



Electric Vehicles: Analysis of Revenue Issues and Charging Station Implementation Plans

Report Number: KTC-22-02/KHIT147-1F

DOI: <https://doi.org/10.13023/ktc.rr.2022.02>



Kentucky Transportation Center
College of Engineering, University of Kentucky, Lexington, Kentucky

in cooperation with
Kentucky Transportation Cabinet
Commonwealth of Kentucky

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Research Report
KTC-22-02/KHIT147-1F

Electric Vehicles: Analysis of Revenue Issues and Charging Station Implementation Plans

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March 2022

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Section 1 A Quick Introduction to Electric Vehicles

The nationwide push to electrify vehicle (EV) fleets is gaining momentum. Automakers are ramping up production of EVs and promising to phase out vehicles with internal combustion engines (ICEs). By 2030, Ford claims EVs will account for 40 percent of its total sales, while GM pledges that by 2035 all vehicles it produces will generate zero emissions.¹

Three types of EV are available. Hybrid electric vehicles (HEV) have both an ICE and electric motor with battery. The HEV is a self-contained system that charges the battery and cannot be plugged in. Plug-in hybrid electric vehicles (PHEVs) are similar to HEVs, but they have a larger battery that allows them to run on only the electric motor for short distances (12 – 60 miles) and can be plugged in. In HEVs and PHEVs, the electric motor supplements the ICE to provide power and improve fuel economy. Battery electric vehicles (BEVs) run entirely on battery power.

Drivers recharge PHEVs and BEVs by plugging them into a charger. Three types of chargers are available — Level 1, Level 2, and Level 3 (direct current fast charger [DCFC]). Figure 1.1 summarizes the key features of each and their respective use cases and costs.




Type	Characteristics
 Types of Charging Stations Level 1 (L1)	Three kinds of charging stations are available to EV drivers. PHEVs can only use Level 1 and 2 chargers. Costs related to installation and onsite electrical work can vary significantly, which accounts for the broad price ranges seen below. <ul style="list-style-type: none"> • Power Output: 1 kW - 3 kW • Range Added Per Hour of Charging: 3 - 5 miles • Use Case: Residential • Cost: New vehicles come with L1 chargers as standard equipment
 Level 2 (L2)	<ul style="list-style-type: none"> • Power Output: 3 kW - 19 kW • Range Added Per Hour of Charging: 15 - 35 miles • Use Case: Residential, Workplace, Public • Cost: Residential – \$2,000 to \$5,000; Workplace/Public – \$5,000 to \$15,000
 Level 3 (Direct Current Fast Charger, or DCFC)	<ul style="list-style-type: none"> • Power Output: 50 kW - 350 kW • Range Added Per Minute of Charging: 2 - 18 miles • Use Case: Workplace, Public • Cost: \$50,000 to \$300,000

Figure 1.1 Characteristics of L1, L2, and L3 Chargers

EVs have many benefits. They produce fewer tailpipe emissions than conventional ICE vehicles, which cuts down on pollutants such as carbon dioxide and fine particulate matter, and are also cheaper to refuel (Table 1.1). Depending on the price of gasoline and fuel efficiency, on a per-mile basis operating a BEV is 25 to 30 percent the cost of a conventional vehicle. In Table 1.1, MPGe stands for miles per gallon of gasoline equivalent. The Environmental Protection Agency (EPA) states that 33.7 kWh = 1 gallon of gasoline. A vehicle that gets 100 MPGe uses about 34 kWh of electricity to travel 100 miles. Beyond lower fueling costs, EVs also have lower long-term maintenance costs because they are less complex mechanically than conventional ICE vehicles.

¹ Forbes has a useful rundown of how automakers are approaching EVs: <https://www.forbes.com/wheels/news/automaker-ev-plans/>

Table 1.1 Fuel Efficiency of EVs and Conventional Vehicles

Vehicle Type	Fuel Efficiency	Cost Per Mile
Conventional Gas-Powered ICE	20 MPG	\$0.16 / mile
Conventional Gas-Powered ICE	30 MPG	\$0.11 / mile
BEV	100 MPGe	\$0.046 / mile

* Calculations based on a gasoline price of \$3.225 / gallon and an electricity price of \$0.1249 / kWh.

EVs are transforming how people and goods move, but widespread adoption poses challenges to state governments. To meet these issues head on, states are beginning to develop and publish EV roadmaps that lay out strategies for corridor planning (e.g., determining where to site charging stations), best practices for designing and operating EV charging stations, increasing public awareness of EVs, and leveraging multi-stakeholder partnerships to prepare jurisdictions for electrification of the transportation system. Some states have also established grant programs to fund charging stations through partnerships with public and private stakeholders.

This document provides an executive-level summary of recent trends in the EV space. Its purpose is to orient KYTC leadership to key issues state-level government agencies are contending with.

Table 1.2 Report Structure and Content

Chapter	Content
2	<ul style="list-style-type: none">Summarizes different approaches states and multi-state partnerships have adopted to facilitate the build out of EV corridors
3	<ul style="list-style-type: none">Reviews methods for recouping fuel tax revenues lost as drivers switch to EVs, state-level incentives for EV purchases, and legislation introduced or passed in 2021
4	<ul style="list-style-type: none">Analyzes EV registration data for Kentucky and projects fuel tax revenue losses under different adoption scenarios
5	<ul style="list-style-type: none">Examines Kentucky's current EV charging infrastructure and future needs

Section 2 State-Level and Regional Approaches to EV Infrastructure Planning

Many state governments are developing EV roadmaps which describe their approaches to EV infrastructure, corridor planning strategies, how they will encourage consumers to adopt EVs, and best practices for developing and laying out sites at which charging stations are located. A number of states have also established grant programs to fund new charging infrastructure. This chapter provides a high-level overview of how states are planning for EVs. Instead of methodically working through each state individually, we begin with more general observations using a question-and-answer format. After this, we present a few detailed case studies focused on states KYTC leadership expressed interest in learning more about.

2.1 Overview of State-Level EV Strategies

What types of agencies are responsible for preparing EV roadmaps and administering programs?

It varies. Generally, comprehensive roadmaps that address all facets of EV planning and adoption are not published by DOTs. In many states departments of energy or environment have taken a leading role. There are exceptions to this, however. For example, the North Carolina DOT developed the *North Carolina ZEV Plan* (although it coordinated with the state's Department of Environmental Quality). The Drive Electric Tennessee consortium, which issued the state's roadmap, brings together over 30 stakeholders including the state DOT, the Department of Environment and Conservation, and Tennessee Valley Authority. Developing EV roadmaps and corridor plans requires the input and participation of multiple state government agencies. Some states have hired consultants to manage this process.

Clearly delegating responsibilities among agencies is critical. This gives individual agencies the opportunity to focus on tasks within their domains and forge cross-agency partnerships to coordinate activities where needed. And it also prevents the duplication of efforts or programs.

How are state governments funding new EV charging infrastructure?

Many states are using up to 15 percent of funds they received as part of settlements with Volkswagen for the diesel emissions scandal. In some states, this money is being supplemented by other funding sources. For example, in Tennessee, the Department of Environment and Conservation is partnering with the Tennessee Valley Authority to build a statewide charging network. In addition to Volkswagen settlement funds, federal Highway Infrastructure Program funds are being leveraged to expand fast-charging capabilities along Tennessee's FHWA Alternative Fuel Corridors. Many states have grant programs that partially fund electric vehicle service equipment (EVSE) installation through partnerships with public and private stakeholders. The recently enacted Infrastructure Investment and Jobs Act sets aside \$5 billion in new funds for EV charging infrastructure projects. Kentucky is eligible for up to \$10 million in FY 2022.

How do grant programs for EV charging infrastructure work? What requirements must grantees abide by?

Grant programs typically pay up to 80 percent of eligible project costs while grantees supply a 20 percent match. In most states eligible applicants include businesses, public entities, and non-profit organizations. Some states — such as Colorado — in a bid to expand EVSE access at multi-unit dwellings are encouraging apartment complexes, condos, and homeowner associations to apply for funding. Eligible project costs typically include equipment, construction materials, onsite utility work, signage, labor, and networking fees. Purchasing or renting land for EVSE is generally not an eligible expense. Grantee requirements vary, but typically specify that charging stations should be publicly accessible, continuously operational, ADA compliant, well-lit, future-proofed, and provide access to restrooms and amenities. Site hosts must also agree to operate the charging station for a minimum amount of time (five (5) years is a common requirement). Some states require grantees to report charging station performance data (e.g., number of charging cycles, power consumption).

What charging options should be available at sites funded through grant programs?

