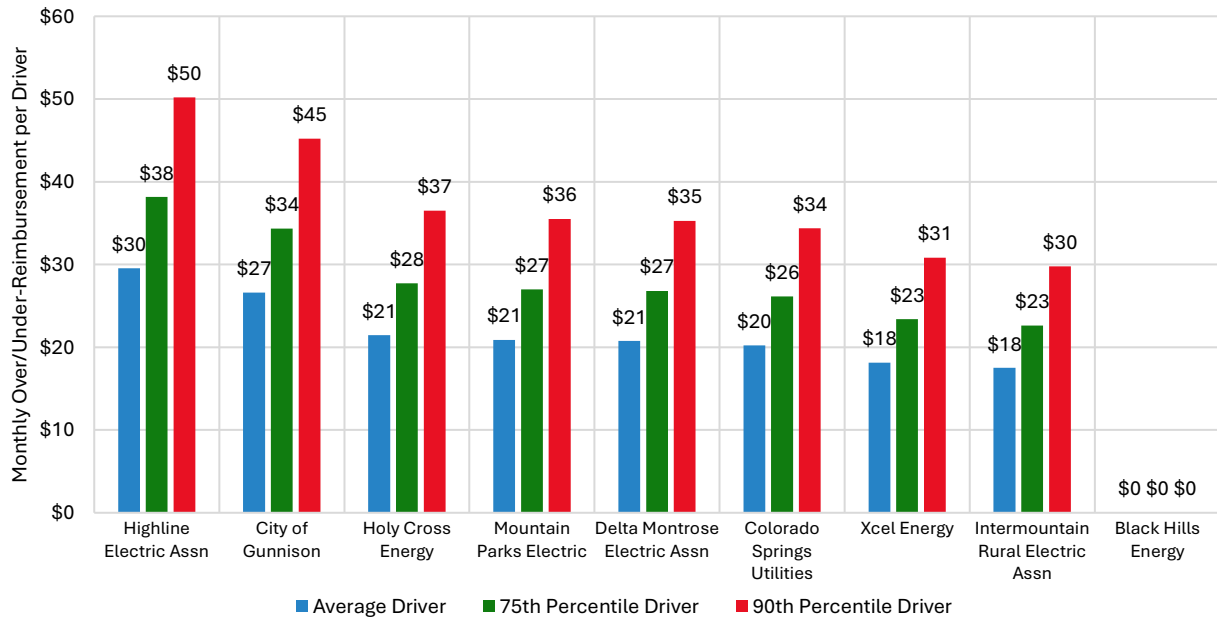
Figure 4: Monthly Over/Under-Reimbursement per Driver Using the Weighted Average Reimbursement Rate, Including Black Hills Energy (\$0.1387/kWh)



This figure shows how much each customer would be over- or under-reimbursed if Colorado adopted the Weighted Average Reimbursement Rate assuming a charging load of 275 kWh per month for an average driver, 356 kWh for the 75<sup>th</sup> percentile, and 468 kWh for the 90<sup>th</sup> percentile.

The Maximum Reimbursement Rate, set equal to Black Hills Energy’s residential rate, would ensure that every driver is fully reimbursed, but this approach would result in excess reimbursement for most EV drivers. EV drivers in Xcel Energy’s service territory would receive between \$18 and \$31 per month more than they would likely use for average and high-mileage drivers, respectively, while EV drivers in other utility service territories could be over-reimbursed by as much as \$50 per month (see Figure 5).

Figure 5: Monthly Over-/Under-Reimbursement per Driver under the Maximum Reimbursement Rate (\$0.1925/kWh)



This figure shows how much each customer would be over- or under-reimbursed if Colorado adopted the Maximum Reimbursement Rate assuming a charging load of 275 kWh per month for an average driver, 356 kWh for the 75<sup>th</sup> percentile, and 468 kWh for the 90<sup>th</sup> percentile.

## Recommended Reimbursement Rate

Based on the results presented in *Discussion of Potential Reimbursement Rates* on page 8, Atlas recommends that Colorado adopt the Adjusted Reimbursement Rate with a Black Hills Energy Adder with a base rate equal to the Intermountain Rural Association Rate (\$0.1289/kWh) and a \$0.0636/kWh adjustment for Black Hills Energy customers.

While using two different reimbursement rates may increase the administrative burden on State agencies, using a uniform rate would significantly over- or under-reimburse a substantial number of EV drivers due to disparities in the cost to charge an EV in Black Hills Energy's service territory relative to the other utilities. Using this base rate would enable the State to meet its goal of fully reimbursing EV drivers at a lower cost than the Maximum Rate.



## Electric Vehicle Reimbursement Rate for Colorado State Employees

Under the recommended reimbursement rate, it would cost the State an estimated \$3,930 per month to fuel a fleet of 100 take-home BEVs (Table 2).<sup>5</sup> For reference, fueling a comparable fleet of gasoline-powered vehicles could cost more than \$7,000 per month.<sup>6</sup> Furthermore, excess reimbursement for EV drivers in utility service territories with lower electricity rates would total just \$111 per month, making up less than three percent of total fuel costs (Table 2).

Table 2: Monthly Fuel Costs and Total Excess Reimbursement of Representative Fleet of 100 BEVs under Recommended Reimbursement Rate

Utility	Estimated EVs	Monthly Fuel Cost	Monthly Excess Reimbursement
Xcel Energy	65	\$2,297	\$40
Black Hills Energy	22	\$1,154	\$0
Holy Cross Energy	3	\$117	\$13
Highline Electric Assn	2	\$82	\$28
Delta Montrose Electric Assn	2	\$71	\$6
Colorado Springs Utilities	2	\$65	\$5
City of Gunnison	2	\$55	\$14
Mountain Parks Electric	1	\$52	\$5
Intermountain Rural Electric Assn	1	\$38	\$0
<b>Total</b>	<b>100</b>	<b>\$3,930</b>	<b>\$111</b>

<sup>5</sup> In a separate analysis for the Colorado Energy Office, Atlas identified just under 500 take-home vehicles in Colorado's light-duty fleet that are likely candidates for electrification by 2025 on a total cost of ownership basis.

