



White Paper – EV Charging

Tolling and EV Charging – A Perfect Mobility Match


Compiled by: A-to-Be® | Mobility-Beyond
#electric #charge

Executive Summary

Across the world, the public and private sectors are gearing up for the transition to electric mobility. In the U.S., state legislatures and governors are acting to phase out the sale of internal combustion engine vehicles in the next two decades, and vehicle manufacturers are increasingly electrifying their product lines. But to truly transition to an electrified future, **the U.S. needs to build out a charging infrastructure that will ease the “range anxiety” of charging-conscious EV drivers.**

This network does not yet exist in the U.S., but fortunately, Europe is farther along this path. There, tolling operators are playing a critical role in helping their patrons find, activate, and pay for charging as a “value added” service for the operator. This white paper will discuss **the need for a nationwide, interoperable EV charging network**, the qualities that **make tolling operators an ideal piece of that network**, and **examples that U.S. operators can follow** from their peers in Europe.

Introduction



Many industries have moved to be more environmentally conscientious, and the auto industry is no different. **Auto manufacturers around the world have announced a dramatic shift towards electric vehicles (EVs).** In 2021, General Motors, Ford, and Chrysler announced that they hope to have 40 to 50 percent of new vehicle sales by 2030 be zero-emission vehicles, including battery-electric, plug-in hybrid electric, or fuel cell electric vehicles. **American consumers will have 20 new EVs to choose from in 2022** and, according to the most recent Guidehouse Insights report, **by 2030 there will be over 2.6 million plug-in electric vehicles on the road in North America** compared to the end of 2021 when there were about 2 million. In the Europe Union (EU), registrations for EVs increased from 550,000 registrations in 2019 to about 1.4 million in 2020 showing exponential growth, according to the European Environmental Agency, and Bloomberg shared that **EU is aiming to have 30 million EVs on the road by 2030**, up from the 1.4 million at the end of 2020. As the global EV economy grows, so does the need to strategically deploy EV chargers. **Deploying EV infrastructure in an articulated and integrated way, along key roadways, is essential for the success of the shift to electric mobility.**

“ 50% of new vehicles by 2030 be zero-emission vehicles, including battery-electric, plug-in hybrid electric or fuel cell electric vehicles. ”

Additionally, individual countries in the EU and **states in North America have begun to set their own ambitious EV policies**. In Washington State, Governor Jay Inslee signed legislation banning the sale of gas engine cars after 2030. In 2020, California Governor Gavin Newsome signed an Executive Order directing the state to require that, by 2035, all new cars and passenger trucks sold in California be zero-emission vehicles and New York Governor Kathy Hochul signed a law banning gas cars by 2035. **As the popularity and legislation of EVs has increased, so too has the public demand for charging EVs.** The recently passed federal infrastructure bill in the United States provides \$7.5 billion for EV charging. States will receive \$5 billion total, which will be divided among the states using a specific formula, to support the expansion of an EV charging network in their respective states along highway corridors. Each state must submit an EV Infrastructure Deployment Plan that describes how the State intends to use the funding it was appropriated, and the Federal Highway Administration (FHWA) will approve eligible Plans by September 30, 2022.

Due to the United States federal guidance, **states are required to first build out their Alternative Fuel Corridors with 150kW+ Direct Current Fast Chargers (DCFC)** with locations within 1 mile of the corridor. DCFC is popular with businesses, especially convenience stores, gas stations, truck stops, and travel plazas. Fast chargers can usually charge a car over 80% in less than half an hour and frequently consumers are willing to pay nearly double for the convenience. Until the United States Department of Transportation (USDOT) has certified that a state's corridors are fully complete, states will not be able to use the EV charger funding for other types of chargers, such as Level 2 (L2) charging. Because of these requirements, the USDOT released a statement that **turnpikes and toll roads will play a major role in the rollout of EV chargers within the states.**

The psychology of EV drivers differs compared to gas-powered drivers. EV drivers tend to plan their trips in advance and travel along routes that have easy access to EV chargers to reduce range anxiety. Range anxiety is what an EV driver feels when the battery charge is low. Although gas-powered drivers can also feel range anxiety, it is currently easier to find a gas station than to find an EV charging station. Turnpikes and toll roads are a key infrastructure, used by medium to long-distance travelers, where range anxiety is most likely to occur.