Requirements vary by state. A rule of thumb is that charging stations should be able to recharge four (4) vehicles simultaneously using DCFCs. Charging units should provide CHAdeMO and CCS connectors (Level 2 charging units

must have a J1772-compatible connector). Looking at particular state requirements provides additional insight and offers a sense of best practices:

- Alabama requires that charging stations be equipped to simultaneously charge two (2) EVs at power levels or configurations at a minimum of 100 kW. Sites should be futureproofed by installing a conduit and electrical service box with adequate size and disconnect capacity so that additional cable can be run to meet increasing demand.
- Minnesota’s fast-charging corridor grants focus on installing 50 kW chargers and call for placing adequate electrical conduit to support future upgrades up to 350 kW.
- Oklahoma requires at 150 kW DCFC sites that a single vehicle receive 150 kW and that when multiple vehicles are connected each receives a minimum of 50 kW. At 50 kW DCFC sites, at least 50 kW must be provided to each vehicle. Futureproofing is required as well, as sites should have the capacity to support the installation of two additional 50 kW charging stations or a single higher-powered station of up to 350 kW.
- Stations installed during Phase I of the Nevada’s Electric Highway build out were required to have at least two (2) Level 2 chargers and one (1) DCFC. Stations installed during Phase 2 must have at least two chargers; both can be DCFCs.

How long does it take to plan, build, and commence operation of a public charging station?

For DCFCs, 12 – 15 months. For Level 2 stations, 6 – 9 months. Grant programs require that grantees (site hosts) plan the site, buy and install EVSE, and operate the facilities. Resolving issues related to power supply is time-consuming and grantees need to focus on these challenges as soon as possible.

Do states and grant programs encourage the use of renewable energy sources to power charging stations?

Yes, although this is not a requirement. A primary justification for transitioning from conventional vehicles to EVs is they reduce vehicle emissions and generate less air pollution (e.g., carbon dioxide, nitrogen oxides, fine particulate matter, volatile organic compounds). Exposure to emissions negatively impacts cardiac and respiratory health — this is of particular concern to communities of color, which endure disproportionate levels of exposure. If the energy used to charge EVs is generated from high-carbon sources, carbon dioxide emissions are similar to those generated ICE vehicles (Figure 2.1²).

² See [Navigating Operations for Transportation Electrification and Solar Charging: Steps and Lessons Learned in Montana Communities \(2021\)](#)

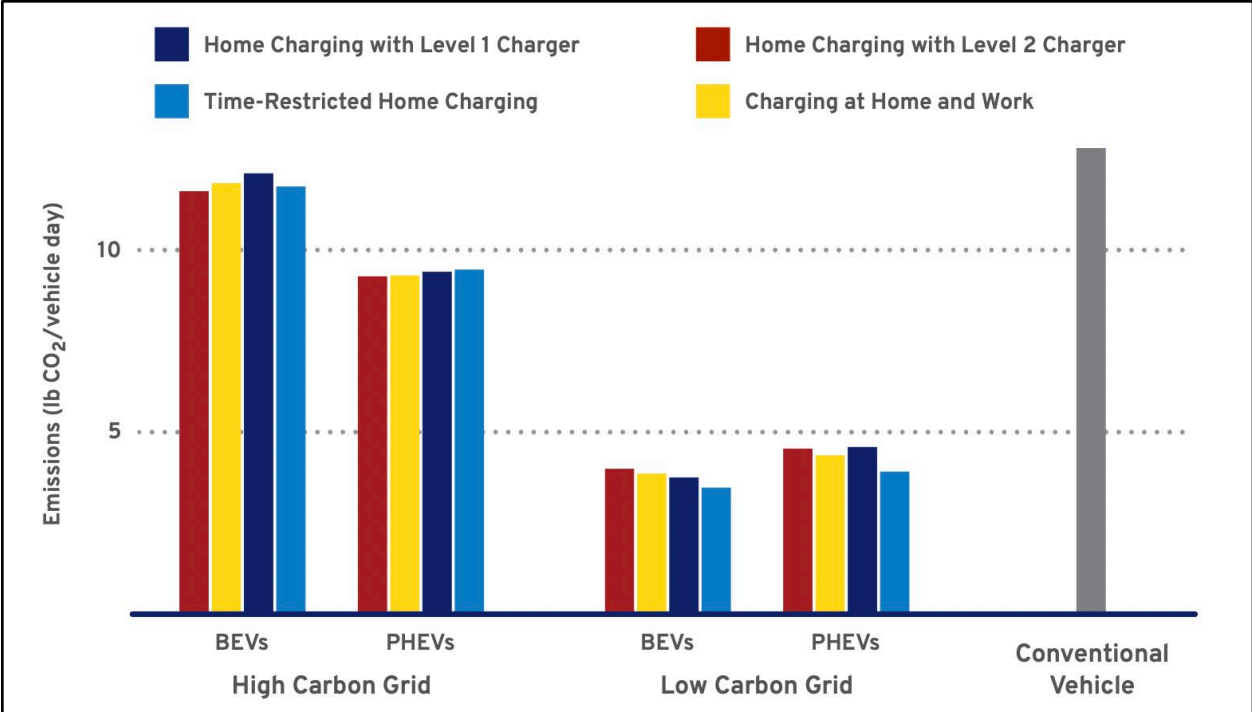


Figure 2.1 Carbon Dioxide Emissions from EVs Under Different Electricity Grid Configurations

How are corridors prioritized for EV infrastructure?

Most states and regional partnerships are focusing initially on highly trafficked corridors (e.g., interstates, US routes, major metropolitan areas), fast-charging networks, and growing the number of FHWA-designated Alternative Fuel Corridors (AFC). Highway segments receive an AFC *corridor-ready* designation if (a) charging stations are available at intervals of 50 miles or less and (b) charging stations are located no more than one (1) mile from interstate exits or highway intersections. Being designated corridor-ready indicates a corridor has enough charging facilities to support travel. Criteria have been updated for 2022 (previously the distance threshold was five (5) miles).

State governments are working with multiple stakeholders — industry groups, nonprofits, businesses, utilities — to identify destinations that warrant charging station installation and develop long-term plans to improve the electrical grid to support widespread charging. Multi-state partnerships coordinate regional corridor planning to facilitate seamless EV travel (e.g., Regional Electric Vehicle Plan for the West; Figure 2.2)

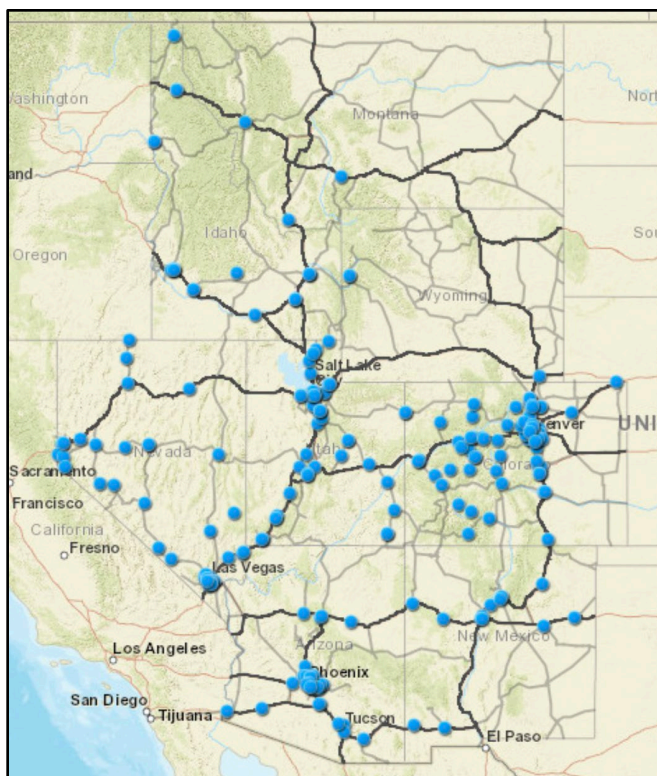


Figure 2.2 Corridor Map — Regional Electric Vehicle Plan for the West

Understanding electricity requirements is critical when siting new charging stations. DCFCs require the availability of three-phase power. Most stations with DCFCs can accommodate 2 – 4 vehicles at a time. However, as more plugs are added, electricity demands increase. For instance, a charging station able to support the simultaneous charging of 20 vehicles using DCFCs requires up to 3,000 kW — enough to power 1,500 homes (Ohio DOT 2020). Delivering sufficient electricity to power DCFCs can be particularly challenging in rural areas.

How do consumers pay to charge their EVs?