<sup>6</sup> Atlas assumed a gas price of \$3.00 per gallon and an average fuel economy of 35 miles per gallon.

# APPENDIX A: TIME-OF-USE RATES

As more drivers switch to time-of-use (TOU) rates, the State may need to adjust the reimbursement rate to reflect the true cost of charging to employees who charge at home. With Black Hills Energy recently filing a residential TOU rate, and Xcel Energy planning to switch all residential customers onto a TOU rate by the end of 2024, this adjustment may need to happen in the near future.

## TOU Methodology

Atlas used a similar methodology for calculating TOU rates (see *Equation 2*), accounting for on- and off-peak periods. Atlas used three scenarios, 100 percent off-peak, 80 percent off-peak, and 50 percent off-peak, where the on- and off-peak rates are weighted by the respective amount of energy delivered in each charging period. These three charging scenarios represent different plausible charging times that the State's drivers may undertake, depending on their familiarity with TOU rates, their ability to control when they charge, or other factors that influence an individual's charging behavior. The 100 percent off-peak scenario best aligns the reimbursement rate with the intent of TOU rates, which aim to encourage charging during off-peak periods, but does not account for scenarios that lead customers to charge during on-peak periods.

Atlas also considered a charging scenario with mostly off-peak charging with 20 percent of charging to take place in on-peak periods. This spread accounted for EV drivers having to charge right after work or those without scheduled charging. The last scenario, a 50 percent blended off- and on-peak rate provided an upper bound, accounting for chargers that may face limited charging flexibility.

Based on information provided by the Colorado Energy Office, Atlas included Black Hills Energy's proposed TOU rate. The rate is not yet effective, but a preliminary decision by the administrative law judge indicates the rate is likely to be implemented. Accordingly, the riders are not yet available, and Atlas applied the riders from Black Hills Energy's standard rate to the TOU rate.

## Equation 2: TOU Rate Calculation

$$TotalRate = [(OffPeakRate \times OffPeakPct) + (PeakRate \times (1 - OffPeakPct))] \times (1 + TaxRate + FranchiseFee) + Riders$$

## TOU Analysis Results

Table 3 shows the on- and off-peak rates for each utility, inclusive of all applicable riders, taxes, and franchise fees, as well as the peak periods. It is important to note that utilities have different on-peak periods, and it may be more difficult for drivers in utilities with longer on-peak periods to charge entirely during off-peak periods.

Table 3: Time-of-Use Rates and Peak Periods

Utility	On-Peak	Off-Peak	Peak Hours
Black Hills Energy	\$0.3126/kWh	\$0.1533/kWh	3-7 PM Monday-Friday
City of Gunnison	\$0.1198/kWh	\$0.0583/kWh	6-10 AM, 5-9 PM Monday-Friday
Colorado Springs Utilities	\$0.2754/kWh	\$0.0856/kWh	4-10 PM Monday-Friday, October-March 3-7 PM Monday-Friday, April-September
Delta Montrose Electric Association	\$0.1826/kWh	\$0.0667/kWh	12-10 PM Monday-Saturday
Highline Electric Association	\$0.0979/kWh	\$0.0524/kWh	12-3 PM and 5-10 PM Monday-Friday, October 1- April 30
Holy Cross Energy	\$0.2618/kWh	\$0.0655/kWh	4-9 PM Monday-Sunday
Intermountain Rural Electric Association	\$0.3213/kWh	\$0.0829/kWh	4-8 PM Monday-Sunday

## Electric Vehicle Reimbursement Rate for Colorado State Employees

Utility	On-Peak	Off-Peak	Peak Hours
Mountain Park Electric	\$0.2246/kWh	\$0.0749/kWh	5-10 PM Monday-Saturday
Xcel Energy	\$0.1875/kWh	\$0.0935/kWh	3-7 PM, Monday-Friday

Rates include all applicable riders, taxes, and franchise fees. In addition to an on-peak and off-peak period, Xcel Energy has a “shoulder” period immediately preceding on-peak periods. The cost of electricity during the shoulder period is more than during the off-peak period but less than during the on-peak period. Xcel Energy’s shoulder period runs from 1-3 PM, Monday-Friday, and costs \$0.1406/kWh, including riders, taxes, and franchise fees.

The cost to charge an EV on a TOU rate varies significantly depending on the charging scenario. In every utility, it is cheaper to charge an EV on a TOU rate if 100 percent of charging happens during the utility’s off-peak period. If only 80 percent of charging occurs during the utility’s off-peak period, the TOU rate is still cheaper than the standard rate in seven out of nine utilities considered in the reimbursement rate analysis (Figure 6).

Colorado could set a reimbursement rate based on TOU rates using the same methodology as the standard reimbursement rate described in *Recommended Reimbursement Rate* on page 14. Under the 100 percent off-peak scenario, drivers could be fully reimbursed using a reimbursement rate of \$0.0935/kWh with an additional \$0.0597/kWh for Black Hills Energy’s customers. Reimbursing at this rate would save the State \$0.0354/kWh compared to the Adjusted Reimbursement Rate with a Black Hills Energy Adder, or nearly \$10 per month for an average BEV driver. Figure 7 shows the percentage of EV drivers that would be fully reimbursed for charging off-peak under a TOU rate at different reimbursement rates.

