FIRE: THE FIRST-YEAR INNOVATION & RESEARCH EXPERIENCE

SUSTAINABILITY ANALYTICS

# WHAT IS THE IMPACT OF EV TIME-OF-USE REBATE ON EV SALES IN MARYLAND?

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## BACKGROUND

- Nearly one-third of Maryland's $CO_2$ emissions come from cars, making emission reduction vital for state climate goals (Department of the Environment).
- High costs remain a significant hurdle for widespread EV adoption.
- Time-of-Use (TOU) rebates encourage EV owners to charge during off-peak hours, reducing costs and grid strain.
- This study examines Maryland's TOU rebate program's impact on EV adoption.
- Insights can help Maryland improve rebates and serve as a national model for EV transition.

**BGE Charging Rates**

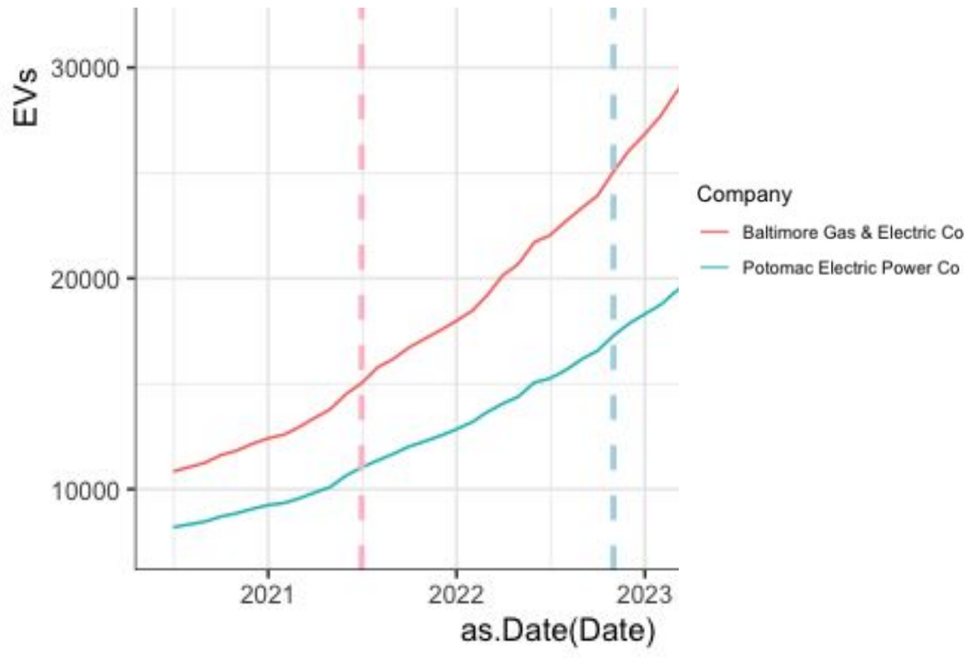
- With TOU Rebate:
  - Peak Hours (Weekdays, 10 a.m.–8 p.m.): 25.10 cents/kWh
  - Off-Peak Hours (Nights and Weekends): 10.04 cents/kWh
- Without TOU Rebate:
  - Standard rate: 16 cents/kWh

## HYPOTHESIS

TOU Rebates will increase monthly EV sales.

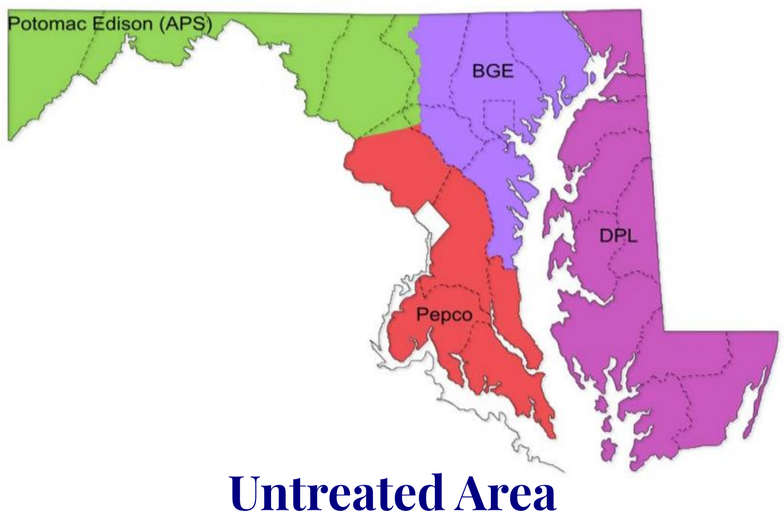
## METHODOLOGY

- We researched the impact of TOU rebates on EV sales by looking at the changes in EV's sold in areas receiving electricity from BGE. This area received the rebate in July 2021.
- We then compare EV sales in BGE to EV sales in areas receiving electricity from Potomac Electric Power (Pepco), where there is no rebate until November 2022
- This meant we we're looking at 16 observations (months) of data from July 2021 (inclusive) to November 2022 (exclusive)




### Treated Area

We extracted EV sales from dealerships in counties receiving electricity from BGE.




### Untreated Area

We also extracted EV sales from dealerships in counties receiving electricity by Pepco.

