NARUC Electric Vehicles State Working Group

MANAGED CHARGING

MAY 27, 2025 3:00 - 4:30 PM ET

Welcome

EV SWG Chair

Commissioner Katherine Peretick, Michigan Public Service Commission

EV SWG Vice Chair

Commissioner Milt Doumit, Washington Utilities and Transportation Commission

EV Commission Staff Leads

Steve Olea, Arizona Corporate Commission

Benjamin Baker, Maryland Public Service Commission

NARUC Staff

Danielle Sass Byrnett / Jeff Loiter

Agenda

Feel free to enter questions into chat at any time

3:00 PM	**Welcome and Announcements: Commissioner Peretick** • Agenda review • Announcements
3:10 PM	**Speakers:** Stephanie Leach, Baltimore Gas & Electric Mathias Bell, Weave Grid Kara Podkaminer, U.S. Department of Energy
4:00 PM	**Member Discussion**
4:30 PM	**Adjourn**

bge SM
AN EXELON COMPANY

May 27, 2025

EVsmart® Programs

Stephanie Leach | Manager, Strategic Programs

Goals

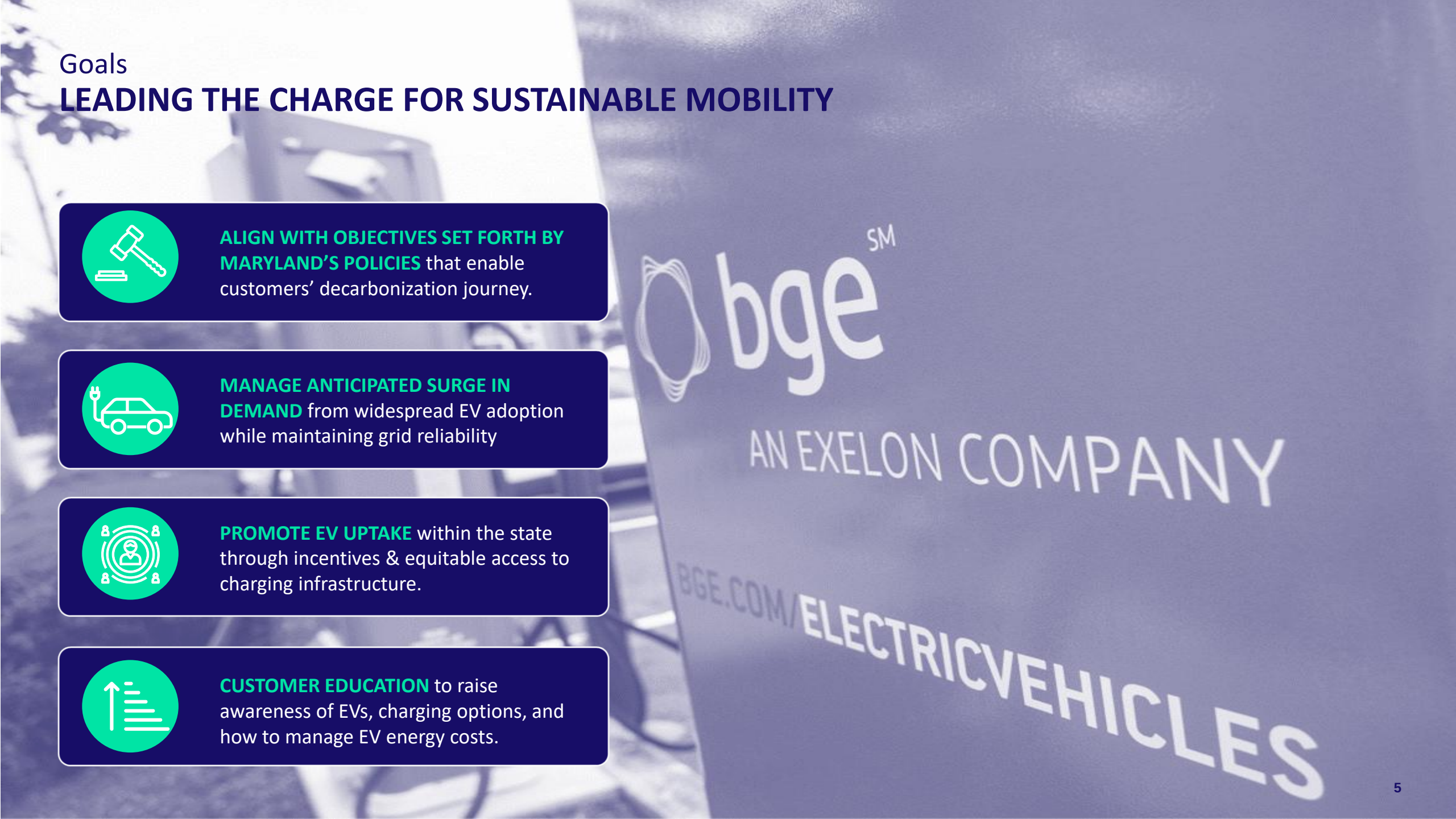
LEADING THE CHARGE FOR SUSTAINABLE MOBILITY

ALIGN WITH OBJECTIVES SET FORTH BY MARYLAND'S POLICIES that enable customers' decarbonization journey.

MANAGE ANTICIPATED SURGE IN DEMAND from widespread EV adoption while maintaining grid reliability

PROMOTE EV UPTAKE within the state through incentives & equitable access to charging infrastructure.

CUSTOMER EDUCATION to raise awareness of EVs, charging options, and how to manage EV energy costs.



Vehicle Charging Time of Use (TOU) Rate

Customers save approx. $120 annually by charging off-peak

TWO WAYS TO PARTICIPATE

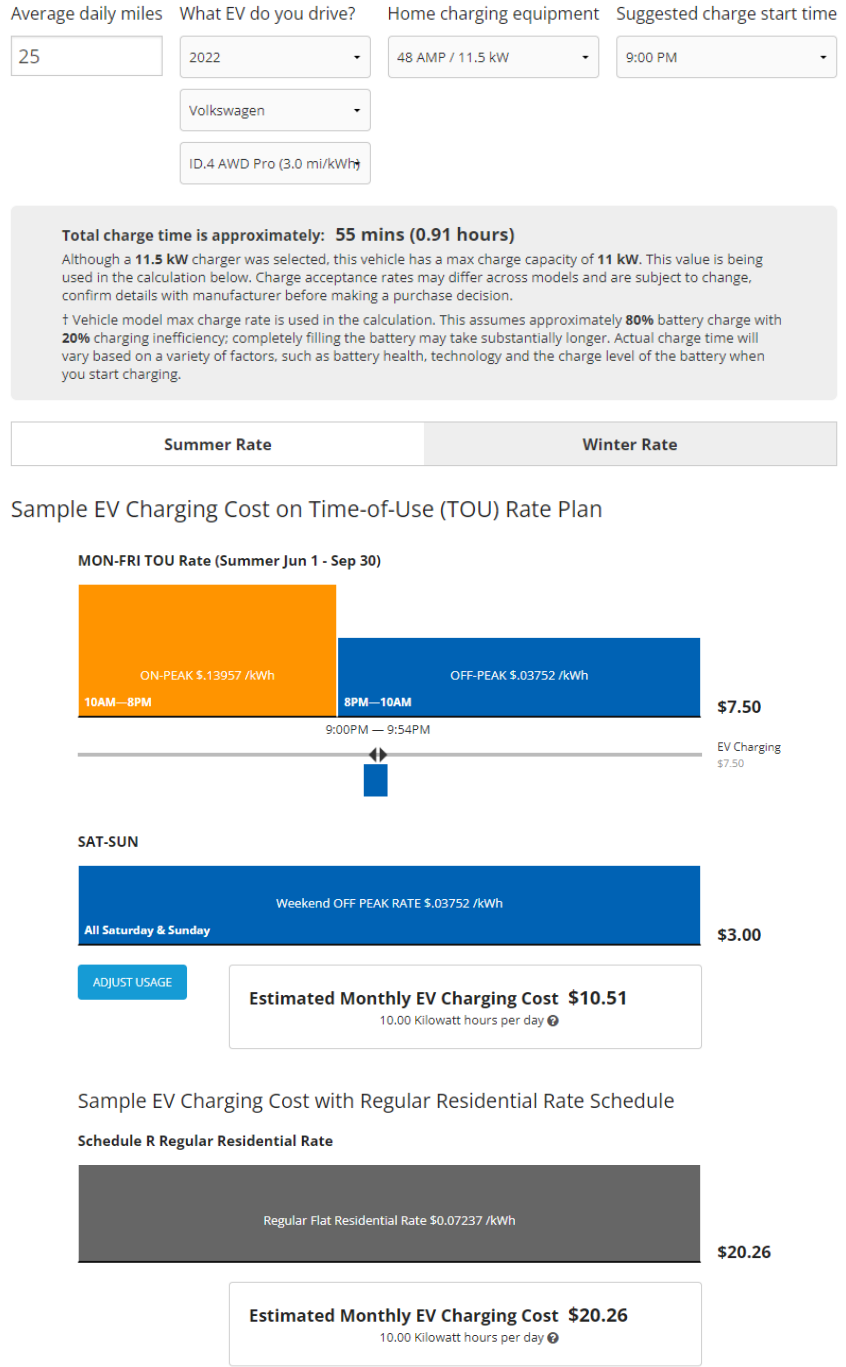
1	2
Smart Level 2 Charger: • ChargePoint • Wallbox • Emporia	Vehicle Telematics: • Tesla • Toyota • Lexus • Jeep

Participation is through EV implementation vendor, WeaveGrid

Eligible customers complete two step enrollment process online beginning at: **BGE.com/VehicleChargingTOU**

- **Step 1:** Sign into BGE My Account to enroll program
- **Step 2:** Sign up vehicle/charger through WeaveGrid site
- **Step 3:** BGE confirms enrollment within 1-2 business days

Customers on TOU rate or with 3rd party supplier are not eligible



Smart Charge Management

EVs will represent the most significant new electric load since the rise of air conditioning in the 1950s.*

Pilot Period

- 2021-2022: Research
- 2023-2024: Charging demonstration
- 2025 and beyond: full program implementation

What are the Benefits?