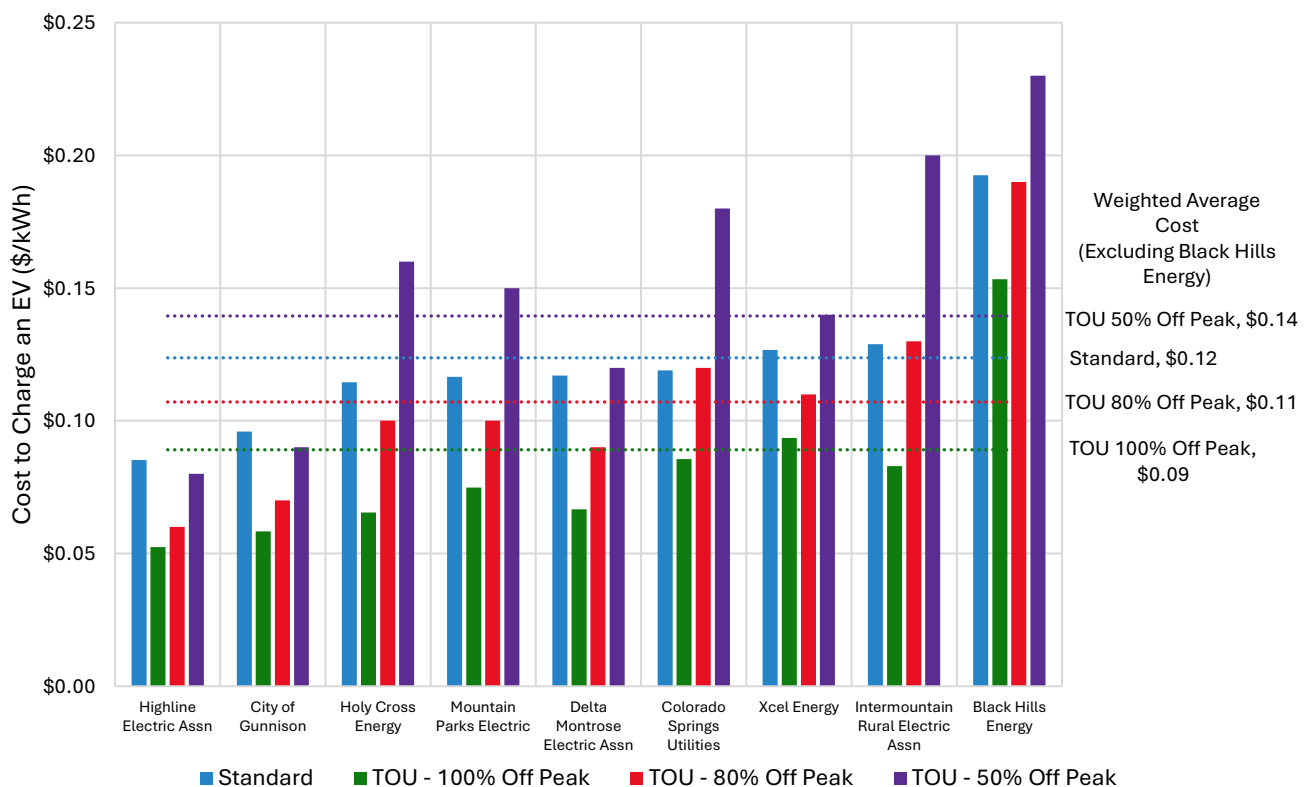
Initially, the State could set the reimbursement rate based on a more lenient charging scenario to ease the transition to TOU rates for State employees and provide more flexibility for employees with shorter off-peak windows. However, different charging scenarios may call for a different approach to choosing the reimbursement rate. Figure 8 shows the percentage of EV drivers that would be fully reimbursed for charging 80 percent off-peak under a TOU rate at different reimbursement rates. In this case, using the Intermountain Rural Electric Association rate (the second-highest rate after Black Hills Energy) may lead to excess reimbursement of EV drivers. Instead, the State may consider using the weighted average rate (excluding Black Hills Energy) as the base rate or setting the base rate equal to the cost to charge in Xcel Energy’s service territory to capture the most EV drivers while reducing excess reimbursement.

In the long-term, setting the State reimbursement rate based on 100 percent off-peak charging has multiple benefits for the State. Primarily, it reduces overall costs. By aligning

## Electric Vehicle Reimbursement Rate for Colorado State Employees

the state reimbursement rate with the utilities TOU periods, the State can help ensure that its program is aligned with the rates itself. At a high level, more charging to occur during off-peak hours can put downward pressure on overall electricity rates and provide system-wide benefits. State drivers that most closely align their charging with off-peak hours that the reimbursement rate covers can minimize their out-of-pocket costs and, in doing so, can also help mitigate conditions that could otherwise strain the grid. For these reasons, aligning the State reimbursement rate with off-peak charging can support other State goals related to electrification and can benefit ratepayers throughout the State. As more customers move to TOU rates, the State can look to adjust its average reimbursement rate to account for a greater share of customers no longer on standard rates. Additional analysis can provide a more granular, hour-by-hour analysis of how an increasing number of TOU customers could impact the state's reimbursement rate.

