



# BEYOND HARDWARE: RELIABILITY AND SERVICE DRIVE THE NEXT PHASE OF EV INFRASTRUCTURE

BY KERRIGAN SOURA AND RUSSELL CLARKE

**The U.S. is shaping the future of electric vehicles (EVs) with significant momentum.**

In the third quarter of 2024, [EVs accounted for 8.9% of vehicle sales](#), indicating 11% year-over-year growth from the third quarter of 2023. Federal funding and incentive programs have accelerated the installation of charging stations across many U.S. regions – yet holes remain in today’s EV charging infrastructure ecosystem.

So far, the development of charging infrastructure has centered largely on hardware – the physical charging stations and balance of system (BOS) components. Yet, as the industry evolves, there’s a growing need to emphasize software solutions and meaningful investment in service and maintenance to optimize the expanding charger network.

## GRID RELIABILITY BECOMES CRITICAL AS THE INSTALLED CHARGING BASE REACHES SCALE

The mass adoption of EVs poses a significant challenge to the electrical grid, especially as the grid becomes increasingly reliant on diversified and intermittent energy supply. Without proper management, a sudden surge in demand from simultaneous EVs charging could overload local grids and cause blackouts. A recent [University of Michigan study](#) found that besides blackout risk, unmanaged EV charging leads to inefficient energy utilization, equipment degradation and possible failure, transformer stress and overheated wires. While utilities rely on software solutions to enhance grid resiliency, these findings

underscore the need for additional innovation – such as artificial intelligence (AI) modeling and more granular visibility and control of the grid edge – to manage and optimize interactions with electric vehicles.

Monitoring tools provide utilities with more detailed insights into the grid and EV usage. Products can be embedded into the “grid edge,” such as smart meters and EV chargers, to collect data that can be shared with utilities and independent system operators (ISOs) to inform decisions based on customer use. This specific data can provide critical inputs for AI models and grid-management software. For example, Utilidata’s “Karman” is a product that can be embedded within a charger to integrate AI and provide real-time visibility into usage and power quality. Similarly, companies like StreetLight Data (acquired by Jacobs) use cell phone data to provide utilities and operators with actionable insights. Eversource recently used StreetLight to collect information on traffic patterns as part of its Massachusetts EV charger implementation planning, which guided the energy provider’s charging rates, substation upgrades and energy management strategies toward ambitious electrification goals.

While these are useful tools, having access to real-time data alone isn’t enough to solve grid reliability. Also needed is the ability to forecast accurately and adapt quickly. Utilities and operators will have to leverage more sophisticated solutions that can aggregate data and produce highly accurate forecasts for EV charging demand and power needs. These tools should account for long-term demand as well as short-term spikes, such as rush-hour direct current (DC) fast charging and overnight charging at home.

ElectroTempo, a software company focused exclusively on the predictive analysis of EV charging down to the city block level, offers charging demand forecasts across a range of time horizons to help utilities with load planning. Solutions like these enable utilities to respond to changing power needs quicker and with more accuracy, supporting the continued deployment and penetration of EV charging.

Along with forecasting and managing power supply, software and monitoring systems can help with demand management. Utilities will need to find ways to incentivize users to charge during off-peak hours.



Sensors and software embedded in chargers that communicate with each other and dynamically adjust charging rates can help owners balance demand – and this can ultimately benefit the owner through rebates or incentives offered by the utility. As the EV market grows, grid management will be an ongoing dynamic process and the importance of software tools will continue to increase.

## SERVICE AND MAINTENANCE MAKE OR BREAK LONG-TERM SUCCESS

Maintenance of EV chargers, particularly for Level 3 chargers or direct current fast chargers (DCFC), is sorely needed. A [2022 study of 657 non-Tesla chargers](#) found that only 72.5% were capable of charging for more than two minutes. While Level 2 chargers are often more cost effective to replace, Level 3 chargers are more complex and expensive products with far more sophisticated, high-power componentry.

As a relatively new market, the EV charging industry has yet to see widespread breakdowns occur on a large enough scale to warrant an organized plan of action or scaled specialist providers, pushing off the need for

a significant service segment across the industry. Add the difficulty in low-density deployments and lack of mechanical components that typically drive break-fix service businesses, and it's clear that a lack of service support is coming to a head. This has spurred strong demand for service in the industry and opens the door for high-value, reoccurring maintenance and service revenue for electrical service businesses that can serve the growing market.