- Identify managed charging techniques that can be shared industry-wide
- Understand and reduce grid impacts of EV charging on the utility's distribution and transmission systems
- Lessen Exelon customers' capital investment required to manage EV charging demand as EV ownership grows

*Source: SEPA, A Comprehensive Guide to Electric Vehicle Managed Charging, May 2019

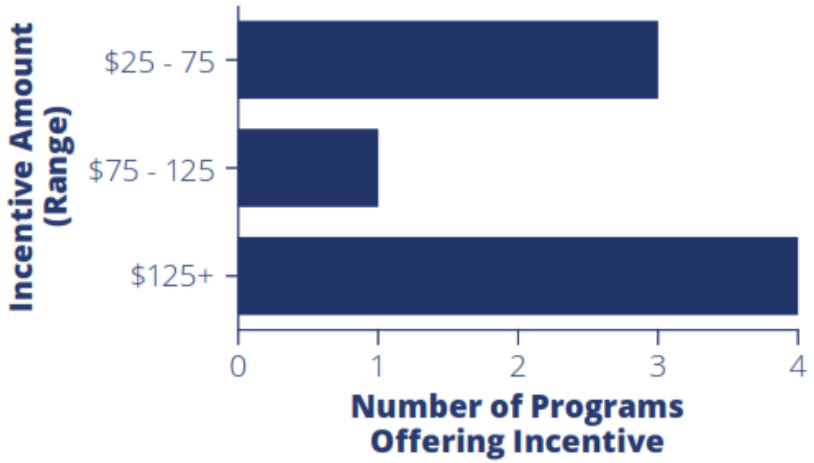
SCM by the Numbers

Enrollment

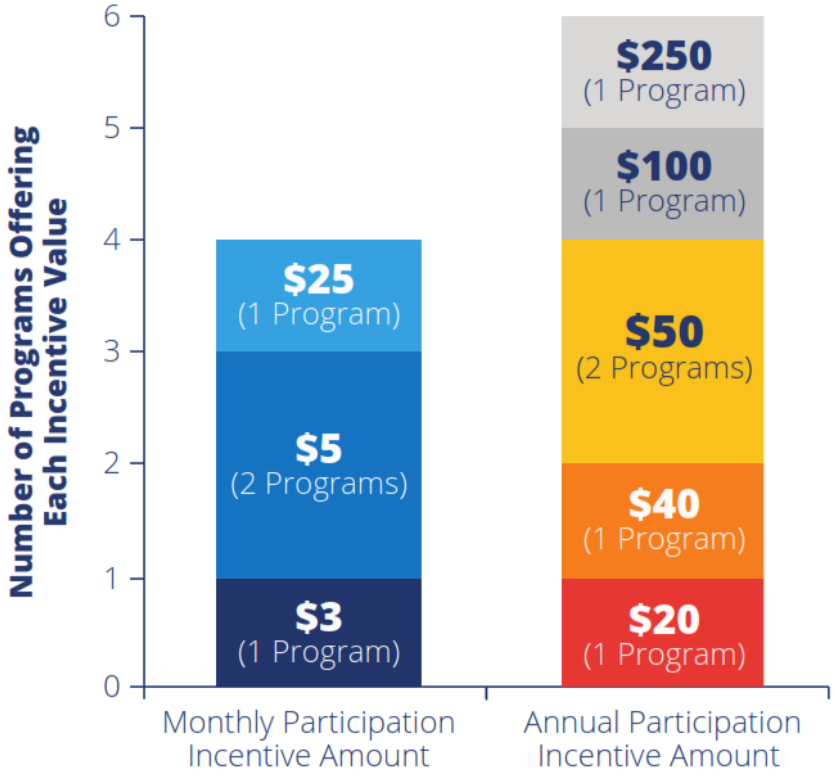
- Nearly 4,000 drivers enrolled Maryland service territory since Dec. 2022
  - pilot goal: enroll 2,000 by June 2024
  - program goal: 30,000 by December 2027
- No account limitations to enrollment (i.e., electric choice, net metering, etc.)
- Must charge at home
- Enrollment through vehicle or charger beginning
- Customers can also be in EV TOU

Incentives

- $5-$10 monthly bill credit, depending on charging level
- Limit of 4 overrides per month
- Must have one+ active managed charging session monthly



Source: Smart Electric Power Alliance, 2021.



Source: *Managed Charging Incentive Design*, SEPA, 2021

Incentive Design

- Analysis performed by Smart Electric Power Alliance (SEPA) in 2021
- 30% of programs offered an enrollment incentive ranging from $25-450 with a median value of $125
- 40% of active managed charging programs offer a monthly or annual incentive
  - Monthly incentives ranging from $3-25
  - Annual incentives range from $20-250 with a median value of $50
- Monthly/annual incentives inspire continuous load control if the utility will call on the asset frequently vs. a per-event basis
  - Demand response events put more burden on the customer and utility

Smart Charge Management Program Design

- Utility/WeaveGrid throttles customers' charging through vehicle telematics or through charger to reduce peak demand, encourage off-peak charging and improve reliability
- Customers can be on flat rate or TOU rate
- Drivers set daily departure time and vehicle is ready when they need to leave
- Charging optimization is seamless and unnoticeable to customer but offers opportunity to measure grid impact

Learn more at **WeaveGrid.com/BGE**

How it works.

Your charging will be automated during "smart times" and you'll get rewarded with a $10 credit on your electric bill every month.

By smart charging at home and joining other BGE EVsmart programs like the Home Charging Incentive and Vehicle Time of Use Rate, the typical driver can save up to **$320 year***!

First, you'll set up a free account with evPulse and connect your vehicle. evPulse quickly connects your vehicle to BGE's Smart Charge Management program and helps you take advantage of program perks.

1

Connect your Tesla.

Sign up for evPulse and connect your vehicle by entering your Tesla app login credentials— takes less than a minute!

Create evPulse account >>

2

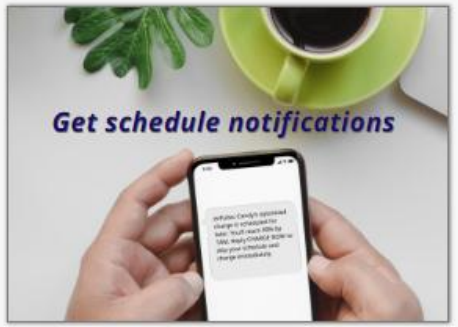
Enroll in program.

BGE will confirm your enrollment via email. Visit your evPulse dashboard to customize your automatic smart charge settings.

3

Get rewards.

Charge during "smart times" at least 50% of the time and you'll receive a $10 credit on your electricity bill every month!



Hassle-free charging.

With the Smart Charge Management program, you'll never have to worry about planning your EV charging.

Simply plug in when you get home and evPulse takes care of the rest.

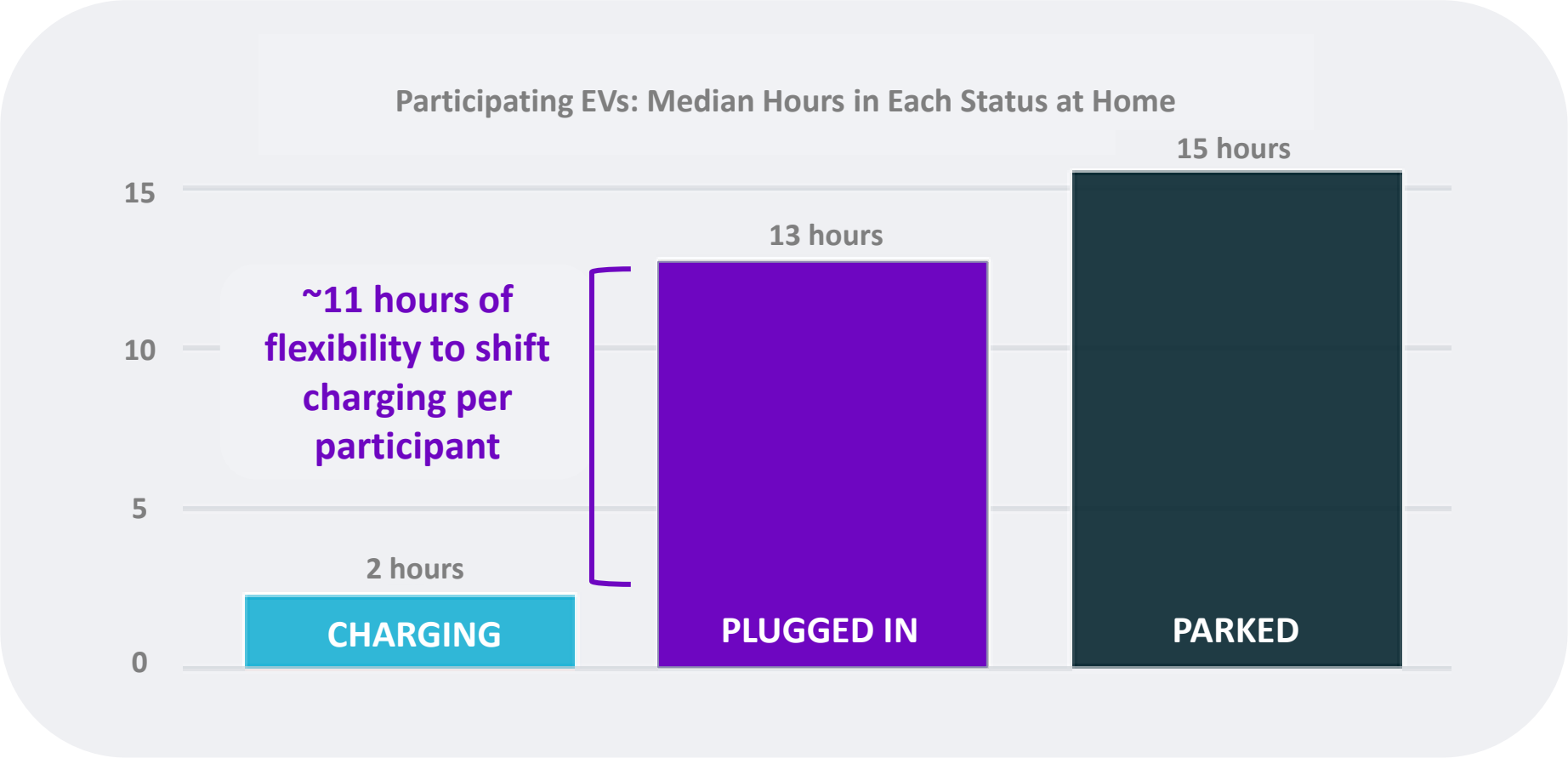
Your Tesla automatically charges when grid stress is low, rates are cheapest, and renewable energy is abundant.

