

Powering Communities: Lessons From Bidirectional Charging Programs Nationwide

Introduction

As Illinois moves toward a cleaner energy future, ComEd is exploring innovative solutions like bidirectional charging to support the state's [goal of 1 million electric vehicle \(EV\) registrations by 2030](#). Bidirectional charging allows EVs to not only draw power from the grid but also send energy back to homes, buildings or the grid itself. This two-way energy flow may help improve grid reliability, reduce energy costs and lower emissions—benefiting both customers and communities.

As implementation of the [Beneficial Electrification Plan](#) progresses, ComEd continues to evaluate how to best deliver benefits to all customers, especially the geographic areas throughout Illinois that would most benefit from equitable investments by the state designed to combat discrimination and foster sustainable economic growth. These communities are inclusive of [low-income](#) (LI) households; [Restore, Reinvest, Renew](#) (R3) communities; and [environmental justice](#) (EJ) communities, jointly referred to as “Select Customers.”¹

To further this commitment, ComEd launched a comprehensive Bidirectional Charging Environmental and Social Impact Study to evaluate how bidirectional charging technology can deliver tangible benefits to Illinois communities. This study explores both the environmental and social impacts of bidirectional charging technology, an area not previously examined at the local level, and seeks to understand how these impacts can be leveraged to deliver equitable outcomes for all communities.

Lessons From National Bidirectional Charging Pilots

Across the country, utilities are piloting bidirectional charging programs to unlock new value for customers and communities. **Table 1** below summarizes how leading programs measure and report three types of benefits:

1. **Customer benefits:** direct outcomes for participants, such as cost savings, backup power or incentives
2. **Environmental benefits:** effects on the natural environment, including changes in pollution levels and air quality resulting from energy use
3. **Social benefits:** impacts on people and communities, such as health outcomes, access for underserved groups and support during power outages

The comparison illustrated in **Table 1** shows which bidirectional charging pilot programs are evaluating these benefits.

Table 1: Pilot Program Benefits Comparison as of December 2025

Utility/ Program	Status	Customer Benefits (tracked/reported)	Environmental Benefits	Social Benefits
BGE and Sunrun (2024)¹	Completed	Yes—backup power events, grid support, participant earnings	No—limited direct tracking of greenhouse gas (GHG) emissions or air quality impacts	No—no health impact tracking
Xcel Energy²	Active	Yes—peak demand reduction, bill impacts, technology performance	Partial—supports grid decarbonization, but no direct tracking of GHG or air quality	No—partnerships may support cleaner air, but no formal health tracking
National Grid³	Active	Yes—backup power for school bus fleets, cost savings, revenue, grid stabilization	Partial—electrification of buses expected to reduce GHG, but not formally tracked	No—focus on underserved communities and children’s exposure, but no health tracking
PG&E⁴	Active	Yes—grid reliability, backup power, incentives, adoption rates	Partial—general climate benefits discussed, not systematically tracked	No—outreach to disadvantaged communities, but no formal health tracking
ComEd⁵	Active	Yes—advanced modeling of environmental and social impacts	Yes—advanced modeling quantifies GHG reduction and air quality improvements	Yes—formal assessment of health impacts and equity for Select Customers

Key Trends in Bidirectional Charging Pilots

Table 1 above shows that while most pilot programs track customer benefits, few systematically measure environmental or social impacts. ComEd stands out for its commitment to ensuring that all customers benefit from bidirectional charging programs by rigorously modeling and tracking impacts, with a particular focus on understanding and advancing equitable access and outcomes. Building on these findings, several key trends have emerged in bidirectional charging programs nationwide:

- **Resilience and emergency preparedness:** Many programs focus on providing backup power during outages, directly supporting customer benefits like reliability and safety.
- **Carbon reduction and sustainability:** Utilities are working to reduce pollution and GHG emissions, which are core environmental benefits tracked in several pilots.
- **Cost savings and revenue opportunities:** Programs help participants save money on energy bills or earn incentives, reflecting the customer benefits listed in the table.
- **Equitable access and community engagement:** There is a growing emphasis on making benefits available to underserved communities, supporting social benefits such as improved access and community support. This focus aligns with the goals of the [Clean Energy Jobs Act \(CEJA\)](#), which prioritizes equity and expanded opportunities for communities that have historically faced economic and environmental challenges.
- **Addressing participation barriers:** Utilities are testing incentives and simplified enrollment to help more people participate, which can enhance both customer and social benefits.
- **Data-driven decision-making:** Rigorous data collection helps utilities measure impacts and guide investments, ensuring that customer, environmental and social benefits are tracked and enhanced.
- **Benchmarking and best practices:** Utilities are learning from each other to refine their programs, helping to maximize all types of benefits for participants and communities.

Key Takeaways

Recent pilot programs demonstrate that bidirectional charging can deliver real benefits for grid stability, customer savings and community resilience. However, the table reveals that:

- Most pilots track customer benefits but few systematically measure environmental or social impacts.
- ComEd is unique in its rigorous approach to modeling and tracking both environmental and social outcomes, especially for underserved communities.
- Equitable access, robust community engagement and targeted incentives are essential for program success.

ComEd's Bidirectional Charging Study: Localizing Best Practices

ComEd's Bidirectional Charging Environmental and Social Impact Study draws on a range of practices and findings from national pilot programs. For example, PG&E's incentive structures, Xcel and National Grid's outreach and engagement methods and BGE and Sunrun's data collection practices are all strategies that have been successfully implemented in other pilot programs. These programs and strategies can serve as useful reference points as ComEd evaluates options for its own program design.

At the same time, ComEd is building on lessons from national pilots by introducing several innovations that set its study apart.

- **Advanced modeling:** ComEd is the only utility in this comparison to use advanced modeling to quantify GHG reductions and air quality improvements, providing transparent data on environmental outcomes.
- **Equity and health focus:** The study formally assesses health impacts and equity for Select Customers, ensuring that benefits reach Select Customers.
- **Tailored outreach:** ComEd is developing outreach strategies specifically for equity-eligible communities, lowering barriers to participation and maximizing community benefit.
- **Application of national lessons:** ComEd reviews practices from other utility pilot programs and may incorporate similar strategies—such as incentive design, community engagement and data collection—to its own program, adapting them to local needs.

These steps are intended to ensure that environmental and social benefits are measured, reported and accessible to a broad range of customers.

Want to learn more?

Learn more about bidirectional charging at the [Backup Power Capabilities - ComEd Customer Innovation](#) webpage. Visit the ComEd [V2G Pilot Program](#) webpage to learn how you can participate or benefit from upcoming initiatives. For additional information on ComEd’s available resources and programs, please visit [ComEd.com/EV](https://www.comed.com/EV).

i LI refers to Low-Income, EJ is Environmental Justice communities, and R3 is Restore, Reinvest, and Renew communities. EJ + R3 are also often referred to jointly as "Equity Investment Eligible Communities (EIEC)."

¹ Sunrun. "Sunrun Launches Nation's First Vehicle-to-Home Grid." Press Release, 2024. Available at: investors.sunrun.com/news-events/press-releases/detail/318/sunrun-launches-nations-first-vehicle-to-home-grid

² Fermata Energy. "Fermata Energy and Xcel Energy Announce Transformative Vehicle-to-Everything Bidirectional Charging Pilot." Article, 2024. Available at: fermataenergy.com/article/fermata-energy-and-xcel-energy-announce-transformative-vehicle-to-everything-bidirectional-charging-pilot/

³ National Grid. "Vehicle-To-Grid." EV Fleet Hub, 2024. Available at: nationalgridus.com/ev-fleet-hub/Intro-to-EVs/Vehicle-To-Grid

⁴ Pacific Gas and Electric Company (PG&E). "Vehicle-to-Everything (V2X) Pilot Programs." Clean Energy Electric Vehicles, 2024. Available at: pge.com/en/clean-energy/electric-vehicles/getting-started-with-electric-vehicles/vehicle-to-everything-v2x-pilot-programs.html

⁵ ComEd. "Backup Power Capabilities – ComEd Customer Innovation." 2024. Available at: innovate.comed.com/bepilots/backup-power-capabilities/