It varies. In some states charging station owners can charge customers on a per-kWh basis. Elsewhere, charges are based on the amount of time drivers spend at the station. An issue states have grappled with is whether charging station owners should be able to resell electricity without being designated as a public utility and being regulated as such. At least 30 states and Washington, D.C., enable non-utilities to resell electricity.³

2.2 Case Studies

Oklahoma — ChargeOK

Although Oklahoma lacks a formal EV roadmap, the Department of Environmental Quality administers the ChargeOK grant program, which is using \$3.1 million in Volkswagen settlement money to fund EVSE infrastructure. Projects must be located on one of two site types — (a) transportation corridors or (b) single point locations. Transportation corridors are classified as either Tier 1 or Tier 2 based on factors such as AADT. Figure 2.3 identifies routes prioritized in the 2020 RFP. Charging stations on transportation corridors must provide DCFCs. They must also be located a maximum of one mile from an entrance / exit ramp, be accessible to the public 24 hours per day throughout the year, and have adequate lighting during twilight and overnight hours. Site host agreements for these locations must stipulate the charging station will remain operational for at least five years. Other key requirements charging stations must abide by include the provision of ongoing services (e.g., customer service, parking, payment options, signage)

³ <https://electrek.co/2019/08/12/kwh-pricing-ev-drivers-miss-benefits/>

and particular equipment specifications (e.g., charging unit characteristics, making sites future proof by allowing for the installation of additional chargers). Single point location charging stations are intended to serve a community. These sites can offer either L2 chargers or DCFCs but have the same operational requirements as charging stations along transportation corridors.

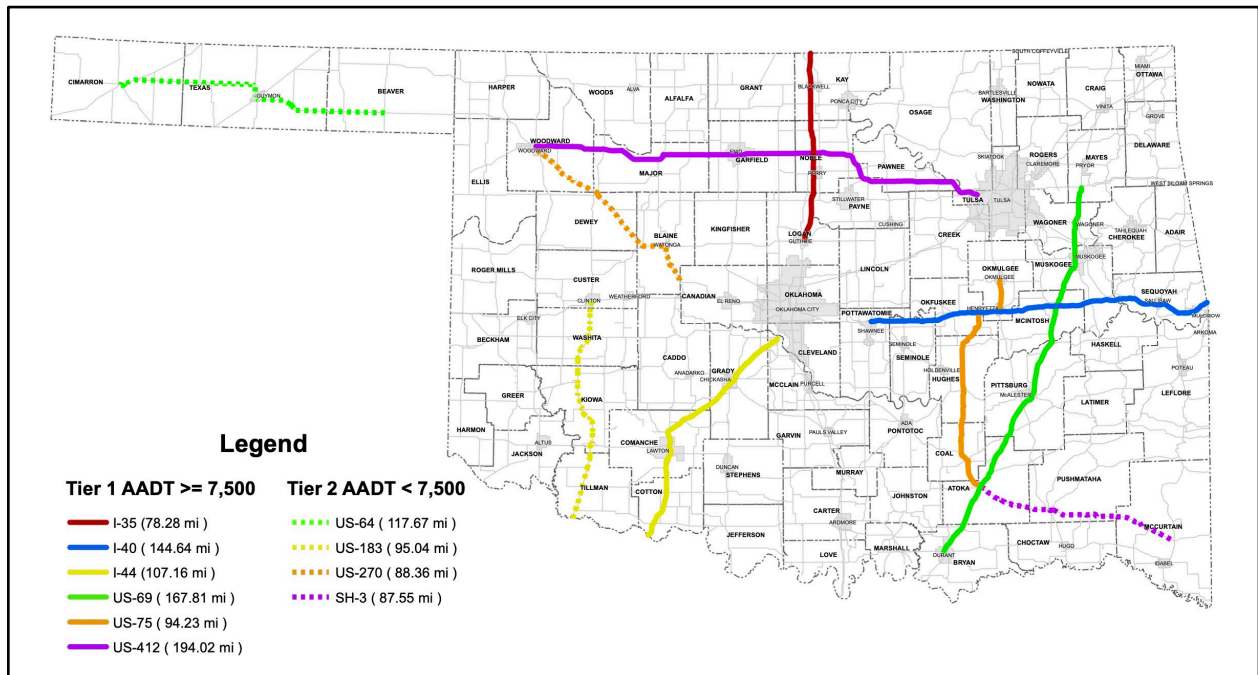


Figure 2.3 Oklahoma 2020 Priority Corridors

Eligible applicants include businesses; federal, state, local, and tribal government agencies, 501(c)(3) entities; air quality or transportation organizations; and MPOs or rural / regional transportation planning organizations. A scoring committee evaluates applications based on several criteria: project narrative; station location and access to amenities; cost-effectiveness; station design, requirements, and specifications; organizational capacity; project partnerships; innovation and sustainability; and level of detail and completeness. ChargeOK reimburses grantees up to 80 percent of eligible project costs, however, grantees are not reimbursed until a project is complete and it has been verified and approved. Project costs eligible for reimbursement include:

- DCFC and L2 equipment
- Installation costs directly associated with and needed for safe equipment operation
- Utility upgrades (e.g., transformers, extensions)
- Additional hard costs (e.g., concrete, conduit, signage, cable, wiring)
- Connecting equipment to electrical services
- Charging equipment warranties (minimum of 5 years)
- Equipment shipping
- Battery storage and solar photovoltaic panels

Expenses that will not be reimbursed by ChargeOK include the purchase or rental of real estate, administrative costs, and other capital costs. Grantees must operate charging stations for a minimum of five (5) years and report data on charging station usage and performance to the Department of Environmental Quality. Appendix A contains a sample RFP issued by ChargeOK.

Tennessee — Drive Electric Tennessee and TVA Partnership

The Drive Electric Tennessee roadmap is the product of input from over 30 stakeholders and puts forward a vision to have 200,000 EVs on the state’s highways by 2028. The document establishes short-, medium-, and longer-term goals in several areas, including availability of charging infrastructure, raising public awareness of EVs, improving vehicle availability, and helping local and state government officials, as well as companies, craft policies to support EV adoption. Arguably, a centerpiece of the state’s efforts is a partnership between the Tennessee Department of Environment and Conservation (TDEC) and the Tennessee Valley Authority (TVA) on the development of a statewide fast-charging network. Funded by money from the Volkswagen settlement, Highway Infrastructure Program, TVA, and project partners, building out the charging network is expected to cost \$20 million.

Eligible applicants include power companies served by the TVA and other utilities whose service territories include prioritized corridor gaps, however, at some point applicant eligibility may expand to include government entities, private companies, and nonprofits. Grantees are responsible for identifying host sites which follow site selection guidelines (Figure 2.4). Charging stations must have at least two DCFCs, and up to four (4) can be installed. Funding requests cannot exceed \$150,000 per charging unit. Grantees are also responsible for purchasing, installing, owning, operating, and maintaining fast-charging equipment for at least five (5) years. Once TVA approves an installation, the grantee receives a one-time credit on their monthly wholesale power bill.

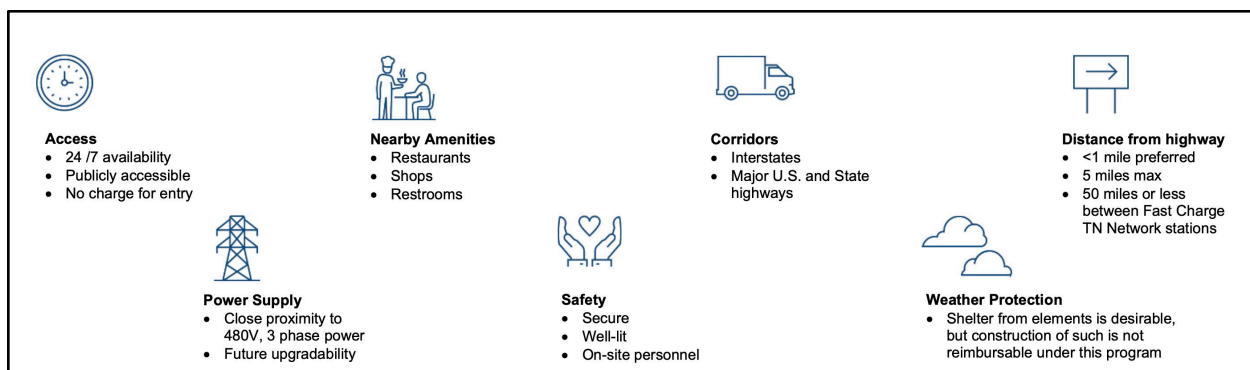


Figure 2.4 Site Selection Guidelines for TDEC/TVA Grant Program

Colorado — Charge Ahead Colorado

Established in 2012, Charge Ahead Colorado is a partnership between the Regional Air Quality Council (RAQC) and Colorado Energy Office (CEO) whose goals include promoting the installation of EV charging stations, increasing EV purchases, reducing air pollution and greenhouse gas emissions, collecting and analyzing charging station data, and supporting implementation of the *Colorado Electric Vehicle Plan*. RAQC primarily funds projects in the seven (7) counties that comprise the Denver metro area, while CEO funds projects in the rest of the state. Public, private, and nonprofit organizations are eligible to apply. The program does not prioritize applications based on organization type, but it does encourage workplaces and multi-unit dwellings to apply. The program pays for up to 80 percent of the costs associated with installing L2 or L3 charging stations. Maximum funding amounts vary by charging station type:

- L2 Fleet-Only Charging Stations — \$6,000
- L2 Multi-Port Station — \$9,000
- L3 Multiple Connection Standard Station — \$35,000

Like Oklahoma, applications are scored by an evaluation committee based several criteria, such as how well the proposed project meets program objectives, benefits to the public, expertise in developing a charging station plan, matching funds, project rationale and expected level of use, ability to collect performance data for five (5) years, operations and maintenance planning, and commitment to renewable energy and energy efficiency. Costs that are eligible for reimbursement include:

- Charging stations and related equipment
- Construction materials and construction labor costs associated equipment purchase and installation
- Utility and electric upgrades (e.g., new transformers, breaker boxes, electrical panels)
- Signage
- Permits
- Networking and subscription fees or activation fees

Grantees are required to operate charging stations for a minimum of five (5) years and report data on overall energy consumption as well as interval data at six-month intervals. Appendix B provides a sample grant application form.