ENROLL NOW >>

Results

Design Observations

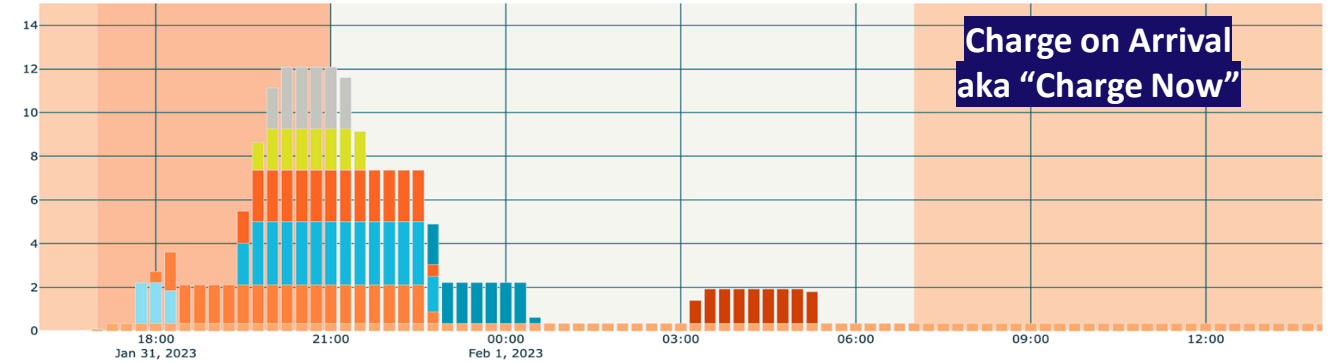
Charging Load Flexibility

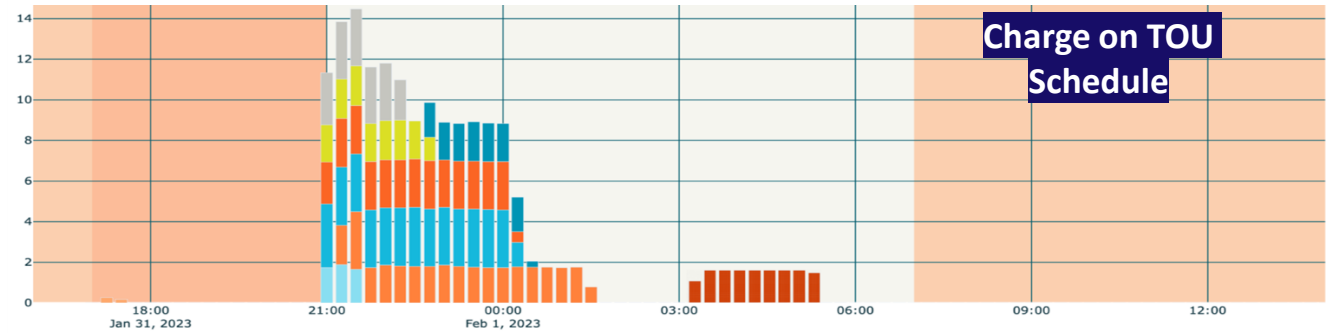


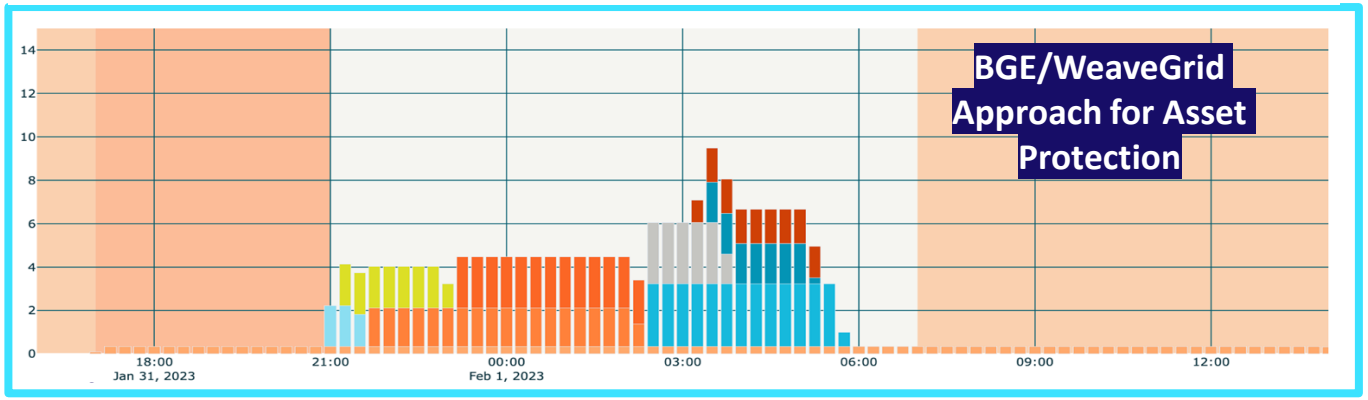
Load Balancing

Distribution Asset Protection

Design

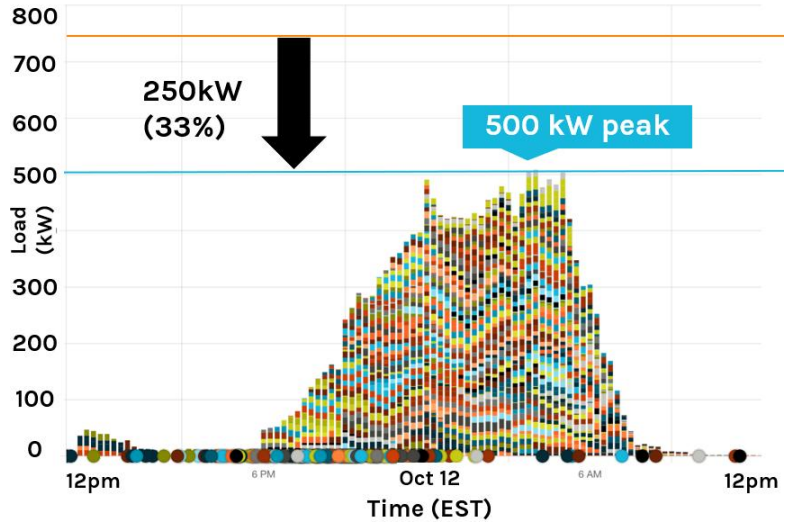




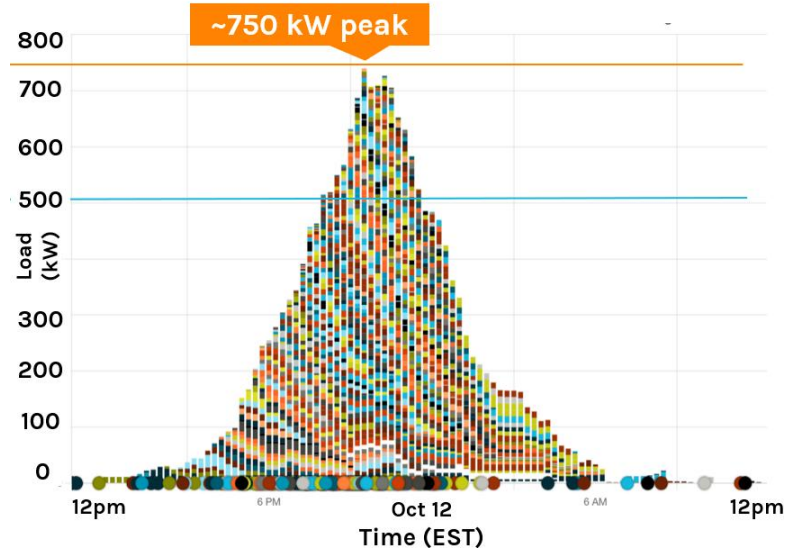


Results

Observed Load
What happened because of load balancing



Charge Now Counterfactual
What would have happened if everyone started charging when they plugged in