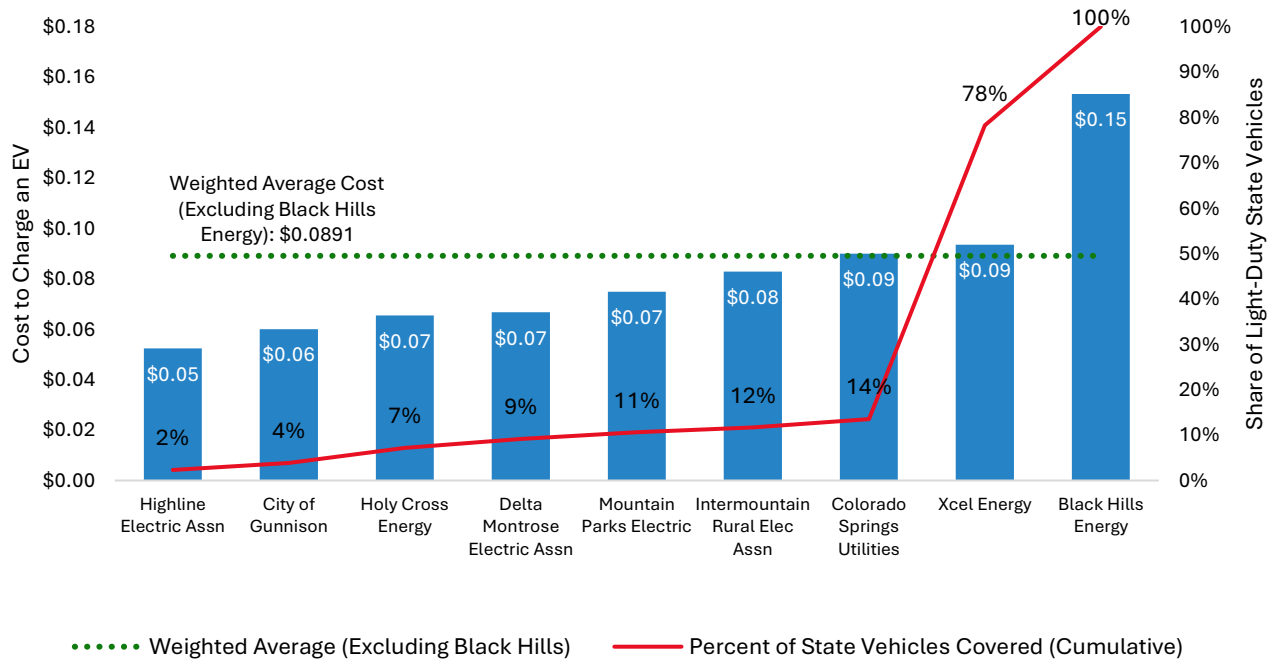
Figure 6: Comparative Cost to Charge an EV by Utility Service Territory



This figure shows a comparison of the cost to charge an EV in each utility service territory under different rate structures and charging scenarios. Weighted average costs are weighted based on the share of State light-duty vehicles registered in each utility's service territory, excluding Black Hills Energy. The colors of the weighted average cost lines match the color of the corresponding cost bars.

## Electric Vehicle Reimbursement Rate for Colorado State Employees

Figure 7: Charging Costs and Coverage of Potential Reimbursement Rates by Utility Service Territory (TOU 100% Off Peak)

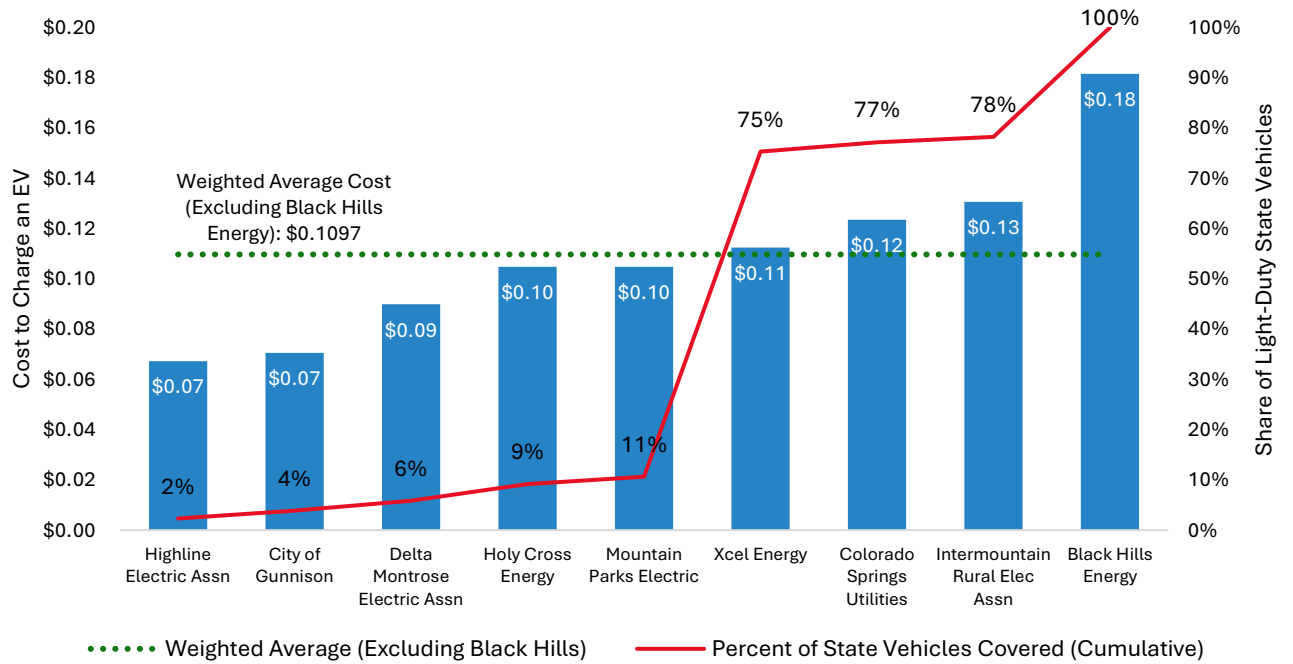


This figure presents the cost to charge an EV and the share of State light-duty vehicles at or below that cost in each utility service territory. A reimbursement rate set equal to a given utility's rate would fully reimburse the share of state vehicles at or below that utility's rate. The weighted average is weighted based on the share of State light-duty vehicles registered in each utility's service territory, excluding Black Hills Energy.



