comed℠ AN EXELON COMPANY | Customer Innovation

# Electric Vehicle Energy Management System Pilot Executive Summary

Release Date
December 19, 2025

Prepared For
Commonwealth Edison Company

Prepared By

WeaveGrid

# Acknowledgements

This pilot was developed and deployed as part of the Customer Innovation initiative within the ComEd Beneficial Electrification Plan 1 under internal project BEPILEVEM. WeaveGrid produced this report for the Customer Innovation Team with overall guidance and management from Tony Bustamante and Ana Villarreal. The team acknowledges the support of our partners, Treehouse and Emporia. For more information on this project, contact Customer.Innovation@ComEd.com.

# Legal Notice

By accessing and using this Electric Vehicle Energy Management System Pilot Report, you agree and acknowledge that content provided is for informational purposes only. ComEd does not guarantee the accuracy, completeness, or current status of the information presented. You agree and acknowledge that you will not reproduce, distribute, or use the information for any purpose other than research [the very specific purpose for which the document is offered].

# I. Executive Summary

This report summarizes the design, implementation, and findings of the Electric Vehicle Energy Management System (EV EMS) Pilot, conducted as part of ComEd's Beneficial Electrification Plan 1. The Pilot evaluated whether an EMS could allow residential customers to install and operate Level 2 electric vehicle (EV) chargers in homes whose circuit panels could not safely and reliably support a Level 2 (or higher) charger without costly panel upgrades, while maintaining safe, reliable, and convenient charging. EMS technology includes hardware and software components that work together to throttle EV charging if the overall household load approaches the configured electrical panel limit.

### The Level 2 Charging Barrier

48A Level 2 chargers are critical for a positive electric vehicle (EV) experience, providing charging speeds up to **9x faster than a wall outlet**.

However, **many homes lack the electrical panel capacity** to safely support this load.

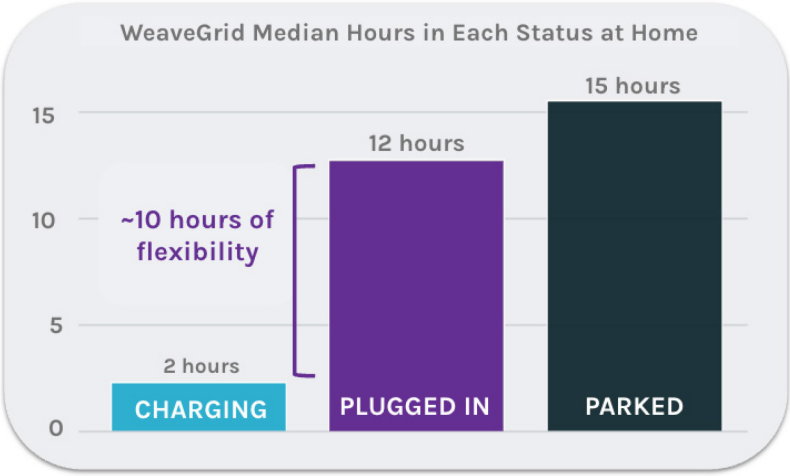
### The High Cost of Upgrades

For these capacity-constrained homes, the solution is often a full panel upgrade.

This is a significant deterrent, with typical costs ranging from **$4,000 to $6,000 per home**, creating an **equity and accessibility challenge.**

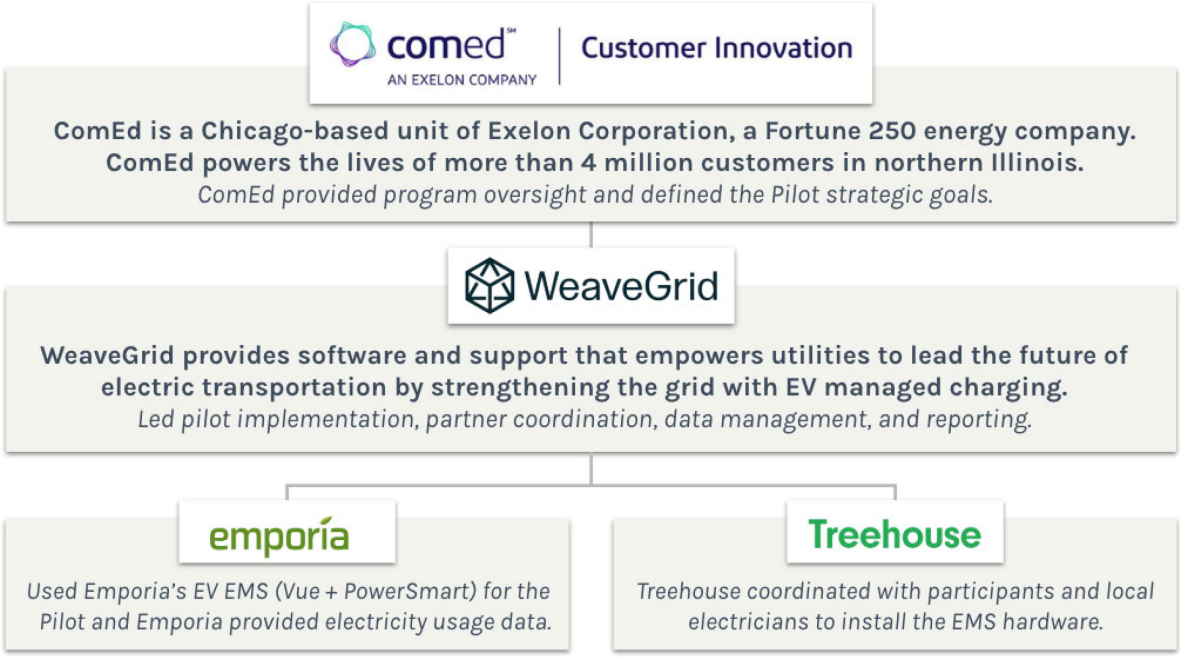
## A. Pilot Overview & Objectives

Many homes in ComEd's service territory lack sufficient panel capacity to support a 48-amp (A) Level 2 charger. According to a study published by ComEd in 2022, roughly two-thirds of homes in ComEd's service territory had service of 100A or less, which is approximately 2.2 million homes. This Pilot was designed to assess EMS technology as a cost-effective alternative that dynamically manages total household load, ensuring that EV charging does not push a home beyond its panel capacity rating, yet still allows for a satisfactory EV charging experience.