Results provided by WeaveGrid

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Thank you

stephanie.leach@bge.com

APPENDIX

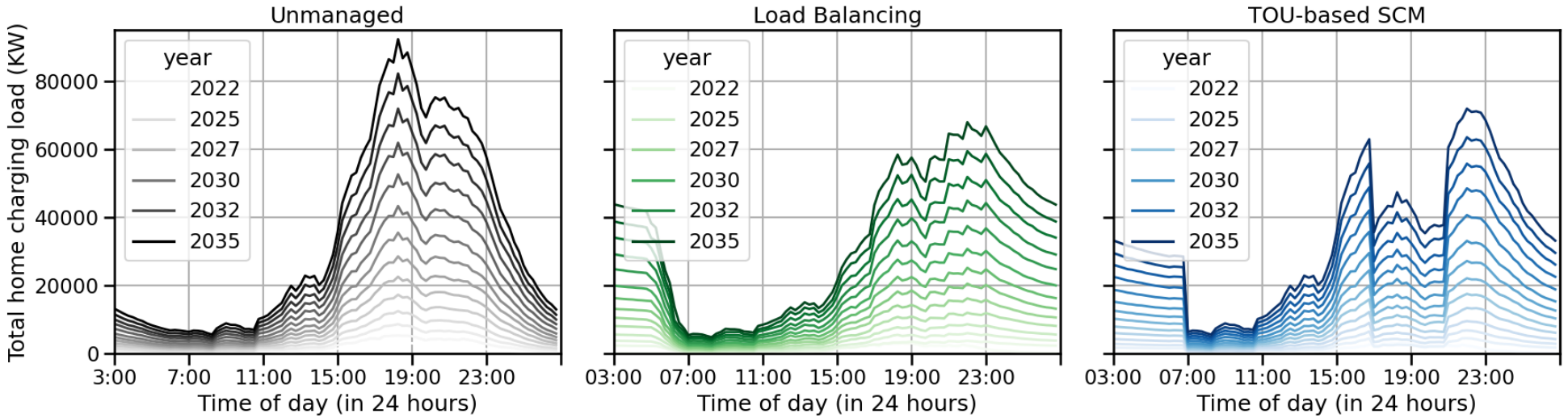
Maryland's Focus on Climate Change

Ambitious goals to reach net-zero emissions

- 300,000 ZEVS on the road by 2025
- Climate Solutions Now Act of 2022
  - Reduce greenhouse gas by 60% (compared to 2006 baseline) by 2031
  - Reach net-zero emissions by 2045
  - Electric School Bus Act
- Advanced Clean Cars Act II / Advanced Clean Trucks
- 2024 Distributed Renewable Integration and Vehicle Electrification (DRIVE) Act

Evaluating long-term EV Impacts: Grid Impact

- Analysis performed by Argonne National Laboratory
- Using census, travel data, EV model info and charging behavior
- Analysis will forecast EV charging impacts by 2035 based on # of EVs in BGE/PHIs service area
- Model two different managed charging scenarios: rate-based (**time-of-use**) and managing to grid assets (**load balancing**)

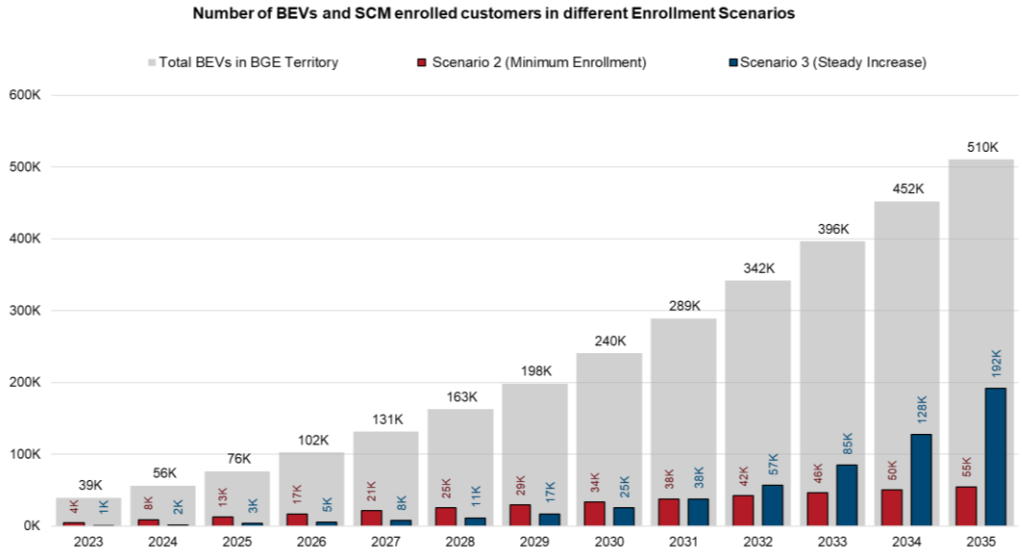


Graph shared by Argonne National Laboratory. This models 50% EV customer enrollment by 2035.

Evaluating long-term EV Impacts: Economic Impact

Economic Impact Analysis

- Use 60 sample feeders from BGE and 60 from PHI with mixed customer load (rural, urban, residential, C&I) and then cluster remaining feeders based on similarities
- Distribution asset costs (line, circuit, transformer, etc.) generalized by NREL
- Model EV load on Exelon's T&D systems based on 4 different enrollment scenarios
- TOU and Load Balancing strategies modeled on three representative days during the year (2022-2035)
- Asset upgraded at first sign of overload/failure