## Electric Vehicle Reimbursement Rate for Colorado State Employees

Figure 8: Charging Costs and Coverage of Potential Reimbursement Rates by Utility Service Territory (TOU 80% Off Peak)



This figure presents the cost to charge an EV and the share of State light-duty vehicles at or below that cost in each utility service territory. A reimbursement rate set equal to a given utility's rate would fully reimburse the share of state vehicles at or below that utility's rate. The weighted average is weighted based on the share of State light-duty vehicles registered in each utility's service territory, excluding Black Hills Energy.

## APPENDIX B: STANDARD RATES

Utility	Tier 1 Standard Rate		Tier 2 Standard Rate		Effective Date	Source
	Summer	Winter	Summer	Winter		
Black Hills Energy	\$0.1000	\$0.1000	\$0.1300	\$0.1300	10/10/2019	<a href="https://www.blackhillsenergy.com/sites/blackhillsenergy.com/files/coe-tariff.pdf">https://www.blackhillsenergy.com/sites/blackhillsenergy.com/files/coe-tariff.pdf</a>
City of Gunnison	\$0.0897		\$0.0897		2/10/2021	<a href="https://cms5.revize.com/revize/gunnisonco/Finance/utilitiesrates2.10.pdf">https://cms5.revize.com/revize/gunnisonco/Finance/utilitiesrates2.10.pdf</a>
Colorado Springs	\$0.0777		\$0.0777		4/1/2021	<a href="https://www.csu.org/Documents/ResidentialRate-Sheet.pdf?csf=1&amp;e=xc6cs6">https://www.csu.org/Documents/ResidentialRate-Sheet.pdf?csf=1&amp;e=xc6cs6</a>
Delta Montrose Electric Association	\$0.1095		\$0.1095		7/1/2020	<a href="https://www.dmea.com/rates">https://www.dmea.com/rates</a>
Highline Electric Association	\$0.1168		\$0.0797		2021	<a href="https://www.hea.coop/residential-rates">https://www.hea.coop/residential-rates</a>
Holy Cross	\$0.1050		\$0.1050		1/10/2020	<a href="https://www.holycross.com/wp-content/uploads/2020/01/Electric-Service-Tariffs-Rules-and-Regulations-1.10.20.pdf#page=15">https://www.holycross.com/wp-content/uploads/2020/01/Electric-Service-Tariffs-Rules-and-Regulations-1.10.20.pdf#page=15</a>
Intermountain Rural Electric Association	\$0.1205		\$0.1205		1/20/2017	<a href="https://irea.coop/wp-content/uploads/2020/09/Rates_and_Regulations_09.01.2020.pdf">https://irea.coop/wp-content/uploads/2020/09/Rates_and_Regulations_09.01.2020.pdf</a>
Mountain Parks Electric	\$0.1090		\$0.1090		1/1/2017	<a href="https://mpei.com/electric-rates">https://mpei.com/electric-rates</a>
Xcel Energy	\$0.0546	\$0.0546	\$0.0990	\$0.0546	8/1/2021	<a href="https://www.xcelenergy.com/staticfiles/xcel-response/Company/Rates%20and%20Regulations/PSCo_Electric_Entire_Tariff.pdf">https://www.xcelenergy.com/staticfiles/xcel-response/Company/Rates%20and%20Regulations/PSCo_Electric_Entire_Tariff.pdf</a>

## APPENDIX C: UTILITY RIDERS

This appendix lists all riders considered in the analysis. Riders, also known as cost adjustments, are fees charged by utilities on top of the base rate for electricity generation. Atlas retrieved riders from the most recent tariff sheets posted on each utility's website. Riders that are expressed in terms of a percentage may apply to the base rate or may apply on top of other riders. Atlas used utility tariff sheets to determine when to apply each percentage-based rider. Some riders can be negative if it is a credit to customers that overrides previously approved units that lower a utility's cost of doing business, such as the Clean Air Clean Jobs Act, reflecting a reduction of the base rate. These riders are a credit that a utility must provide to the customer or other process that gives money back to ratepayers on their bills.

Utility	Rider	Standard Cost	TOU Cost
Xcel Energy	General Rate Schedule Adjustment	\$0.00876/kWh	\$0.00876/kWh
Xcel Energy	Purchased Capacity Cost Adjustment	\$0.00415/kWh	6.65%
Xcel Energy	Demand Side Management Cost Adjustment	\$0.00177/kWh	2.84%
Xcel Energy	Electric Commodity Adjustment	\$0.03544/kWh	56.82%
Xcel Energy	Transmission Cost Adjustment	\$0.00108/kWh	1.73%
Xcel Energy	Clean Air Clean Jobs Act	(\$0.00009)/kWh	(0.14%)
Xcel Energy	Transportation Electrification Programs	\$0.00046/kWh	0.74%
Xcel Energy	Renewable Energy Standard Adjustment	1.00%	1.00%
Xcel Energy	Colorado Energy Plan	1.00%	1.00%