Regional Electric Vehicle Plan for the West

A few regional consortiums⁴ have sprung up in the past five years to coordinate EV corridor development across multiple states. These voluntary agreements are non-binding and member states can exit without penalty. The Regional Electric Vehicle Plan for the West (REV West) is a partnership involving eight (8) states — Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming — that began in 2017 and which aims to build out an Intermountain West Electric Vehicle Corridor. Once complete, EVs would be able to travel throughout the region on major transportation corridors.

Here are the key goals and activities of the participating states:

- Educate consumers about the benefits of EVs and increase EV adoption
- Coordinate on EV charging station placement and design to ensure a consistent user experience and avoid network redundancies
- Promote the adoption of REV West voluntary minimum standards for EV charging stations
- Strengthen the coordination between member states’ energy, environment, and transportation agencies to identify regulatory barriers to EV charging station deployment and address infrastructure gaps
- Encourage automakers and dealerships to stock and market EVs
- Identify, respond to, and collaborate on funding opportunities to develop the REV West Plan
- Foster the rapid build out of fast-charging corridors through direct state investment, partnerships with utilities and local governments, and public-private partnerships
- Integrate EV charging station infrastructure into planning and development processes (e.g., building codes, metering policies, renewable energy projects)

Since the partnership was established, over 100 DCFC charging stations have been built by public and private sector stakeholders. Another 75 are in the planning stages (as of 2020). Over 1,250 highway miles have been designated as corridor-ready under the FHWA’s AFC program. With funding from the US Department of Energy, the partnership is working to overcome barriers to EV adoption and infrastructure deployment in remote and rural areas.

⁴ Other examples include the Regional Electric Vehicle Midwest Coalition (Illinois, Indiana, Michigan, Minnesota, Wisconsin), West Coast Electric Highway (British Columbia, Washington, Oregon, California), and the Northeast Electric Vehicle Network (11 states in the Northeast and Mid-Atlantic plus Washington, D.C.). The Electric Highway Coalition is a consortium of utilities working to build EV infrastructure from Texas to Maine.

Section 3 State-Level EV Registration Fees, Legislation, and Incentives

3.1 Vehicle Fees and Legislation

All vehicle owners pay Kentucky's 6 percent motor vehicle usage tax when they purchase or register their vehicle in the state for the first time. Drivers of conventional vehicles powered by ICEs also pay state and federal motor fuel taxes each time they fill up their tank. The federal gasoline tax, which finances the Federal Highway Trust Fund, is 18.3 cents per gallon and has remained unchanged since 1993. State fuel taxes are critical for ensuring states have a dependable revenue source to fund transportation projects. Kentucky's motor fuel tax is calculated dynamically pursuant to KRS 138.228 and is currently 26 cents per gallon. KYTC's chief source of revenue is the Road Fund, whose revenues in turn come from motor fuels tax, the motor vehicle usage tax, license and privilege taxes, interest income, and miscellaneous departmental fees, permits, and sales.⁵

With the transition to EVs, states need shore up the revenue sources they rely on to pay for transportation projects. Why? BEV owners pay no motor fuel taxes, while owners of HEVs and PHEVs pay less in fuel taxes as these vehicles are partially reliant on electric motors. In Kentucky, the motor fuels tax has historically been the largest source of Road Fund revenue. It generally accounts for at least half of all Road Fund revenues. In FY 2021, motor fuel taxes accounted for 46 percent of Road Fund revenues. Since FY 2008, the average contribution of the motor fuels tax to the Road Fund has been 52 percent (Figure 3.1).

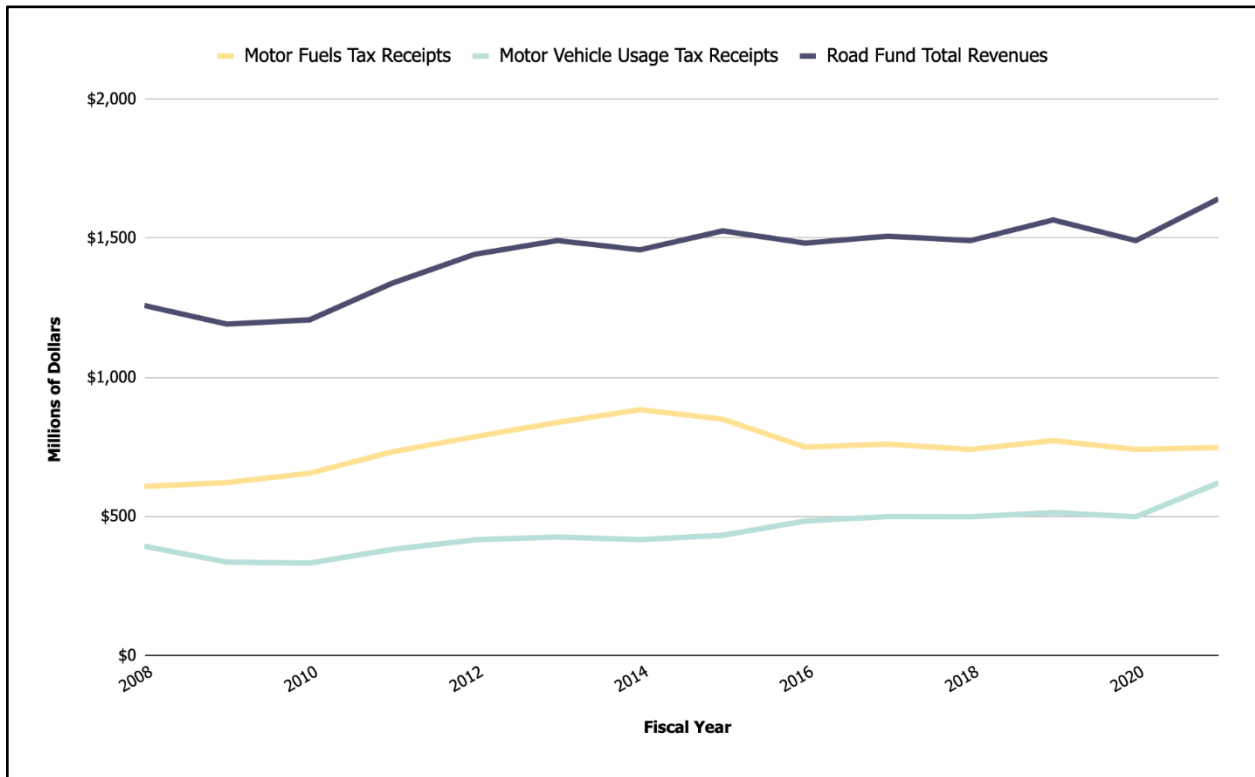


Figure 3.1 Trends in Tax and Road Fund Revenues (2008 – 2021)

To ensure all roadway users pay their fair share, 30 states have introduced fees for BEVs and hybrids. Fees are typically levied annually — often as an additional registration fee. BEV fees range between \$50 and \$227 (average = \$127), while hybrid fees range between \$33 and \$200 (average = \$59). A few states have developed fee structures that account for vehicle weight and are indexed to inflation. Most states have not yet introduced fees which target

⁵ <https://osbd.ky.gov/Publications/Documents/Budget%20Documents/2018-2020%20Budget%20of%20the%20Commonwealth/1820%20BOC%20Budget%20in%20Brief%20-%20FINAL.pdf>

commercial BEVs. Georgia and Oklahoma are exceptions. In Georgia the fee is \$320, while in Oklahoma vehicles over 26,000 pounds are charged a \$2,250 fee.