WeaveGrid

NARUC EV State Working Group

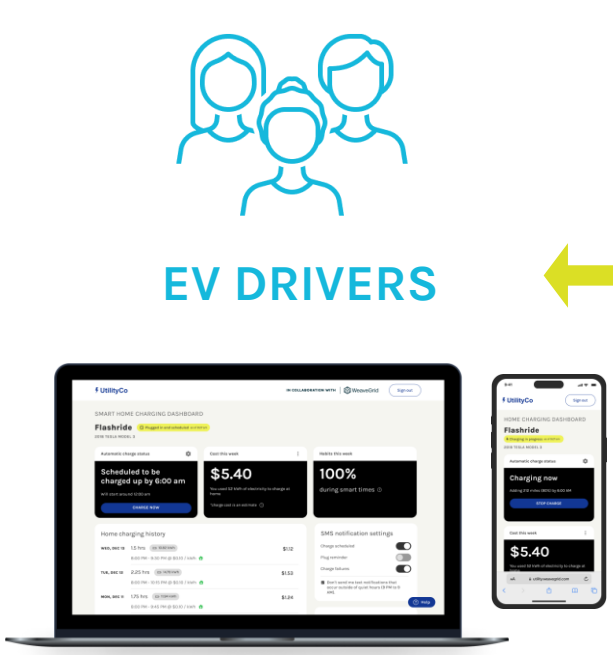
Mathias Bell

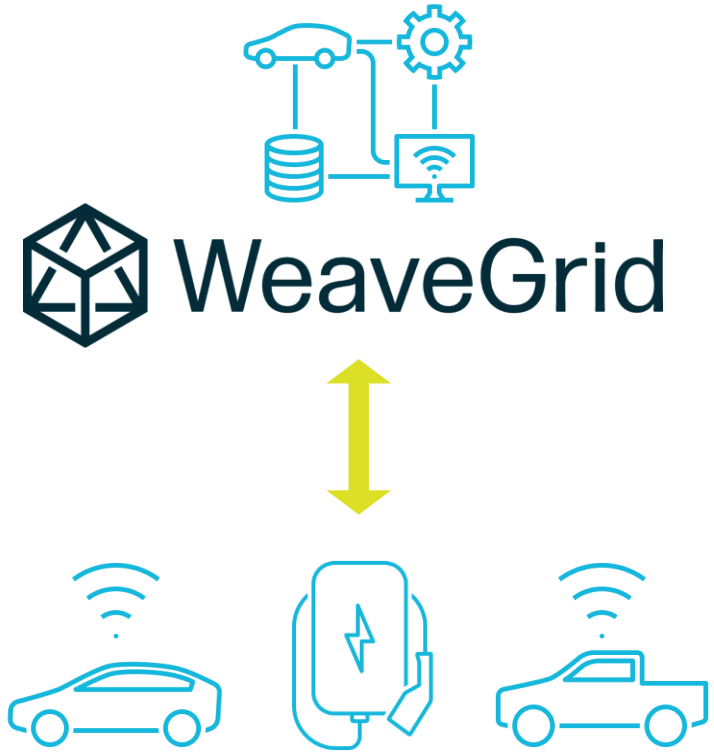
VP Policy & Regulatory Affairs

May 27, 2025

WeaveGrid

WeaveGrid builds software that helps integrate EVs and the electric grid





THE PROBLEM

The grid's growing bottoms up distribution challenge

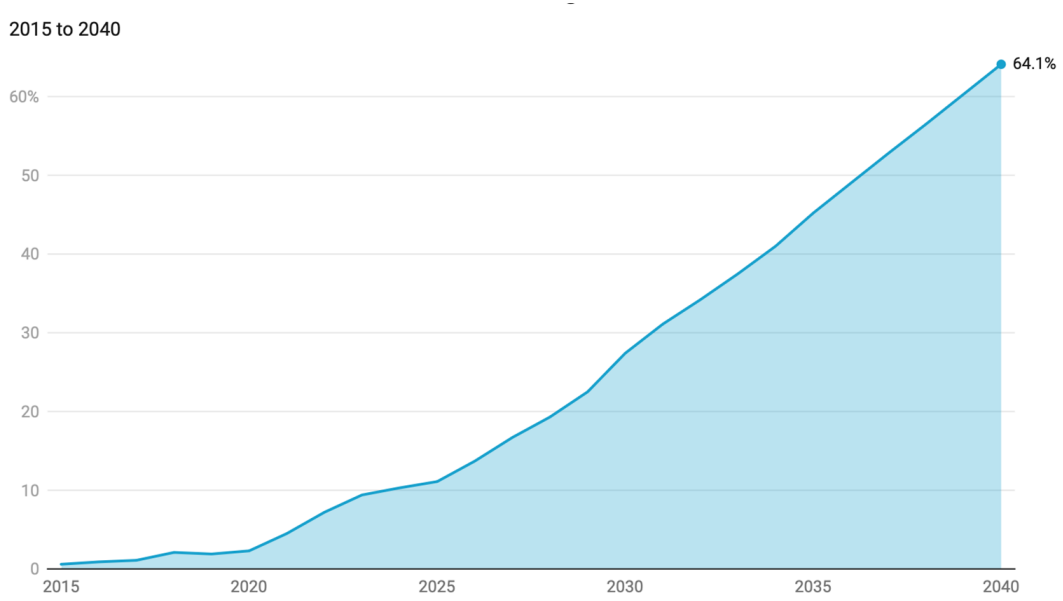
80% of charging happens at home

Level 2 charger doubles average home electricity demand

EV adoption is very clustered

Increases in distribution asset failure and upgrade needs

2025 EV Adoption Projection

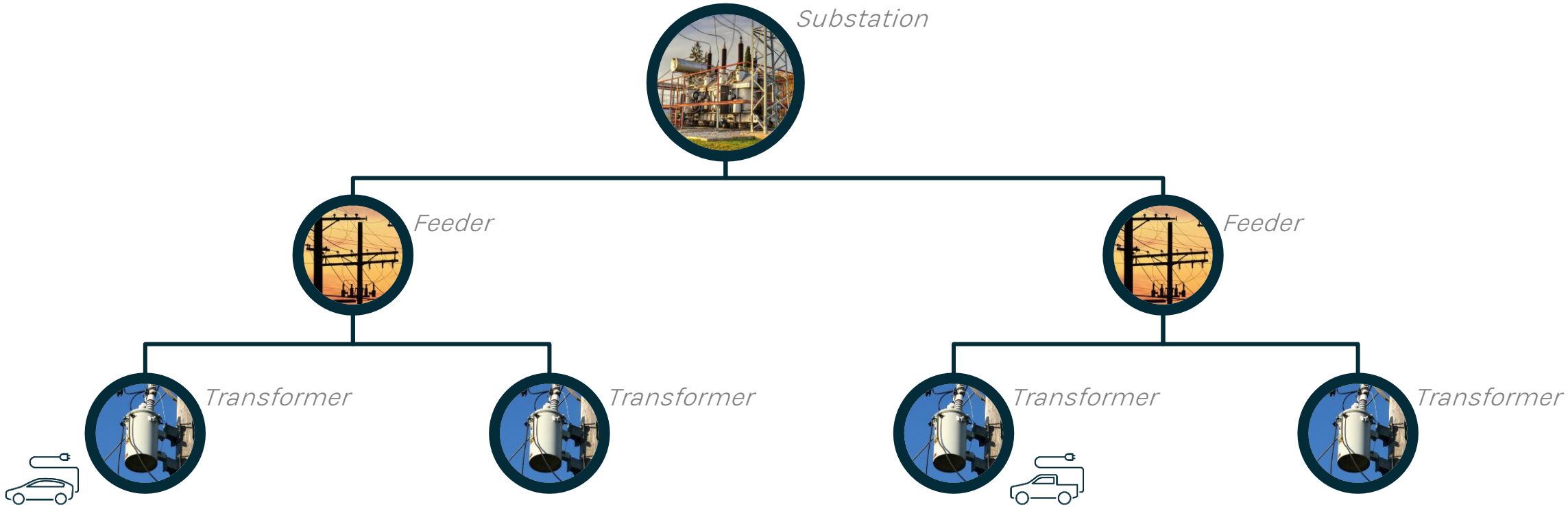


Source: J.D. Power

WeaveGrid

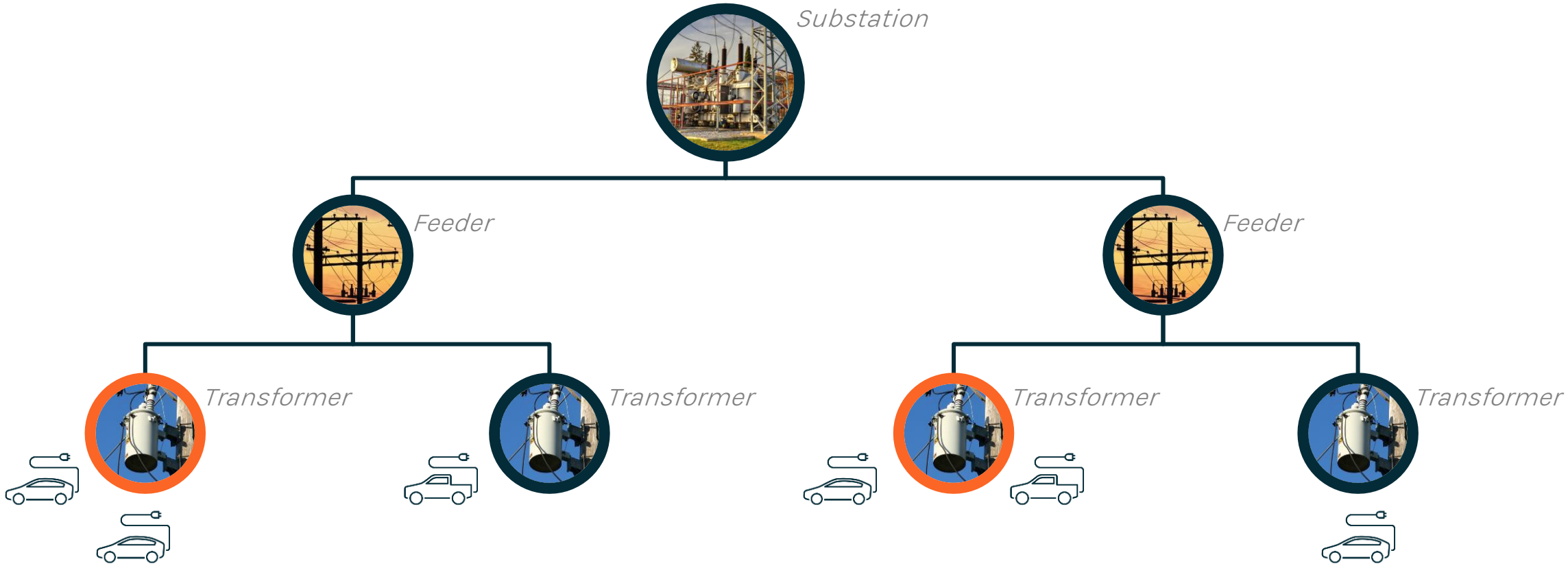
DISTRIBUTION IMPACTS

The distribution system faces strain even at early levels of EV adoption

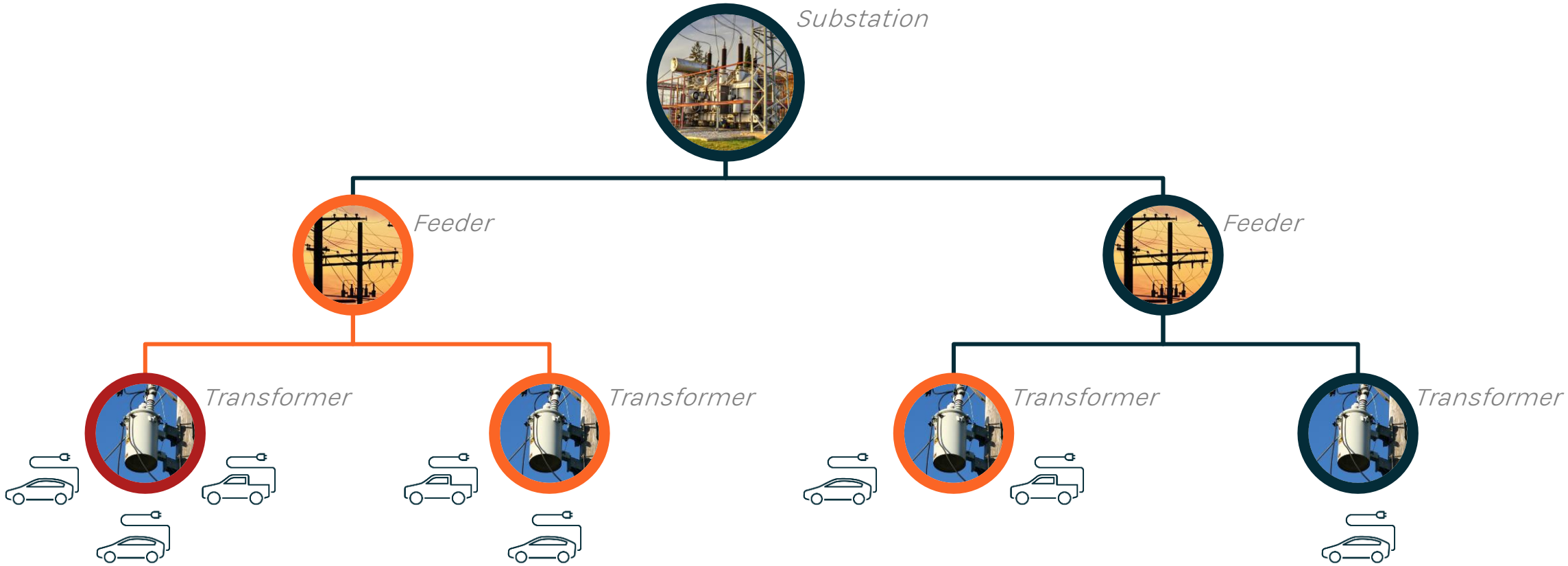


WeaveGrid

Transformers are most vulnerable to overload from clustered charging because they serve a limited number of homes