## Electric Vehicle Reimbursement Rate for Colorado State Employees

Utility	Rider	Standard Cost	TOU Cost
Black Hills Energy	General Rate Schedule Adjustment	(3.75%)	N/A
Black Hills Energy	Purchased Capacity Cost Adjustment	\$0.00108/kWh	N/A
Black Hills Energy	Demand Side Management Cost Adjustment	2.75%	N/A
Black Hills Energy	Energy Cost Adjustment	\$0.03854/kWh	N/A
Black Hills Energy	Transmission Cost Adjustment	\$0.003655/kWh	N/A
Black Hills Energy	Clean Air Clean Jobs Act	\$0.00444/kWh	N/A
Black Hills Energy	Renewable Energy Standard Adjustment	2.00%	N/A
Holy Cross	WE CARE Rate Rider	2.00%	2.00%
Colorado Springs	Electric Capacity Charge	\$0.0042/kWh	\$0.0045/kWh
Colorado Springs	Electric Cost Adjustment	\$0.0294/kWh	On-Peak: \$0.0703/kWh Off-Peak: \$0.0233/kWh

## APPENDIX D: SENSITIVITY ANALYSIS FOR TIERED RATES

Three utilities use tiered rate structures that set a limit on the amount of electricity offered at a set price. Once a customer exceeds that limit, the price of electricity changes. For Xcel Energy and Black Hills Energy's customers, the first 500 kWh used costs less than energy used in excess of 500 kWh. For Highline Electric customers, the first 750 kWh are more expensive than subsequent energy use.

A reimbursement rate should aim to reflect the incremental load incurred by charging an EV on top of an employee's existing electricity consumption. In the core analysis described in *Methodology* on page 5, Atlas assumed that State employees are typically already exceeding the limit of their first tier, and that the incremental load of charging an EV would entirely fall within the second tier of usage.

If, instead, the load occurred entirely in the first tier, the recommended reimbursement rate would still fully reimburse all EV drivers; however, Xcel Energy and Black Hills Energy customers would be over-reimbursed by \$0.0215/kWh and \$0.0353/kWh, respectively. These figures can be considered an upper bound, as it is unlikely that the entire incremental energy use of an EV would fall under 500 kilowatt-hours when an EV alone can use 275 kWh per month or more. While some drivers, particularly those with on-site solar, may fall partially into the lower tier, it is reasonable for the state to base its reimbursement rate entirely on the higher tier to ensure that all drivers are fully reimbursed. Colorado should continue to monitor the electricity usage of State employees with EVs and consider adjusting the reimbursement rate if EV drivers are consistently averaging less than 500 kWh per month.

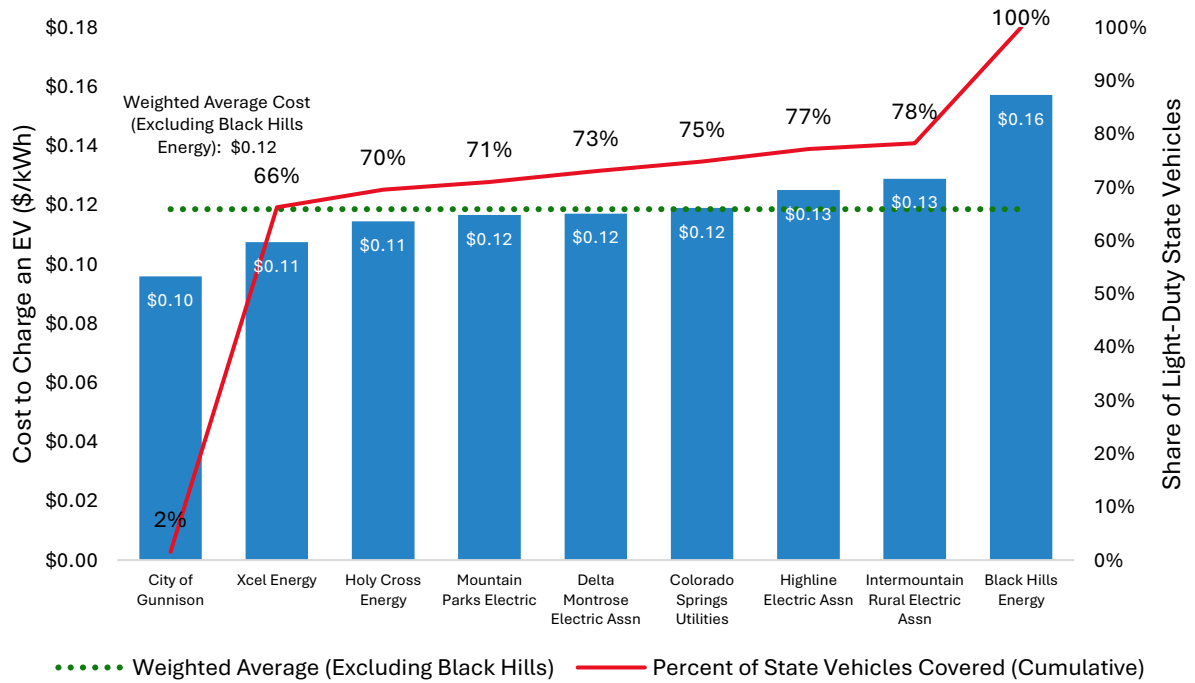
Table 4: Utilities with Tiered Rate Structures

Utility	Tier One Limit	Tier One Rate	Tier Two Rate	Change
Xcel Energy	<500 kWh	\$0.1074/kWh	\$0.1267/kWh	\$0.0193/kWh
Black Hills Energy	<500 kWh	\$0.1572/kWh	\$0.1925/kWh	\$0.0353/kWh
Highline Electric	<750 kWh	\$0.1251/kWh	\$0.0852/kWh	(\$0.0399/kWh)

Rates include all applicable riders, taxes, and franchise fees.