The allocation of registration fees varies based on the fee-establishing legislation. In most states, revenues pay for infrastructure. Sometimes this extends to EV infrastructure (e.g., charging stations). Appendix C lists fees for each state. Table 3.1 provides BEV and hybrid registration fees for Kentucky’s neighboring states.

Table 3.1 BEV and Hybrid Registration Fees (Kentucky’s Neighboring States)

State	BEV Fee	Hybrid Vehicle Fee
Ohio	\$100	\$200
West Virginia	\$200	\$100
Virginia	\$64	\$64
Tennessee	\$100	—
Missouri	\$75	\$37.50 (PHEVs)
Illinois	\$100	—
Indiana	\$150	\$50

Another method of recouping lost fuel tax revenue is a road usage charge (RUC). Two states that currently offer drivers this option are Oregon and Utah. Looking at the specifics of Utah’s program demonstrates how an RUC works. The program is open to EVs, PHEVs, and gasoline hybrid vehicles. Drivers can pay a flat registration fee or opt into the RUC. Vehicles enrolled in the RUC pay 1.52 cents per mile traveled. However, they never pay more than the flat registration fee. Whether a driver selects the RUC depends on their comfort with the technology, which tracks their mileage, and if they think it makes financial sense to do so. Table 3.2 indicates the break-even mileage for each type of vehicle. If driver opts into the RUC and exceeds this mileage amount, they pay the same amount as drivers who choose the flat registration fee.

Table 3.2 Break-Even Mileage for Utah's Road Usage Charge

Alternative Fuel Vehicle Type	Flat Registration Fee	RUC — Break-Even Mileage
Electric	\$120	8,092
Plug-In Hybrid	\$52	3,421
Gas Hybrid	\$20	1,316

Our review of state-level EV legislation proposed in 2021 uncovered several notable trends. Lawmakers in several states without EV fees introduced legislation to impose them, while modifications to fee structures were proposed elsewhere. Other topics addressed by proposed bills include funding charging station infrastructure, taxing electricity used to power vehicles, and establishing commissions to develop EV infrastructure plans. Many of the proposed bills attempt to define what constitutes EV and/or hybrid vehicles. Appendix D summarizes laws proposed in 2021. The National Conference of State Legislators also provides detailed information on EV fees, fee distribution, and related information.⁶ This information is updated routinely.

3.2 EV Incentives at the Federal and State Levels

A federal tax credit of up to \$7,500 is available when consumers purchase an EV.⁷ The credit is \$2,500 for vehicles with a battery capacity of at least 5 kWh. It increases by \$417 for each additional kWh of battery capacity. Credits are allocated by vehicle manufacturer and begin to phase out when 200,000 qualifying vehicles are sold. Several automakers (e.g., GM, Tesla) have exhausted their available credits. Additionally, a tax credit for installing charging station equipment was available for installations completed by December 31, 2021. Owners could claim a tax credit valued at 30% of the total cost of equipment installation. The total credit could not exceed \$30,000. Although the

⁶ <https://www.ncsl.org/research/energy/new-fees-on-hybrid-and-electric-vehicles.aspx>

⁷ <https://www.irs.gov/businesses/plug-in-electric-vehicle-credit-irc-30-and-irc-30d>.

proposed Build Back Better legislation would further incentive EV purchases, because the law seems unlikely to pass it is not discussed here.

A growing number of states, electric utility companies, and other entities incentivize the purchase of EV and EVSE. Appendix E summarizes available state-level incentives. Incentives take different forms: vehicle rebates, tax credits, reduced electricity rates for charging during off-peak periods, assistance installing EVSE. Tax credits and rebates, in some states, are only available to consumers meeting specific income requirements. Many states also provide grants to facilitate EVSE purchase and installation. An example of a non-financial incentive is avoiding emissions inspections requirements. The National Conference of State Legislators maintains an up-to-date catalogue of incentives.⁸

3.3 Key Takeaways

- Many states have embraced annual fees on BEVs and hybrids to make up for lost fuel tax revenues. BEV fees in Kentucky's neighboring states range between \$64 and \$200; for hybrids the range is \$37.50 – \$200. Another potential option is an RUC, which levies a fee for each mile driven. Kentucky will benefit from introducing some type of fee to ensure Road Fund revenues are not compromised.
- Federal tax credits for EVs are being depleted rapidly. While the future of federal incentives is unclear, states, power companies, and other entities offer incentives like tax credits and rebates.

⁸ <https://www.ncsl.org/research/energy/state-electric-vehicle-incentives-state-chart.aspx>.

Section 4 Projecting BEV Registrations and their Impact on Fuel Tax BEV Revenues

4.1 BEV Registrations and Projections

The numerical growth in Kentucky BEV registrations proceeded gradually but slowly between 2016 and 2021 (Table 4.1). In 2016, 391 BEVs were registered in the state; this number jumped to 3,621 by the end of last year. Focusing on the percentage change from year to year paints a slightly more dramatic picture. In most years, BEV registrations grew between 40 percent and 60 percent.

Table 4.1 Kentucky BEV Registrations (2016 – 2021)

Year	Registrations	Percentage Change
2016	391	—
2017	563	43.99%
2018	898	59.50%
2019	1,497	66.70%
2020	2,273	51.84%
2021	3,621	59.30%

Projecting future growth in BEV registrations is challenging. Despite automakers making a more aggressive pitch to consumers, obstacles to widespread BEV adoption remain. Federal tax credits are no longer available on several popular models (e.g., Tesla Model 3, Chevy Bolt) due to manufacturers exceeding sales thresholds at which the credits cut off. Although battery costs are trending downward (currently in the \$130 per kWh range), BEVs remain pricey, with most models exceeding \$35,000. Other factors that deter consumers from BEVs include limited driving ranges, lack of dealer inventory, concerns about maintenance and service, and the lack of a robust public network of L3 chargers. The latter contributes to range anxiety and makes planning extended road trips difficult.

We developed projections for BEV registrations through 2030 under three scenarios. Each scenario’s assumptions are listed in Table 4.2. All scenarios assume at least 30 percent annual growth in BEV registrations. Setting baseline growth at 50 percent for the moderate and aggressive scenarios is reasonable based on patterns observed to date. Given the relatively low registration numbers, it is likely that a modestly sized cohort of early adopters will continue to drive growth.

Table 4.2 BEV Forecast Scenarios

Adoption Scenario	Assumption
Conservative	<ul style="list-style-type: none"> 30% annual growth in registrations
Moderate	<ul style="list-style-type: none"> 50% annual growth in registrations through 2025 30% annual growth in registrations thereafter
Aggressive	<ul style="list-style-type: none"> 50% annual growth in registrations

Figure 4.1 illustrates projected growth for each scenario. Under the aggressive scenario, BEV registrations would reach 140,000 by 2030. Under the moderate and conservative scenarios registrations are 82,000 and 39,000, respectively. Are the numbers plausible? By way of comparison, the Drive Electric Tennessee Roadmap published in 2019 contains BEV population forecasts for each state in the Southeast. This document projected Kentucky to have a BEV population in 2028 of between 25,000 and 30,000, which aligns with our conservative estimate. Of course, uncertainty remains over consumer behavior and other factors that influence adoption rates — macroeconomic forces, commodity prices (e.g., lithium), supply chain constraints, and whether automakers can achieve their stated production benchmarks.

4.2 The Impact of BEVs on Fuel Tax BEV Revenues

How much fuel tax revenues the state collects directly impacts the ability of KYTC and local governments to deliver transportation projects. Although the pace of BEV adoption remains uncertain, we know that because Kentucky does

not require BEV owners to pay a yearly fee to make up for lost fuel tax revenues, the state’s capacity to build and maintain critical infrastructure diminishes slightly with each additional BEV that replaces an ICE vehicle.