On average, WeaveGrid has observed EVs in its managed charging programs across the United States are parked at home about 15 hours daily and only actively charge for 2 hours. That leaves roughly 10 hours of flexibility - more than enough time to throttle charging during high household demand while still meeting drivers' needs.

ComEd selected WeaveGrid to lead Pilot implementation and data management. WeaveGrid subcontracted Emporia and Treehouse to deliver a seamless end-to-end experience. Emporia's EMS technology was used for this Pilot. Emporia's EMS hardware is called the Vue, and their associated software is called PowerSmart.




The Pilot recruited twelve residential customers, six with existing Emporia Level 2 chargers and Vue energy monitors, and six with Emporia chargers but without the EMS. Treehouse installed the Vue and configured PowerSmart for these six customers. An artificial service panel limit was configured in PowerSmart for a subset of participants to trigger EMS operation periodically, allowing ComEd and WeaveGrid to verify whether load management occurred as intended and whether customers experienced any noticeable impact or inconvenience. This approach enabled ComEd to test EMS functionality under real-world conditions while ensuring high standards for safety, data quality, and customer satisfaction.

The project produced operational and behavioral data suitable for assessing both technology performance and program design implications. Further information about incentive design, recruitment, and partners is included following the Executive Summary.

# B. Data Insights & Learnings Summary

Pilot data and feedback indicate that EMS technology can reliably manage EV charging load while respecting household electrical panel limits and preserving a positive customer experience. This Pilot, and about seven years of other non-ComEd-funded in-market deployments more broadly, have validated EMS performance and safety.

Participants reported high satisfaction with the installation process and minimal impact on charging convenience. Participants also reported an appreciation for energy monitoring data and the technology's ability to enable higher charging rates while protecting panel capacity.

***Voice of the Customer***
**All participants suggested ComEd offer an EMS program in the future.**

Lastly, the Pilot highlighted the importance of sufficient time allowances for local Authority Having Jurisdiction (AHJ) EMS installation permitting processes, which can vary considerably across communities.

# C. Recommendations

Based on Pilot findings, WeaveGrid and its partners recommend future programs:

- Integrate EMS and Level 2 charger installation processes to streamline customer participation and reduce costs. An integrated offering would bring installation logistics and customer communications under a single ComEd program.
- Adopt income-sensitive incentive tiers for EV EMS technology and installation, mirroring ComEd's existing EV Charger Rebate structure, to improve equity and access.
- Allocate sufficient installation timelines and schedule flexibility to accommodate local permitting and inspection variables.

This Pilot demonstrated that with the right partnership model (combining hardware providers, experienced installers, and a dedicated integration and data platform), utilities can safely, efficiently, affordably, and equitably expand residential EV charging access in homes with constrained circuit panels. The results provide a foundation for scaling EMS-enabled charging solutions that support both customer affordability and grid reliability across ComEd's service territory.

As part of this Pilot, WeaveGrid conducted  market sizing analysis. Methodology is in the report. Key assumptions include:

- 1) Illinois reaches its 1 M EV goal in 2030 and that ComEd maintains a 90% share of EVs in the state,
- 2) one EV per household,
- 3) 2/3 of ComEd's 900k EVs will reside at homes with electrical service of 100A or less,
- 4) and $5,000 in average savings from avoiding a panel amperage upgrade. This is a conservative estimate. Costs can be as high as $15,000.

By 2030,

**600,000 households**

in ComEd's service territory
could need an EMS to enable Level 2 charging

Using EMS technology instead of
upgrading panel amperage could result in

**$3 billion in customer savings**

Load management is critical to making EV charging adoption cost-effective at scale. A combined EMS and Level 2 charger installation utility program with a realistic timeline and a nuanced incentive strategy could help transform the future of EV mobility, making EVs a more viable option for all customers.

EMS programs alone are insufficient to address the bulk system and distribution constraints increasingly impacting ComEd's system. Even if home load limits are addressed with EMS technology, active managed charging programs are required to address bulk system and localized peak constraints. WeaveGrid suggests ComEd require rebate recipients to participate in an active managed charging program to ensure overall grid value of EV charging is maximized.

### Safe & Reliable Technology

The Pilot proved that EMS technology is **safe, reliable, and effective**. Critically, the technology delivers these benefits **without negatively impacting the customer experience.**

### A Clear Win-Win Solution

An EMS program **removes a cost barrier** for customers, supports grid reliability, and enables ComEd to **improve electrification accessibility.**

### Full Scale Offering with Upstream Grid Optimization

WeaveGrid **suggests ComEd integrate EMS technology into the level 2 charger rebate experience** when electrical panel limits are a blocker.

Requiring rebate recipients to **participate in an active managed charging program,** can provide crucial bulk and distribution system benefits.