## Electric Vehicle Reimbursement Rate for Colorado State Employees

Figure 9: Charging Cost and Reimbursement Rates Needed to Charge an EV by Utility Service Territory (Tier 1 Standard Rates)

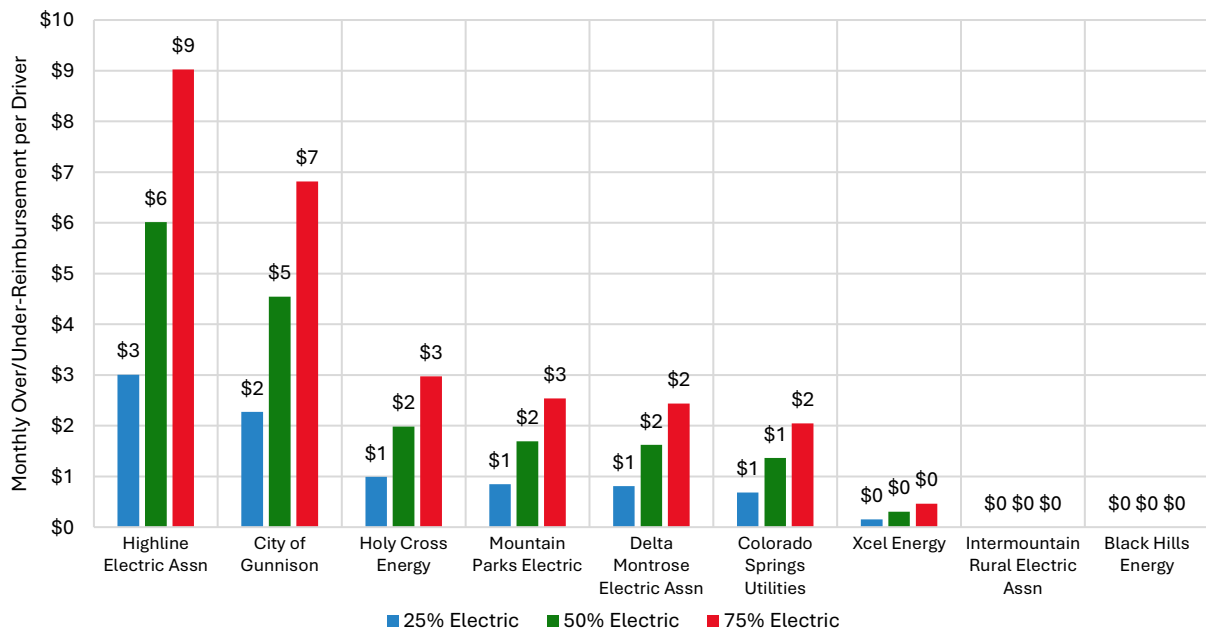




# APPENDIX E: MONTHLY REIMBURSEMENT FOR PLUG-IN HYBRID ELECTRIC VEHICLE DRIVERS

Atlas calculated monthly bill impacts for PHEV drivers in a way that closely approximates the analysis for BEV drivers. The analysis considers three different electrification rates: 25, 50, and 75 percent electrified rates, with each percent referring to the number of miles driven on electricity rather than gas.

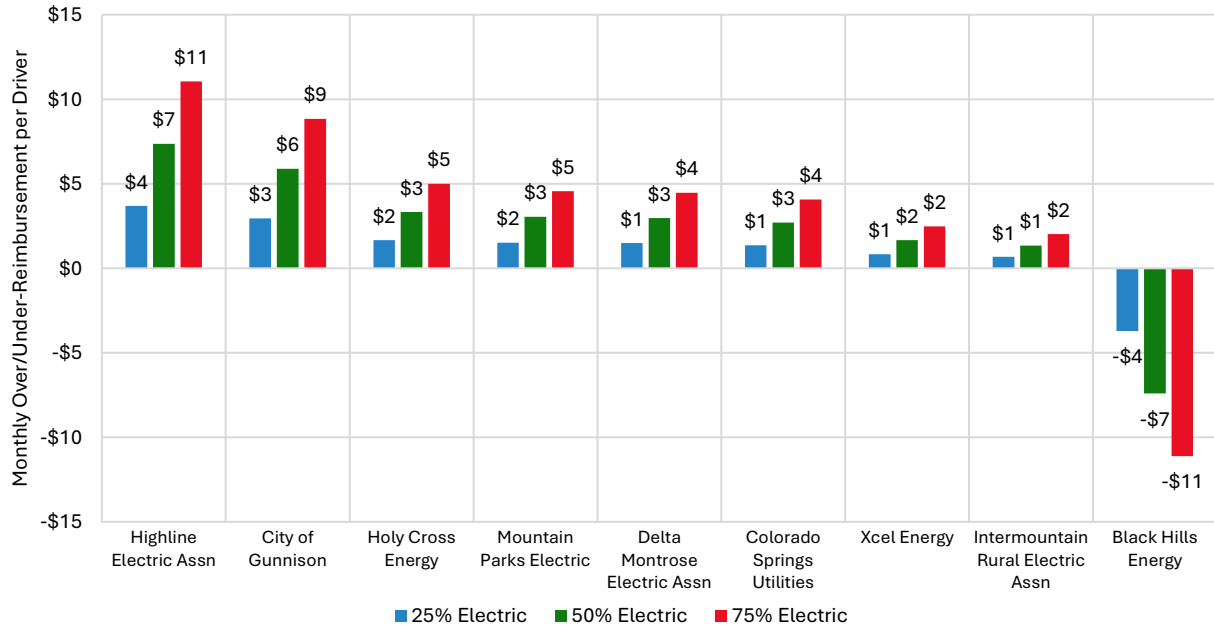
Figure 10: Monthly Over-/Under-Reimbursement per Driver under the Adjusted Reimbursement Rate with a Black Hills Energy Adder (\$0.1289 + \$0.636)



This figure shows how much each PHEV driver would be over- or under-reimbursed if Colorado adopted the Maximum Reimbursement Rate assuming a charging load of 69 kWh per month for PHEV drivers that drive 25% of miles on electricity, 138 kWh for PHEV drivers that drive 50% of miles on electricity, and 206 kWh for PHEV drivers that drive 75% of miles on electricity.