Distribution asset loading will increase upstream with higher EV adoption

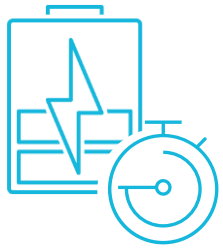


POTENTIAL SOLUTIONS

Many managed charging solutions focus solely on peak coincident impacts but fail to address distribution needs

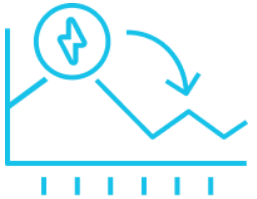
TIME-OF-USE

- ✓ Static bulk peak
- ✗ Dynamic bulk conditions
- ✗ Increased feeder



DEMAND RESPONSE

- ✓ Discrete bulk events
- ✗ Dynamic bulk conditions



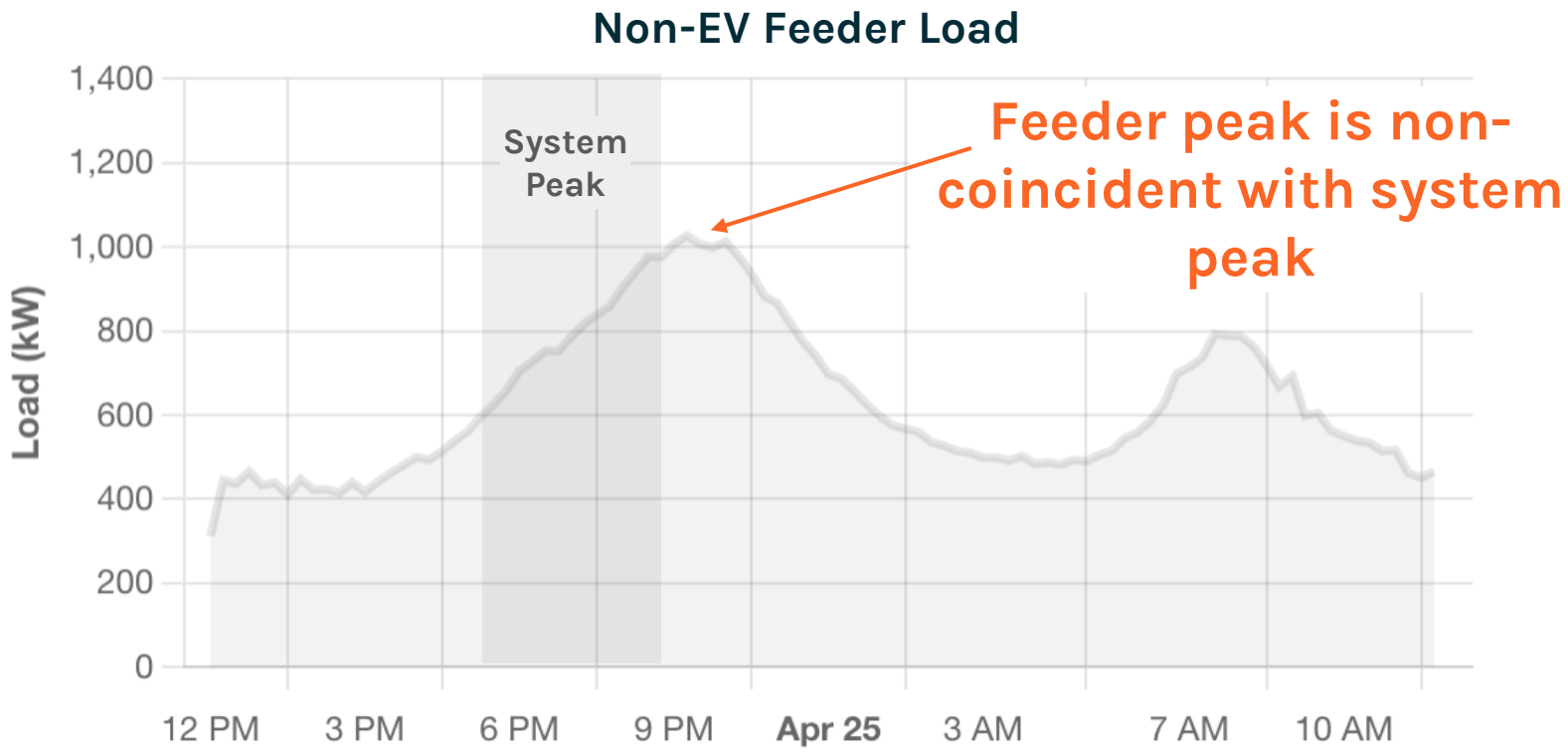
DYNAMIC RATES

- ✓ Dynamic bulk conditions
- ✗ Customer understanding and utility

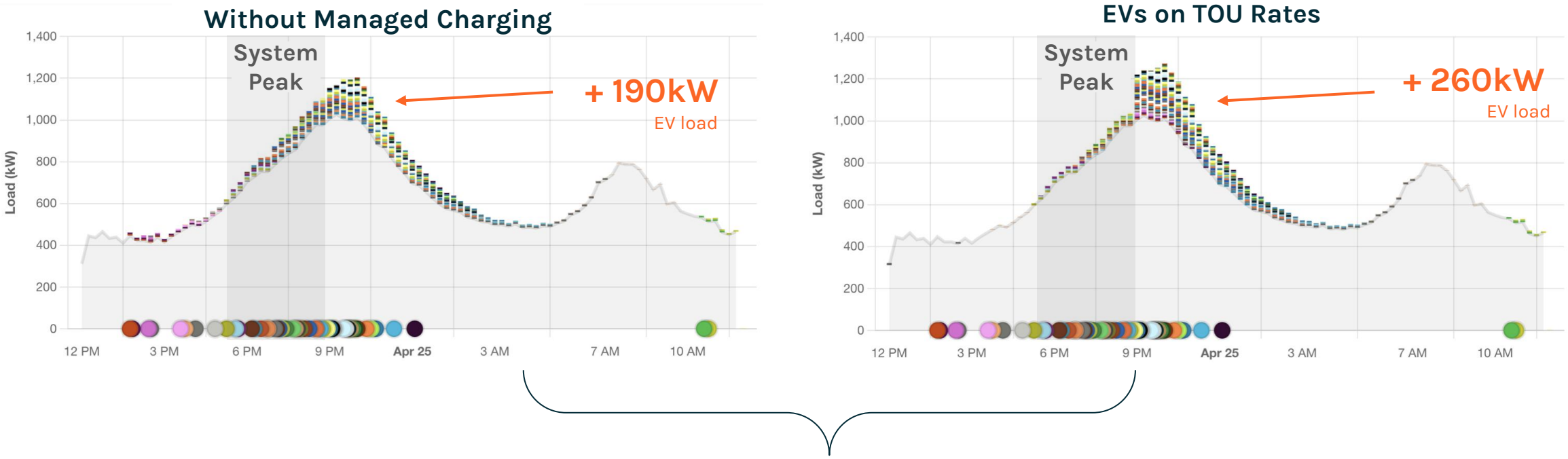
DISTRIBUTION ⟶ BULK SYSTEM

Regional distribution variability, feeder overload, or localized grid constraints

EV load is not the only stressor distribution systems face - how do these solutions look layered on non-EV load?



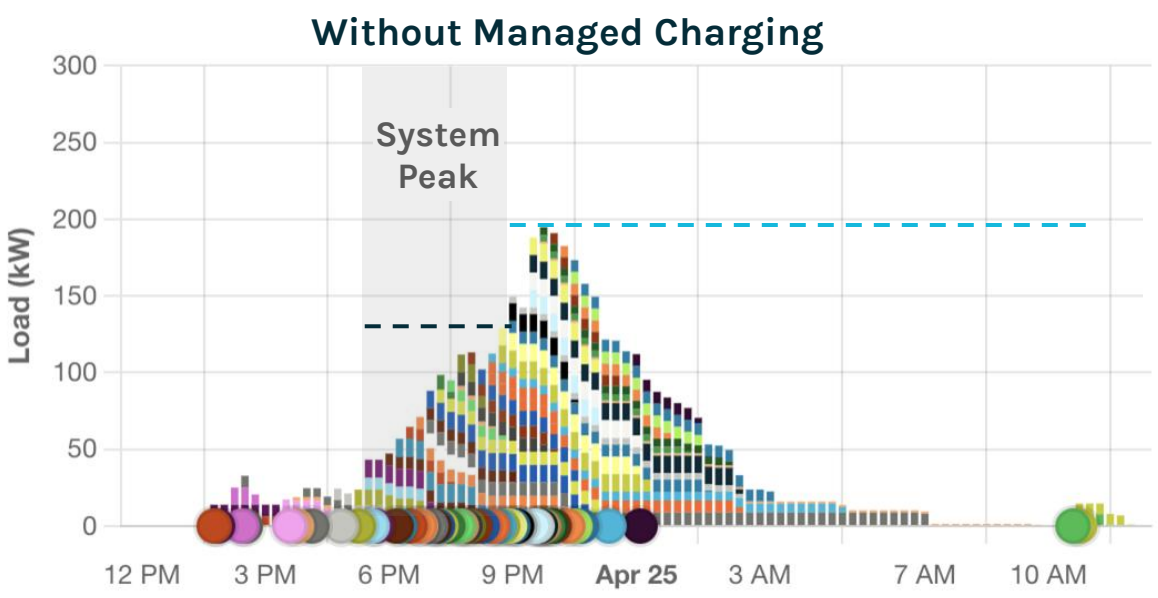
TOU timer peak coincides with feeder peak, increasing strain