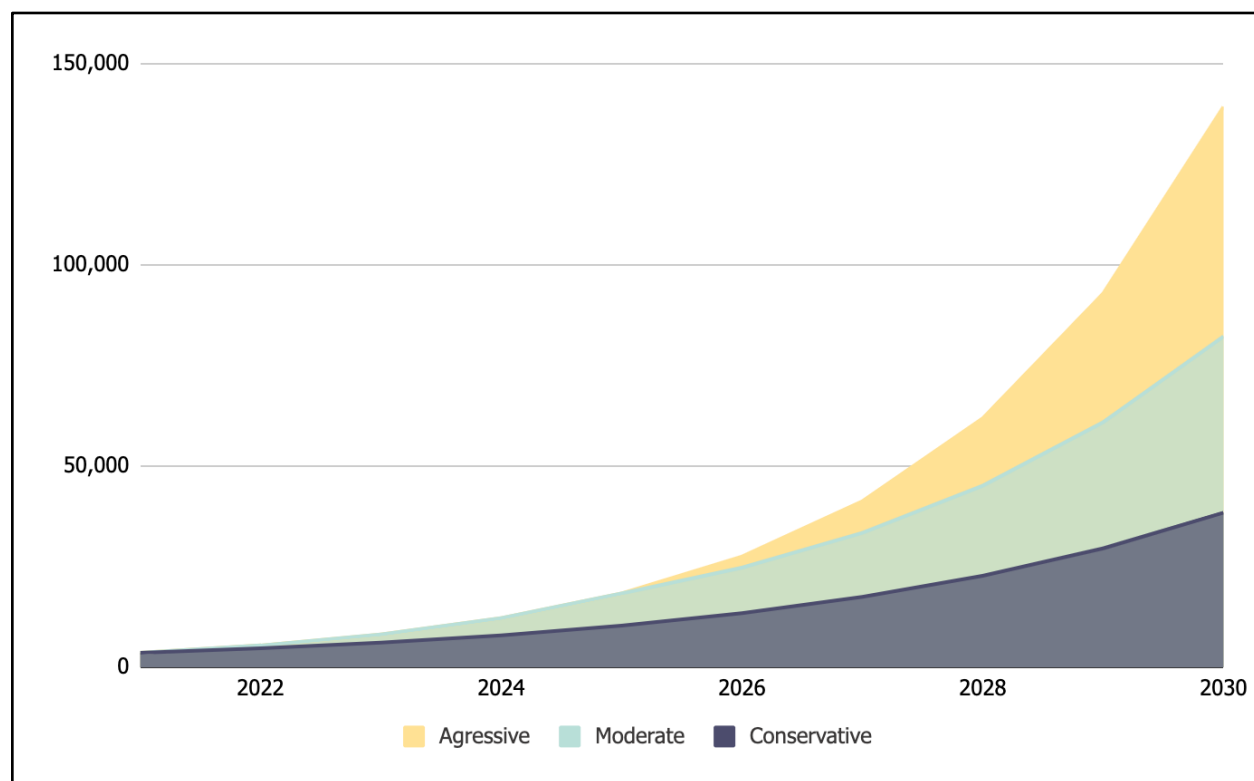


Figure 4.1 Projected BEV Registrations in Kentucky (2022 – 2030)

To get a handle on how much in fuel tax revenues the state is losing — and will sacrifice in the future without fees being imposed on BEVs — we developed simple forecasts. Several assumptions underpin our analysis. First, that BEVs have and will replace conventional vehicles in proportion to mix of new vehicles sold (Table 4.3). Based on 2021 data, CUVs and SUVs made up 55 percent of new vehicle sales. In our forecasts, if 1,000 new BEVs are registered we assume that 550 of those replace CUVs and SUVs.

Table 4.3 Breakdown of New Vehicle Sales

Vehicle Type	Representative Model	MPG	Percentage of New Vehicle Sales
CUV / SUV	Ford Escape	30	55%
Mid-Sized Sedan	Toyota Camry	32	20%
Pickup Truck	Ford F-150	20	20%
Work Van	Ford Transit Connect	25	5%

Next, we assume that each person drives 15,000 miles per year. Third, we set the fuel tax rate at 26 cents per gallon. Based on these assumptions, we estimated how much fuel tax revenues are lost for each vehicle replaced by a BEV and for each vehicle segment. Losses for each segment were summed to determine overall losses. To understand how the calculations work, take the example of a Ford Escape which travels 15,000 miles per year and gets 30 MPG. In one year, the owner will pay \$130 in state fuel taxes. Similar logic applies to the other vehicle types.

Estimating the amount of fuel tax revenues lost each year is then a simple exercise in multiplication and addition. At the end of 2021, there were 3,621 BEVs registered in Kentucky. Table 4.4 lists the number of each vehicle type replaced by BEVs and, under that assumption, the amount of fuel tax revenues the state missed out on — over \$500,000. Applying this method, we estimate Kentucky has lost over \$1.3 million in fuel tax revenues since 2016.

This may represent an overestimate for several reasons. Early adopters have tended to replace more fuel-efficient vehicles. So, most purchasers would not be getting a BEV in lieu of an F-150 or comparable truck. This will change, however, with new electric trucks being launched by Ford, GM, and other manufacturers. Second, we have used a simplified breakdown of the market structure for the sake of computational ease. That is, different segments include many types of vehicles with varying fuel efficiencies. Accounting for these factors could yield more precise estimates, but perhaps not more accurate estimates without actual state-level sales data. Third, using a flat average of 15,000 miles driven per year may overstate the number of miles driven by early adopters. But we lack the data to develop a more informed estimate.

Table 4.4 2021 Fuel Tax BEV Revenue Losses

Vehicle Type	Number Replaced By BEVs	Lost Fuel Tax Revenue
Ford Escape	1,992	\$258,902
Toyota Camry	724	\$88,262
Ford F-150	724	\$141,219
Ford Transit Connect	181	\$28,244
Sum	3,621	\$516,626

Figure 4.2 illustrates projected fuel tax revenue losses for nine levels of BEV adoption, ranging from 100,000 vehicles to 3.6 million, which is roughly the number of vehicles currently registered in Kentucky. Total losses are \$14.2 million for 100,000 vehicles. From there, it is a straight line upward as a fully electrified vehicle fleet — in the absence of an annual fee — generates \$0 in fuel tax revenue. Appendix F provides detailed breakdowns for each scenario.

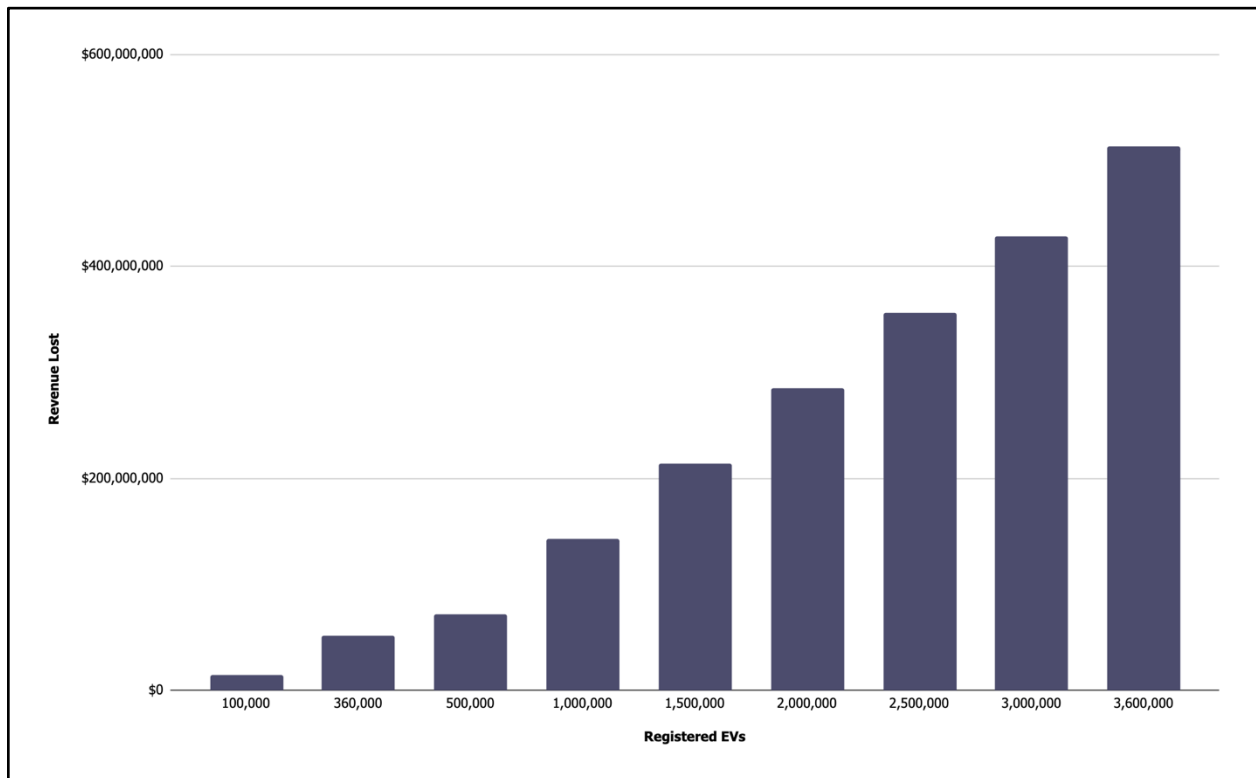


Figure 4.2 Long-Term Projections of Fuel Tax Losses

A couple other caveats should be noted. First, we do not account for miles traveled out of state by vehicles that are registered in Kentucky. Likewise, we do not factor in miles driven by vehicles registered in other jurisdictions which are passing through the state. The latter would require information on how many miles are traveled by out-of-state vehicles each year as well as projections of BEV adoption rates in those states and the number of miles BEVs would

travel in place of conventional vehicles. Second, we did not calculate revenues lost due to plug-in hybrid vehicles. While KYTC has data on the number of hybrids registered in the state, it does not distinguish between conventional hybrids and plug-in hybrids.