## Electric Vehicle Reimbursement Rate for Colorado State Employees

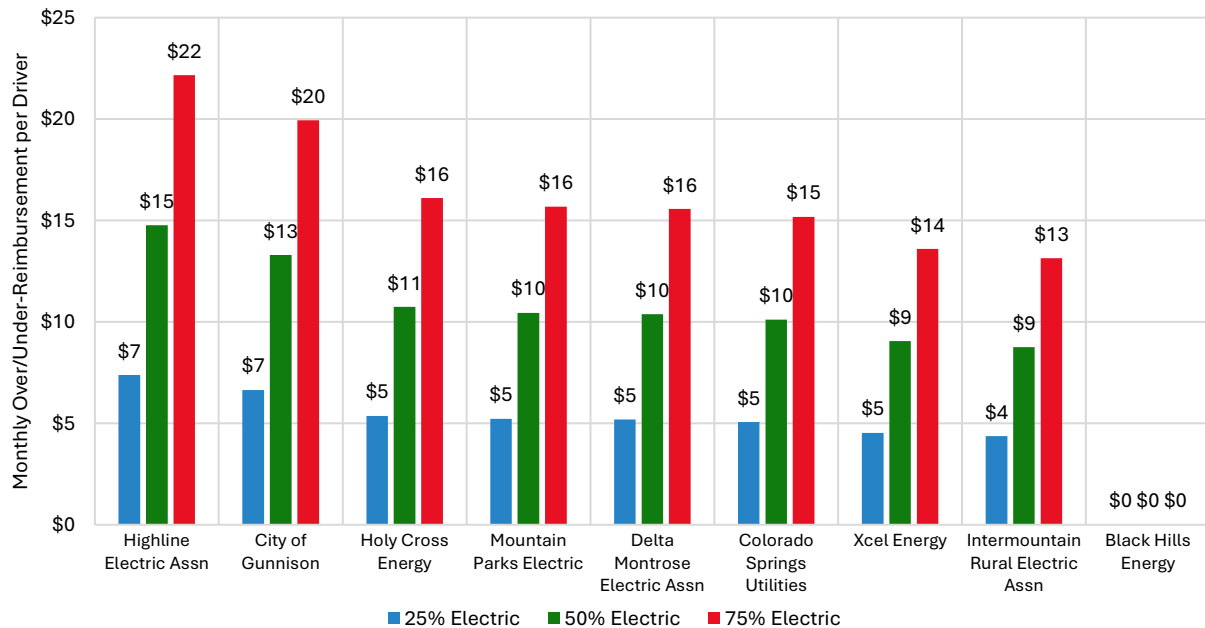
Figure 11: Monthly Over/Under-Reimbursement per PHEV Driver Using the Weighted Average Reimbursement Rate, Including Black Hills Energy (\$0.1387/kWh)



This figure shows how much each PHEV driver would be over- or under-reimbursed if Colorado adopted the Weighted Average Reimbursement Rate assuming a charging load of 69 kWh per month for PHEV drivers that drive 25% of miles on electricity, 138 kWh for PHEV drivers that drive 50% of miles on electricity, and 206 kWh for PHEV drivers that drive 75% of miles on electricity.

## Electric Vehicle Reimbursement Rate for Colorado State Employees

Figure 12: Monthly Over/Under-Reimbursement per PHEV Driver Using the Maximum Reimbursement Rate (\$0.1925/kWh)



This figure shows how much each PHEV driver would be over- or under-reimbursed if Colorado adopted the Maximum Reimbursement Rate assuming a charging load of 69 kWh per month for PHEV drivers that drive 25% of miles on electricity, 138 kWh for PHEV drivers that drive 50% of miles on electricity, and 206 kWh for PHEV drivers that drive 75% of miles on electricity.

Table 5: Monthly Fuel Costs and Total Excess Reimbursement of Representative Fleet of 100 PHEVs under Recommended Reimbursement Rate (50% Electric Miles)

Utility	Estimated EVs	Monthly Electricity Cost	Monthly Excess Reimbursement	Monthly Gas Cost
Xcel Energy	65	\$1,148	\$20	\$2,291
Black Hills Energy	22	\$577	\$0	\$770
Holy Cross Energy	3	\$59	\$7	\$117
Highline Electric Assn	2	\$41	\$14	\$82

## Electric Vehicle Reimbursement Rate for Colorado State Employees

Utility	Estimated EVs	Monthly Electricity Cost	Monthly Excess Reimbursement	Monthly Gas Cost
Delta Montrose Electric Assn	2	\$35	\$3	\$71
Colorado Springs Utilities	2	\$33	\$3	\$65
City of Gunnison	2	\$27	\$7	\$54
Mountain Parks Electric	1	\$26	\$2	\$52
Intermountain Rural Electric Assn	1	\$19	\$0	\$37
<b>Total</b>	<b>100</b>	<b>\$1,965</b>	<b>\$56</b>	<b>\$3,540</b>

This table shows the monthly electricity and gas costs, as well as the monthly excess reimbursement, for a representative fleet of 100 PHEVs. Assumes that 50 percent of miles traveled are electric and 50 percent are gas.



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