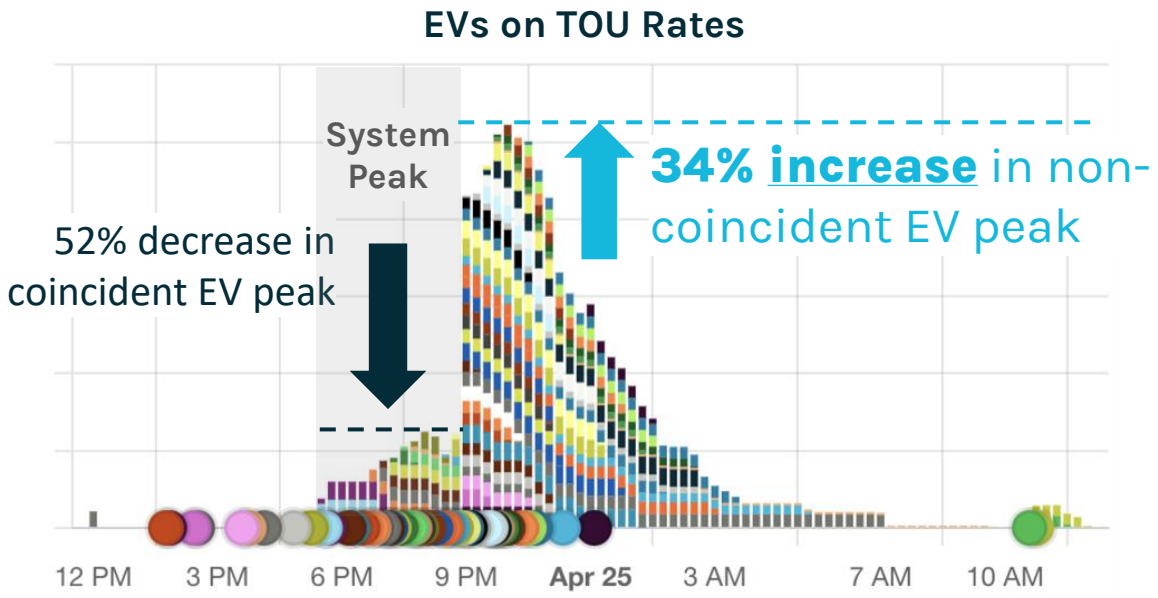


increase *in feeder peak charging load*

with TOU optimization

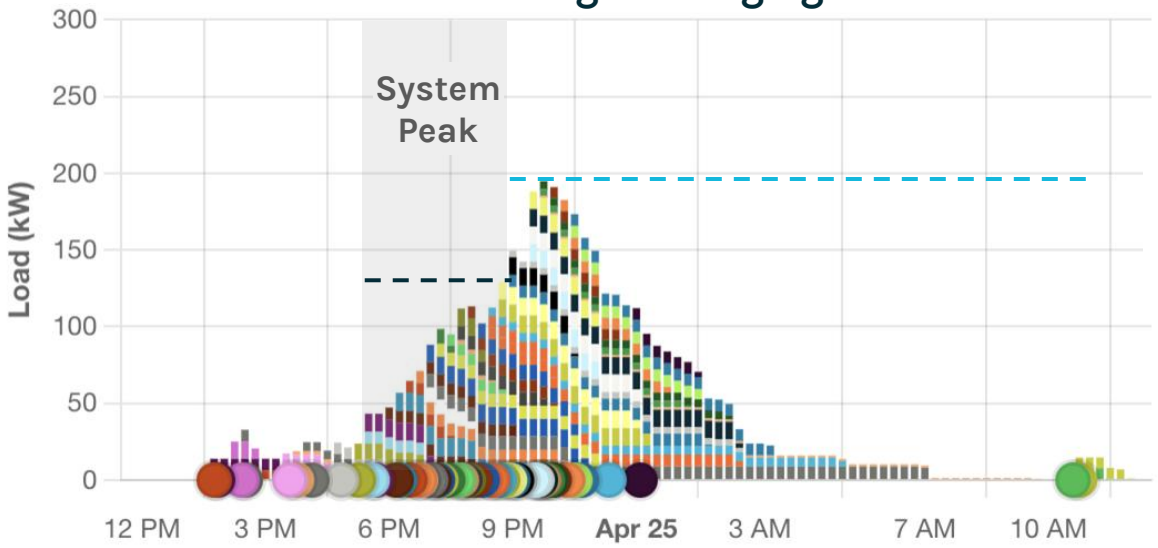
How to complement time-of-use rates?



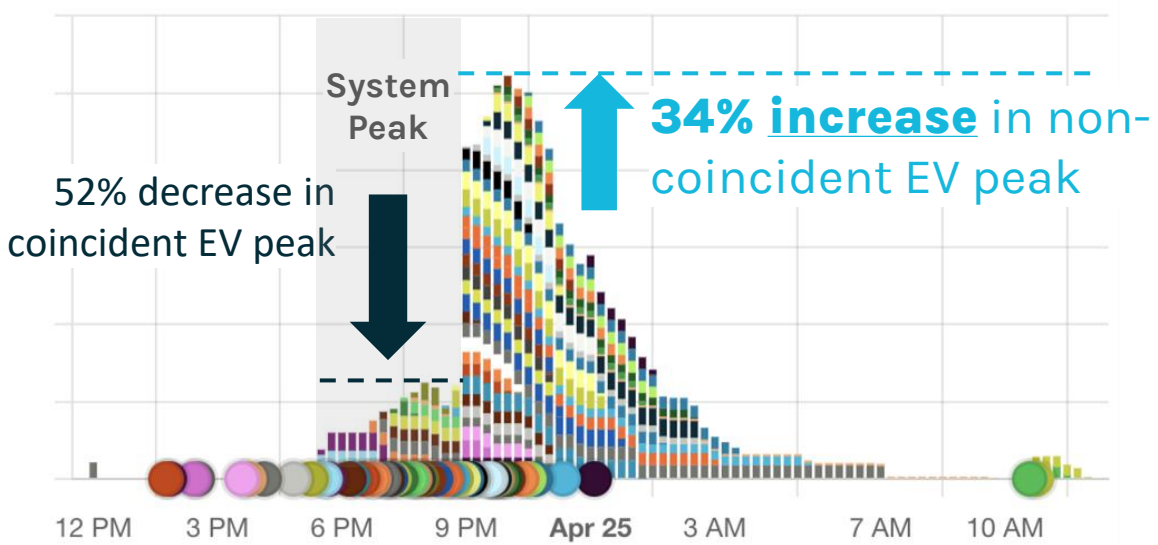


How to complement time-of-use rates?