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Up to now, turnpikes installing EV chargers were staying ahead of the curve. However, if turnpikes do not begin installing EV chargers more broadly, they will fall behind. **By installing chargers along its roadways, turnpikes and toll roads will attract EV drivers to travel along that route,** pay the toll, and utilize services stationed along that roadway. Service Plazas are an ideal place for EV charging stations, allowing drivers the ability to charge while using the plaza to purchase food or drinks. **EV drivers and toll agencies would both benefit from having chargers on toll roads.**

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The tolling industry is well positioned to play a key role in the deployment of EV charging. Not only are toll roads and turnpikes in strategic, cross-country, locations that will ease range anxiety, **tolling agencies have the relationships and technologies to easily include EV charging.** Tolling agencies have a relationship with patrons through established electronic toll collection (ETC) accounts and drivers are accustomed to paying tolls and using their transponder or app to be able to travel. Additionally, technology currently exists that can make using EV chargers convenient in an interoperable way. If all EV charging and tolling systems are connected and communicate, there will be less room for error and less leakage. According to a KPMG study, **32 percent of leakage is driven by insufficient or inaccurate vehicle data** and 31 percent by lax regulations covering the evasion of

tolls. If the same transponder or app was responsible for charging the vehicle, the vehicle information would need to be more accurate, and payment methods would need to be up to date for drivers to be able to move.

- I Tolling agencies already have relationships with patrons through established ETC accounts.
- II Adding EV charging to a toll agency's services provides an incentive to keep account information up to date, reducing leakage.
- III Tolling agencies have the back office experience needed to meet USDOT's interoperability requirement for EV charging networks.

The USDOT guidance also discusses **the need for EV charging infrastructure to be interoperable**. The chargers need to be capable of using open protocols and standards for network connectivity to allow for easier transfer of operations to a new network provider as needed. The USDOT will soon provide additional guidance on several critical issues that will determine the success of the national EV charging network. **The upcoming guidance will discuss real-time data collection and sharing, payment facilitation, display obligations, sourcing needs, pricing information, open-source network connectivity requirements, and cybersecurity constraints, all of which will lead the path for interoperability.** Similarly, in the UK, the Society of Motor Manufacturers and Traders (SMMT) developed a plan they are pushing to the government to have a nationally coordinated charging infrastructure plan and a new regulatory body to ensure minimum standards and affordability across EV charging platforms.

“ The U.S. Federal Government can look to... Portugal to see what types of technologies are available to help EV charging networks. ”

The United States federal government can look to Europe, and specifically Portugal, to see what types of technologies are available to help EV charging networks. Via Verde is Portugal's nationwide electronic toll collection system. The Via Verde app grants users access to more than two thousand EV charging stations in Portugal. **Drivers pay through an app to charge an EV, using the same account that they use to pay tolls and other mobility-related services such as parking, fueling, ferries, and even drive-throughs for food and medicines.** This new EV charging service has national coverage, permitting the more than 2.8 million Via Verde clients to easily locate, unlock, and use any EV charging station in Portugal using a dedicated app. After the charging is complete, the app informs the user about the time and the energy-charge in the electric vehicle's battery. Payment is completed by direct debit through the bank account indicated by the application's user. In Spain, **Iberdrola updated its Public Charging App to include up-to-date information on all of Spain's more than 3,000, electric charging locations**, whether operated by Iberdrola or a third party, to make it convenient for the driver.

Currently, public charging infrastructure in the U.S. has developed through a patchwork of grant funding, settlement funds, private investment, and utility programs. The largest portion of public charging is managed by individual charging companies that operate charging stations under a variety of business models. Many rely on proprietary software and subscriber service models, resulting in different pricing structures and service offerings for their subscribers versus non-subscribers. This model is vastly different than what gas-powered drivers are accustomed to. A gas-powered driver does not have to worry about downloading various mobile apps or juggling different station network memberships to fuel up at a gas station, and this inconvenience poses an unnecessary barrier to EV

“ [Charging] inconvenience poses an unnecessary barrier to EV adoption. ”

adoption. **An open network approach that is fully interoperable, and can work with any type of charger, would ease the transition to an electric future.**



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