## DATA & VARIABLES

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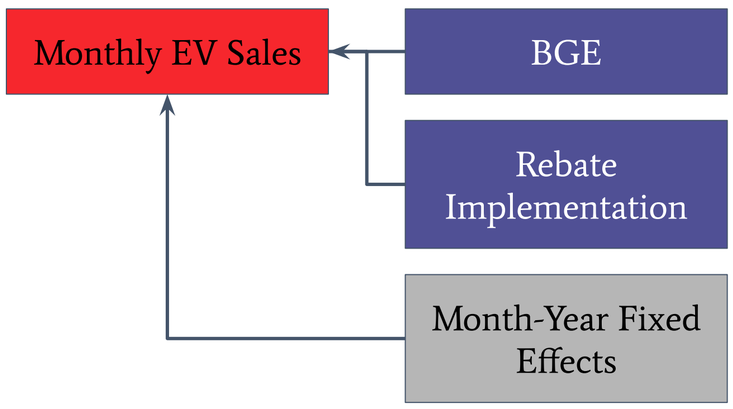
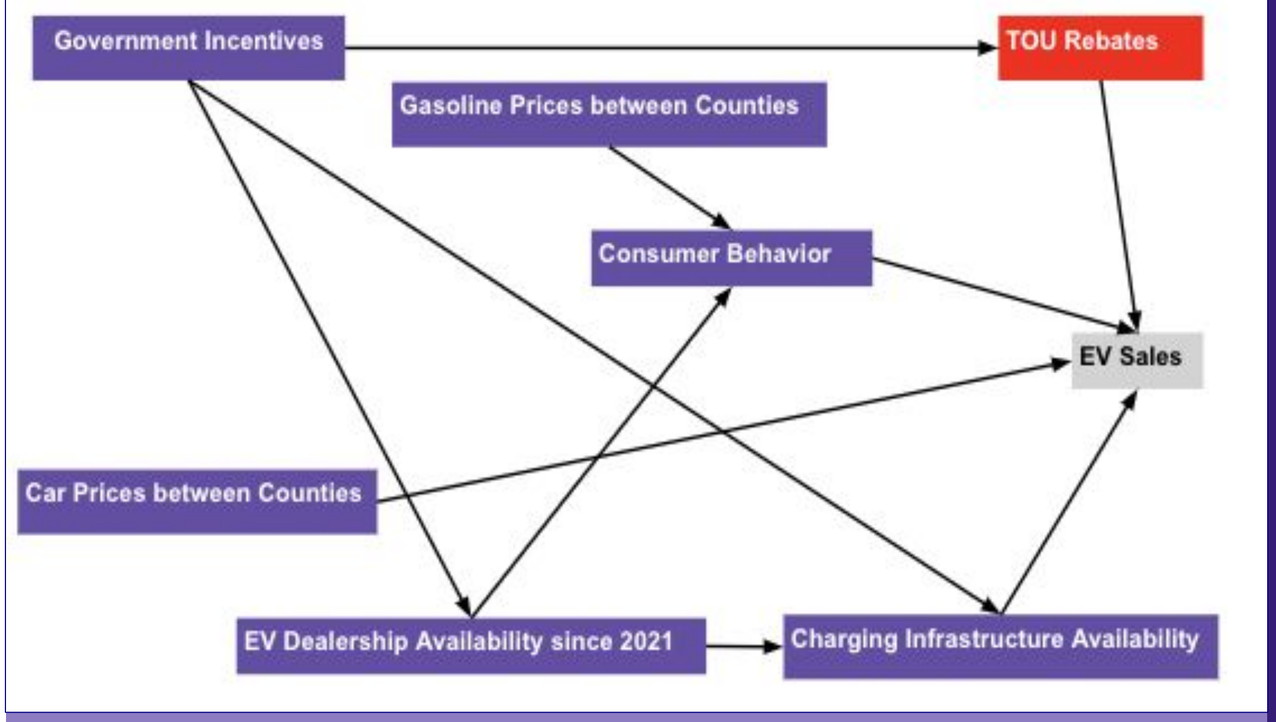



The treatment variable of interest is **TOU Time x BGE**. The **outcome variable of interest is EV sales** which is represented in the data by the number of electric vehicles in a given month **under each electric company's region**.




## DISCUSSION OF THE RESULTS

- TOU Rebate Impact: TOU rebates significantly boosted EV sales in Maryland, accounting for approximately 6,000 EVs sold between mid-2021 and late 2023 (14% of 45,000 total sales)
- According to our results, the p-value is < 2.2e-16, which is much less than 0.05. Therefore, it is statistically significant
- Findings highlight opportunities for Maryland policymakers to refine rebate programs and establish a model for other regions, promoting EV adoption and advancing emission reduction goals
- Number of observations: 16

## CONCLUSION AND FUTURE PLANS

- While we did expect a positive increase in EV sales, it was greater than we anticipated
- A possible mechanism we didn't take into account could be responsible behind the increase, such as a difference in available EV dealerships in either region, so further investigation would is important
- To further test the strength of our hypothesis, in the future we'd like to account of other possible explanations
  - Analyze the impact of Gas Price Differences on EV Sales
  - Compare Used Car Prices in Different Regions
  - Assess difference in quantity of the EV Dealership Sales Trends

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