4.3 Replacing Lost Fuel Tax Revenues

As Chapter 3 showed, many states have introduced annual registration fees for EVs to offset lost fuel tax revenues. Failure to impose a registration fee will make it increasingly difficult for Kentucky and its communities to deliver on their responsibility to build and maintain safe transportation systems that foster mobility and economic growth. Charging a \$150 annual registration fee for non-commercial BEVs is sufficient to compensate for fuel tax losses. Once this fee is in place, it will be critical to explore registration fees for commercial BEVs (e.g., medium- and heavy-duty trucks), although due to limitations on battery charging they will likely be slower to fully penetrate the market.

4.4 Key Takeaways

- BEV registrations in Kentucky are on an upward trend. Absent unforeseen events, the momentum behind BEVs is unlikely to slow. By 2030, our rough estimates suggest between 38,000 and 140,000 BEVs will be registered in the state. Given the many uncertainties involved in consumer purchasing habits and industry dynamics, it is possible registrations will exceed the top range of our estimates.
- As BEVs (and PHEVs) replace conventional vehicles powered by ICEs, fuel tax revenues in Kentucky will decline. Since 2016 the state has likely missed out on over \$1.3 million in revenue. This problem will deepen over time unless an annual registration fee is imposed on BEVs.
- Charging an annual registration fee of \$150 for non-commercial BEVs is enough to make up for lost revenues.

Section 5 EV Charging Infrastructure in Kentucky and Future Needs

One of the most commonly cited statistics in EV-focused reports and publications is that between 80 and 90 percent of all charging is done at home. Charging EVs is a straightforward task if an owner lives in a single-family home. But residents of apartments and other multi-unit dwellings face a more daunting challenge and in most cases lack access to a convenient charging solution. For these people, owning an EV would demand routine trips to a nearby charging station to add range. A robust public network of non-proprietary DCFC charging stations is critical for this population of EV owners. Even vehicle owners who do most of their charging at home need access to public stations. These are necessary to support long-distance trips. As of January 2022, Kentucky had 285 public L2 chargers and 24 public DCFCs. Tesla Superchargers (L3) far outnumber public DCFCs, with 82 throughout the state. Charging options are most ubiquitous in Louisville, Lexington, northern Kentucky, and along interstates and parkways (Figure 5.1). In many parts of the state charging options are limited.

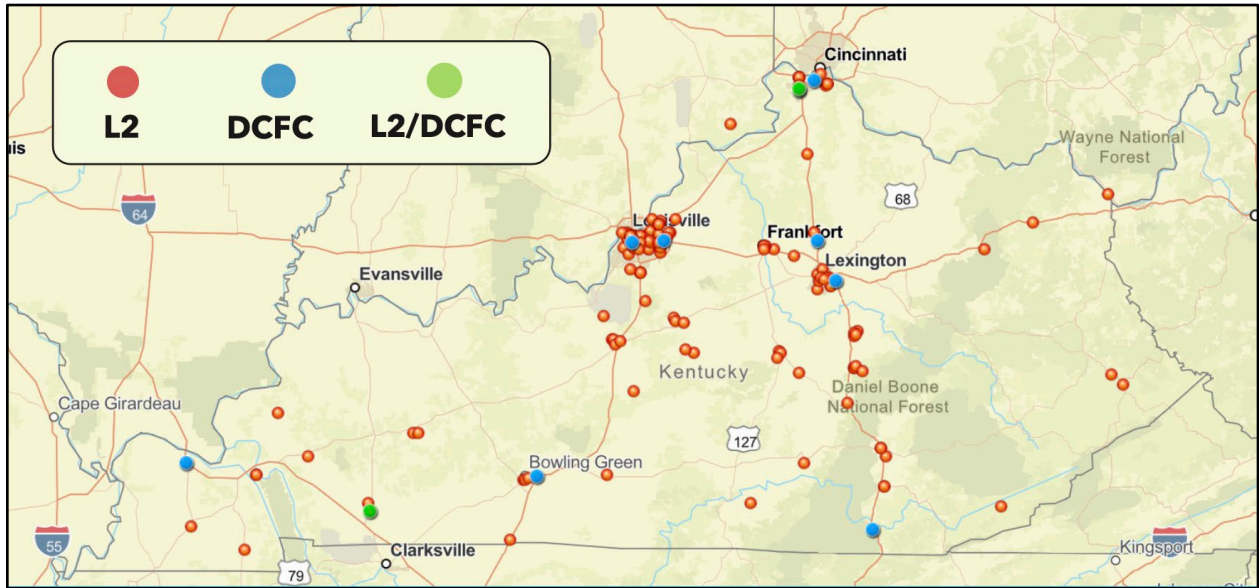


Figure 5.1 Distribution of Kentucky's Charging Stations

To understand the distribution of public L2 and DCFC charging stations in relation to EV owners, we used a GIS-based network analysis. Leveraging EV registration data, we calculated the distance between the registration address and nearest charging station. We excluded Tesla Superchargers and Destination Chargers from analysis, as they are proprietary, and performed separate analyses for non-Tesla EVs and Teslas — approximately 72 percent of EVs registered in Kentucky are Teslas. Statewide, about 74 percent of Tesla owners and 73 percent of non-Tesla owners live within 5 miles of a L2 charger or DCFC. At the 10-mile threshold, this increases to 89 percent and 86 percent, respectively (Table 5.1)

Looking only at DCFC charger access, just 27 percent of non-Tesla owners live within 5 miles of the nearest station, while for Teslas this figure is 41 percent. Moving out to the 10-mile range, these percentages increase to 62 percent and 70 percent, respectively (Table 5.2). Which indicates non-Tesla EV owners may encounter greater difficulties recharging vehicles outside their homes.

Table 5.1 Combined L2 and DCFC Charger Accessibility

Distance to Nearest L2 / DCFC Station	Percentage of Non-Tesla EVs	Percentage of Tesla EVs
< 5 miles	72.95%	74.19%
< 10 miles	86.32%	89.23%
< 20 miles	93.48%	95.45%
< 40 miles	97.69%	98.82%

Table 5.2 DCFC Charging Accessibility

Distance to Nearest DCFC Station	Percentage of Non-Tesla EVs	Percentage of Tesla EVs
< 5 miles	27.16%	41.22%
< 10 miles	62.42%	70.16%
< 20 miles	75.37%	83.09%
< 40 miles	86.42%	94.11%

How many publicly accessible chargers will Kentucky need in the short- and medium-term? It depends on adoption levels. We used the US Department of Energy’s EVI-Pro Lite tool to develop estimates for three scenarios (Table 5.3). Our calculations assume a mix of BEVs and PHEVs and that 90 percent of drivers can charge their vehicles at home. In purely numerical terms, the state’s existing charging infrastructure — assuming that all charging stations are operational — *may be* sufficient to accommodate the current EV fleet. However, several caveats are in order. First, it is not uncommon for non-proprietary stations to go out of service. Although companies try to repair chargers as quickly as possible, when there is already a limited number of chargers available a 1–2-day outage can result in serious inconveniences for drivers. Second, drivers can lack visibility of whether a non-proprietary charger is working, if it is currently being used, and how long a vehicle has been charging for. Tesla provides this information, but the quality of data available from other charging networks varies. Paying to charge at non-proprietary stations can also be cumbersome as drivers cannot simply pay with a credit card, but generally must create accounts and download an app or use a payment card exclusive to the charging network. All these issues can present obstacles to charging, thus complicating our ability to say definitively that Kentucky’s charging network can support both EVs registered in the state as well as out-of-state EVs which may need to charge.

Anticipated growth in EV demand requires expanding public charging infrastructure. Under the new Infrastructure Investment and Jobs Act, Kentucky can access up to \$69.45 million in federal funds over the next 5 years to finance EV charging infrastructure. Taking full advantage of these funds will help Kentucky build a denser, more spatially distributed charging network. A more robust charging network is critical for alleviating concerns over range anxiety and giving motorists access to reliable charging options as they travel throughout the state.