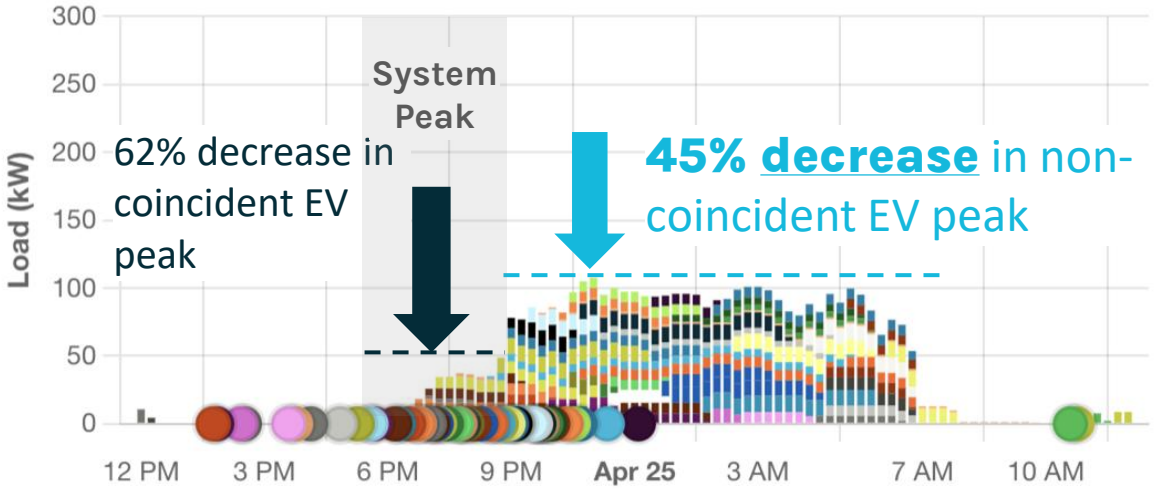
Without Managed Charging



EVs on TOU Rates

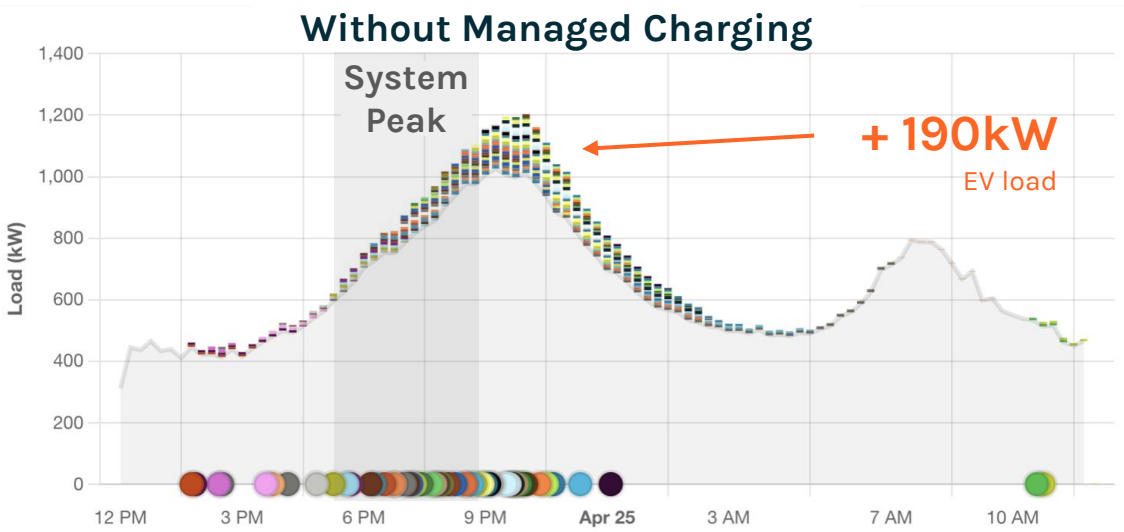


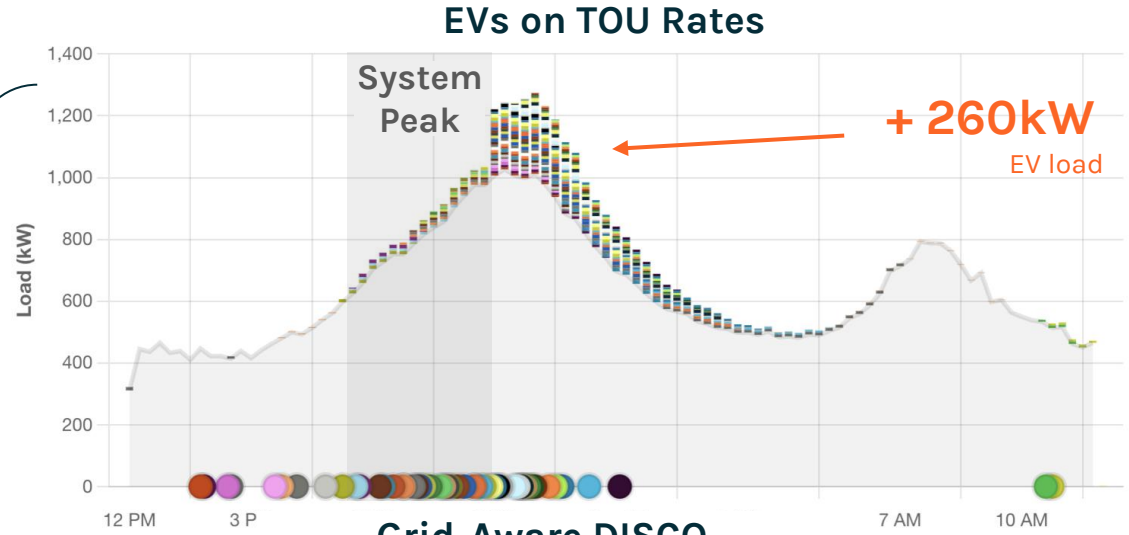
DISCO - Load Balancing

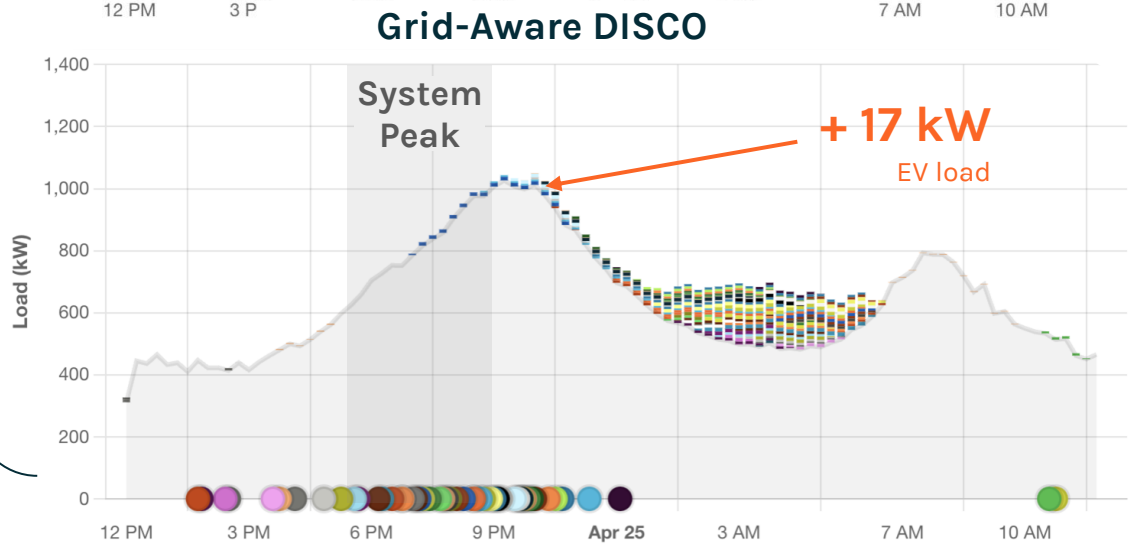


Load Balancing **flattens EV load** in off-peak to **resolve timer and non-coincident peaks**

Minimized feeder peaks by optimizing for EV and non-EV load







***decrease** in asset peak coincident charging load* with Grid-Aware DISCO

SOLUTIONS IN-MARKET

Major utilities are deploying on distribution optimization to improve resiliency and affordability

MAXIMIZE GRID BENEFITS

Enable distribution optimization and scale to maximize benefits

bge℠

PROTECT TARGETED ASSETS

Enhance bulk system optimization program with targeted distribution optimization for strained assets

Xcel Energy℠

ENABLE EV ADOPTION

Meet grid needs for growing EV adoption to ensure reliability and affordability

PG&E Pacific Gas and Electric Company®

WeaveGrid Summary

Managed charging is a proven affordability tool that benefits all ratepayers

Cost Causation. New EVs on the grid disproportionately impact the distribution system.

Optimization in Planning. Before infrastructure upgrades, utilities can deploy load management and vehicle-grid integration to defer spending.

Customer-friendly. Options need to be intuitive, equitable, and built around customer needs to drive high enrollment and system benefits

WeaveGrid

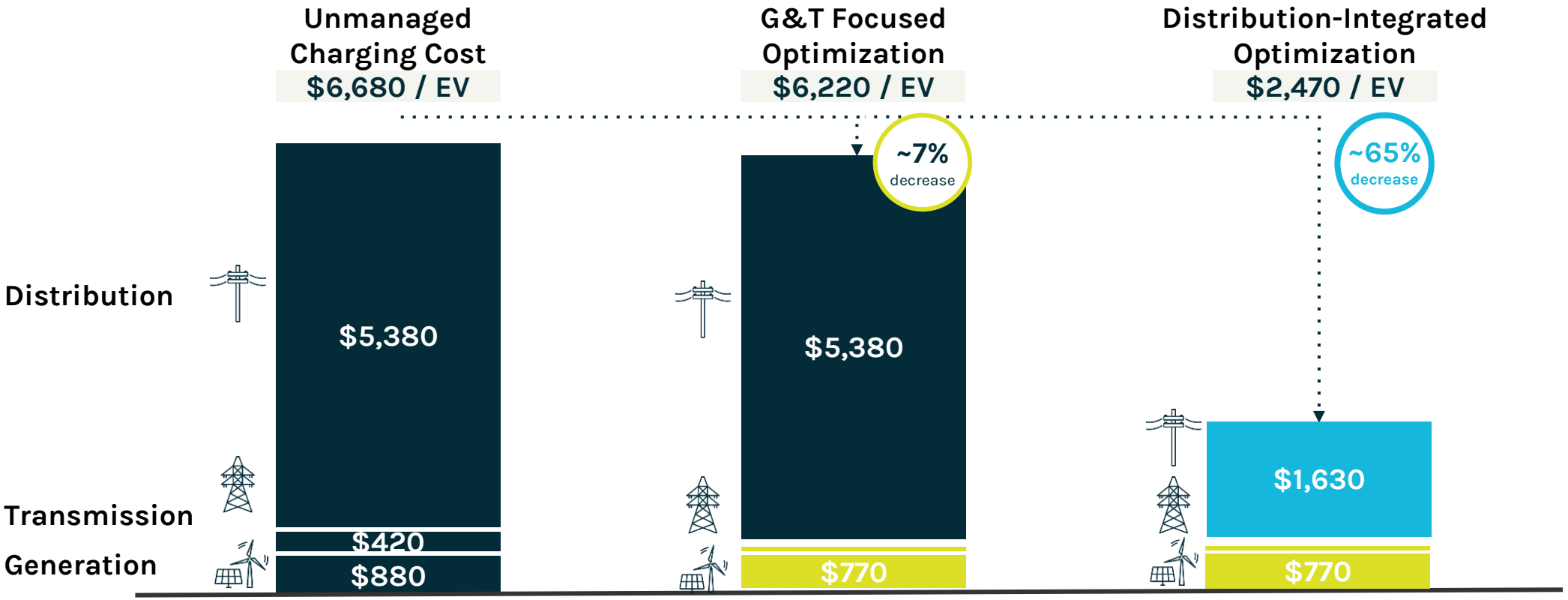
WeaveGrid

Thank You!

Mathias Bell
mathias.bell@weavegrid.com

WeaveGrid

Distribution optimization is critical to meaningfully reduce costs of integrating EVs with the grid



Sources: BCG, WG Analysis

Member Discussion Questions

1. Any pilot programs in your state(s) and data coming back?
2. How is your commission / utility thinking about the value of managed charging from a regulatory perspective? Where is the need (use case, time of day, geographic) the greatest?
3. What barriers / roadblocks are you seeing to advance managed charging in your state?

Next EV SWG Meeting: **June 24**, 3:00-4:30 pm ET via Zoom

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