

Preparing Public Power Utilities for the Electric Vehicle Boom

Public power utilities can take proactive measures in planning for the deployment of electric vehicle charging infrastructure (also known as electric vehicle service equipment) within their service territories, capitalizing on this transformative shift in transportation and mitigating adverse impacts on the grid. With careful planning and strategic investment, utilities can leverage the advent of EVs as a catalyst for improved service and community engagement.



ACRONYMS

BEV: Battery electric vehicle

EVSE: Electric vehicle service equipment

PHEV: Plug-in hybrid electric vehicle

Electric Vehicle Service Equipment Categories

Category	Operating Voltage	Power Level	Compatibility	Common Application	Potential Grid Impacts
Level 1	120 V AC	1 kW	BEV, PHEV	Residential	Can increase evening and overnight residential power demand.
Level 2	240 V AC / 208 V AC	7 – 19 kW	BEV, PHEV	Residential / Commercial	Can alter demand profiles for both residential and commercial locations, including shifting peak periods. Can stress transformers and other distribution equipment.
Level 3	400 – 1000 V DC	20 – 350 kW	BEV only	Commercial	Can add significant load to distribution systems. Can require upgrades to infrastructure.

Deployment Considerations

Public power utilities can play a vital role in EVSE deployment and can collaborate with various stakeholders for successful implementation of EVSE. The utility may choose to take on the responsibility of owning, installing, operating, and maintaining the charging network, or they may enlist the help of vendors for certain aspects of system implementation and management. Infrastructure installation is an area where utilities often seek contractor support even if they choose to be EVSE owner-operators. Alternatively, some utilities may opt to support independently

owned charging infrastructure by providing technical or funding support, or by offering guidance on site selection. Utilities can proactively assess the capacity and capabilities of their distribution infrastructure by identifying where EVSE may be installed and considering where upgrades and investments might be needed.

As the number of EV manufacturers and charging system providers continues to increase, interoperability between different systems has become a major challenge. The risk of a fragmented network of

incompatible charging stations could hinder the user experience and slow down EV adoption. Tips for “future-proofing” EV charging deployments include:

- Build scalability into the charging infrastructure to allow for easier expansion and upgrades to accommodate future increases in demand.
- Evaluate smart grid and energy storage integration from the outset to optimize energy distribution, manage peak loads, and enhance overall grid efficiency.
- Utilize modular charging stations to allow for easier replacement or addition of charging components as maintenance and upgrade needs arise.
- Monitor roadmaps for standards. An example is SAE International's *J3400™ North American Charging Standard (NACS) Electric Vehicle Coupler Technical Information Report*, which promises better interoperability between manufacturers and EVSE suppliers for fast charging stations.
- Stay abreast of planned regulatory changes and government programs. Look for opportunities to inform state and federal regulators as your organization seeks to deploy EVSE and watch for funding opportunities to help offset the cost of infrastructure investments. Grants like the Charging and Fueling Infrastructure Grant Program provide significant funding for EV infrastructure.

Reaching the Whole Community

Public power utilities have unique concerns and advantages when it comes to adopting EV technologies, including having direct accountability to the communities they serve, and playing a role in community education and outreach. Public power utilities are responsible for meeting the needs of the whole community, which includes supporting equitable transportation electrification. As EV adoption grows, it is crucial that all segments of the community benefit from this transition, irrespective of socioeconomic status. Historically, infrastructure developments have often overlooked underserved communities, leading to disparities in access.

To address this challenge, public power utilities can implement targeted strategies, which may include:

- Conducting demographic and geographic analyses to identify areas lacking in EV infrastructure, including multi-family dwellings, and prioritizing these locations for new installations or rebate programs.
- Forming partnerships with community organizations to build charging stations in accessible public areas such as community centers and public parks.
- Implementing incentive programs specifically designed for low-income households.



Risk Awareness

With the digitization of grid operations and the rise of smart charging infrastructure, cybersecurity and data privacy have become critical concerns. Like other smart grid technology, EV charging systems are potential targets for cyberattacks. Such attacks could disrupt operations or compromise sensitive customer data. Public power utilities must therefore consider the security and resilience of charging infrastructure on their system, and work with customers, charging station owners, and manufacturers to ensure that proper cybersecurity measures are being implemented to protect against such threats and maintain customer trust.