## FACTORS INFLUENCING TODAY'S GROWING SERVICE AND MAINTENANCE LANDSCAPE

- **Ownership dynamics:** Similar to the wind industry and other power-focused supply chains, many original equipment manufacturers (OEMs) offer warranties for short-term repairs and maintenance before the responsibility is passed on to the owner. It remains unknown what the industry standard will be for after-market repair and replacement, with various models currently in play. Some independent EV charging installers offer subscription services with preventative maintenance, monitoring and post-warranty repairs, while others provide these services on an as-needed basis.




“The EV charging market is splitting – durable, long-lasting solutions versus quick, disposable options. As technology and climate urgency push for sustainability, reliable, maintenance-backed chargers will become the gold standard. Anticipated regulations and rising EV adoption mean warranty programs must evolve to meet demand for quality and greater accountability,” said Jim Burness, founder and CEO of National Car Charging, a value-added reseller and installer of EV charging products throughout the U.S.

- **Role of electrical contractors:** An important player in service and repair is the local electrical contractor and technician. However, many electrical firms are not specialized in the space and lack the knowledge or skills to easily diagnose and repair software, hardware and electrical components. This can create challenges for large, nationwide charging owners who rely on fragmented providers with varying skills. Another challenge is that many chargers include the manufacturer’s name or logo but no indication of the installer, who is often the logical repair provider. Installers that white-label chargers with their brand can leverage future service opportunities, as they will be top of mind for maintenance and repair.

Gas station repair and maintenance companies have expanded into EV offerings or pursued mergers and acquisitions (M&A) in EV service and parts. Companies traditionally viewed as fueling industry providers, such as JF Petroleum Group and Freedom Electronics, have made a pointed effort to expand into EV charging. Start-ups focused on EV charger repair, such as ChargerHelp!, have also popped up. ChargerHelp! offers Reliability as a Service (RaaS) with unlimited repairs and consistent maintenance for a flat monthly fee.

Selling at scale can be hard given the disparate ownership base outside the large public networks. Dynamics are further complicated by the fact that many EV charging ownership models aren’t yet profitable, forcing owners to put up additional capital and further pressuring economics. As penetration and utilization increase, many of these current challenges should improve over time.

- **Funding:** Most legislative pushes for EV charging have revolved around deployment, as groundbreaking ceremonies make for good optics. However, it’s also necessary to invest in maintenance and other areas to instill consumer confidence and support momentum.



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— **Jim Burness**, Founder & CEO  
National Car Charging

For the first time, federal funds are being directed directly toward repairs. [The U.S. Transportation Department recently awarded \\$148.8 million](#) in funding across 20 states to repair or replace 4,500 charging stations. And new funding rules under the [National Electric Vehicle Infrastructure \(NEVI\) program](#) may further encourage maintenance investment, as it requires charging stations to be operable 97% of the time on an annual basis or run the risk of having funding clawed back. This emphasis on charger reliability and quality, in addition to expanding deployment, is expected to continue to grow.

- **Need for skilled labor:** Capitalizing on the industry's service demands is easier said than done; for one, the industry has a lack of skilled technicians. It's estimated the [industry will need more than 142,000 new certified electricians](#) to reach the White House's 2030 EV goals. Developing capable electricians requires years of education, apprenticeships and hands-on experience, and even many seasoned electricians lack the necessary skills to work on EV chargers.

Massachusetts-based energy and electrical solutions provider [Commonwealth Electrical Technologies](#) recognizes this challenge and has adopted a regional model focusing on primarily in-house labor to develop skilled EV charging technicians in the Northeast. "We work with some great EV

charging companies in this space and provide great training opportunities for our electricians. Our regional approach has helped us become a trusted advisor for our customers as they plan out their EV charging infrastructure for their portfolio of properties," says John Duquette Jr., Commonwealth's vice president and general manager.

## FILLING IN THE GAPS

While hardware deployment has laid the foundation for today's EV charging infrastructure, software solutions that ensure reliability, efficiency and adaptability, along with service solutions to keep these products online, require more emphasis. This will help cement the long-term sustainability of a potential future dominated by EVs. As new companies emerge to fill the gaps in today's market, EV charging will become more reliable, scalable and adaptable to evolving demands.



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