Table 5.3 Kentucky Charging Station Needs

Charging Station	3,600 Registered EVs	10,000 Registered EVs	360,000 Registered EVs
Workplace L2 Chargers	98	272	9,065
Public L2 Chargers	78	215	6,097
Public DC Fast Chargers	38	105	2,379

5.1 Key Takeaways

- The number of charging stations and chargers in Kentucky is trending upward, but growth must accelerate to keep pace with the expected uptick in EV ownership. It will be important to distribute charging options more evenly throughout the state to ensure sufficient levels of access.
- The combined accessibility of L2 charging stations and DCFCs appears reasonable for most current EV owners, with 86 percent of non-Tesla owners and 89 percent of Tesla owners being able to travel 10 miles or less to the nearest non-proprietary charging station. But if stations go down for an extended period or are often congested, drivers may become frustrated with their options.

Selected Resources

In lieu of a traditional bibliography, the table below links to resources which informed development of this report. We focused on planning documents and roadmaps issued since 2019. Consulting the resources will give readers a sense of what states and other jurisdictions are focusing on in formal planning efforts with respect to EVs.

Jurisdiction	Resource
Alabama	<ul style="list-style-type: none"> Alabama Electric Vehicle Infrastructure Plan (2022)
Arizona	<ul style="list-style-type: none"> Arizona Statewide Transportation Electrification Plan: Phase II (2021) Arizona Interstate 10 Alternative Fuels Corridor Deployment Plan (2020)
California	<ul style="list-style-type: none"> California Electric Vehicle Infrastructure Deployment Assessment: Senate Bill 1000 Report (2020) Clean Transportation Program 2021 – 2023 Investment Plan Update for the Clean Transportation Program (2021)
Colorado	<ul style="list-style-type: none"> Colorado Electric Vehicle Plan (2020) EV Fast-Charging Corridors
Connecticut	<ul style="list-style-type: none"> Electric Vehicle Roadmap for Connecticut (2020)
Florida	<ul style="list-style-type: none"> Florida Electric Vehicle Roadmap (2020) EV Infrastructure Master Plan (2021)
Iowa	<ul style="list-style-type: none"> Charging Forward: Iowa’s Opportunities for Electric Vehicle Infrastructure Support (2019) Eastern Iowa Electric Vehicle Readiness Plan (2021)
Minnesota	<ul style="list-style-type: none"> Accelerating Electric Vehicle Adoption: A Vision for Minnesota (2019) Guidance: use, Site Design, and Operations of Electric Vehicle (EV) Chargers at MnDOT Facilities (2021)
Montana	<ul style="list-style-type: none"> Electric Vehicles and Montana Highways (2021) Navigating Operations for Transportation Electrification and Solar Charging: Steps and Lessons Learned in Montana Communities (2021)
Nevada	<ul style="list-style-type: none"> Nevada Electric Highway
New York	<ul style="list-style-type: none"> Electrifying New York: An Electric Vehicle Vision Plan for New York City (2021) Best Practices Guides and Cases (multiple available documents)
North Carolina	<ul style="list-style-type: none"> North Carolina ZEV Plan: A Strategic Plan for Accelerating Electric Vehicle Adoption in North Carolina (2019)
Ohio	<ul style="list-style-type: none"> Electric Vehicle Charging Study (2020)
Oklahoma	<ul style="list-style-type: none"> ChargeOK — Oklahoma Electric Vehicle Charging Program
Pennsylvania	<ul style="list-style-type: none"> Pennsylvania Electric Vehicle Roadmap (2021) Drive Electric PA Coalition
REV West	<ul style="list-style-type: none"> REV West Progress Report (2020)
SETRI	<ul style="list-style-type: none"> Southeast Electric Transportation Regional Initiative
South Carolina	<ul style="list-style-type: none"> Electric Vehicle Stakeholder Initiative
Tennessee	<ul style="list-style-type: none"> A Roadmap for Electric Vehicles in Tennessee (2019) Drive Electric Tennessee
Utah	<ul style="list-style-type: none"> State of Utah Electric Vehicle Master Plan (2020)
Western Governors’ Association	<ul style="list-style-type: none"> Electric Vehicles Roadmap Initiative (2021)

* All links are functional as of 3.8.2021

Appendix A ChargeOK Request for Proposals



Oklahoma Electric Vehicle Charging Grant Program

Funded by the Volkswagen Settlement Environmental Mitigation Trust

Grant Solicitation

FY 2021



Important Information

Project Purpose – The ChargeOK Grant Program, a financial incentive program, provides an opportunity to build out Oklahoma’s light-duty electric vehicle (EV) charging network. Through this program, the State of Oklahoma seeks to build a strategic network of electric charging stations to increase the use of EVs in place of gas-powered cars to mitigate nitrogen oxides, decrease particular matter and greenhouse gas emissions, and reduce EV range anxiety across Oklahoma.

Project Funding – Under the ChargeOK Grant Program Round 2 (FY2021), there is approximately \$1.1 million available for reimbursement grants from the Oklahoma Department of Environmental Quality (DEQ) funded by the Volkswagen Settlement Environmental Mitigation Trust.

Application Submission Period – The ChargeOK Grant Program application submission period will begin upon public notice of availability and will close 63-days later. All applications must be submitted by 5:00 PM on September 8, 2020. DEQ has assembled a committee to review and score applications.

Project Period – The project period will begin upon a Notice to Proceed and end 12 months later.

Submission Format – The application is available online at www.deq.ok.gov/air-quality-division/volkswagen-settlement/chargeok-oklahoma-electric-vehicle-charging-program. Completed application packets may be submitted by email to VWSettlement@deq.ok.gov. If application packet is 10 megabytes or larger, applicants must use postal service, addressed to the following:

Oklahoma Department of Environmental Quality
Air Quality Division
ATT: ChargeOK Grant Program
707 N. Robinson
P.O. Box 1677
Oklahoma City, OK 73101-1677

For questions on the application, RFP, or associated concerns, contact:
VWSettlement@deq.ok.gov
(405) 702-4100

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I. Overview and Background

The DEQ requests proposals from eligible applicants to install EV charging stations throughout Oklahoma. The ChargeOK Grant Program is a financial incentive program created pursuant to Oklahoma's \$20.9 million allocation from the Environmental Mitigation Trust Agreement for State Beneficiaries (Trust, or State Mitigation Trust), resulting from a national emissions violation settlement.¹ With guidance from the Office of the Secretary of Energy & Environment (OSEE), DEQ, as the lead agency, will administer the program and manage requirements required by the Trust Agreement.

A maximum of 15 percent of Oklahoma's State Mitigation Trust allocation, approximately \$3.1 million, will be used to fund light-duty zero emission vehicle supply equipment (ZEVSE) projects. \$2.0 million was used to incentivize development of ZEVSE projects in Oklahoma last year. We have \$1,114,353 remaining to award for this solicitation.

II. Funding Information

A. Available Funding

DEQ anticipates awarding a total of approximately \$1,114,353 on a competitive basis for the purchase, installation, and operation of publicly accessible charging stations proposed by the applicants. Each grant award will be for a single charging site located within 10 miles of one of the designated Locations listed in this Solicitation. See III. Eligible Project Locations for more information.

DEQ will fund a maximum of 80% of eligible project costs. Applicants may submit one application with single or multiple projects – as long as each project is clearly defined. DEQ may award multiple grants to an individual applicant for multiple projects within the same or different areas. DEQ may also award grants to more than one applicant within an area.

B. Funding Type

The ChargeOK Grant Program is funded as a reimbursement grant program. Grant payments are disbursed as reimbursements after the work is completed, verified, and approved. Verification will occur through a site

¹ A \$2.866 billion environmental mitigation trust (State Mitigation Trust) was established by the Environmental Mitigation Trust Agreement for State Beneficiaries filed by the United States (U.S.) Department of Justice, with the U.S. District Court for the Northern District of California on October 2, 2017, in the case, *In Re: Volkswagen "Clean Diesel" Marketing, Sales Practices, and Products Liability Litigation* (No. 3:15-md-02672-CRB (N.D. Cal.), MDL No. 2672). Additional information about the case, settlement, and its' programs are available on Oklahoma's Department of Environmental Quality website.

visit and photograph by a state official, or by obtaining evidence of public use, and photographs of the site from the internet. Under a reimbursement grant, the grantee will pay all project costs and submit an itemized list providing the cost of all goods and services used in the construction of the site and a notarized affidavit testifying that the list is true, copies of project invoices which have a reimburseable amount of equal to or greater than \$2,500, along with an invoice to DEQ. Reimbursement may take up to 45 days if there are no issues with the reimbursement package. Detailed invoice requirements and submission instructions will be provided to successful applicants.

C. Project Period

The project period for the ChargeOK Grant Program will begin upon execution of a Memorandum of Agreement (MOA) and a Notice to Proceed and end 12 months later. Extension requests will be evaluated on a case-by-case basis by DEQ.

Note: Any applicant who begins a project and incurs costs before receiving a fully executed MOA and Notice to Proceed (prior to the beginning of the project period) does so with the understanding that the costs may not be reimbursed.

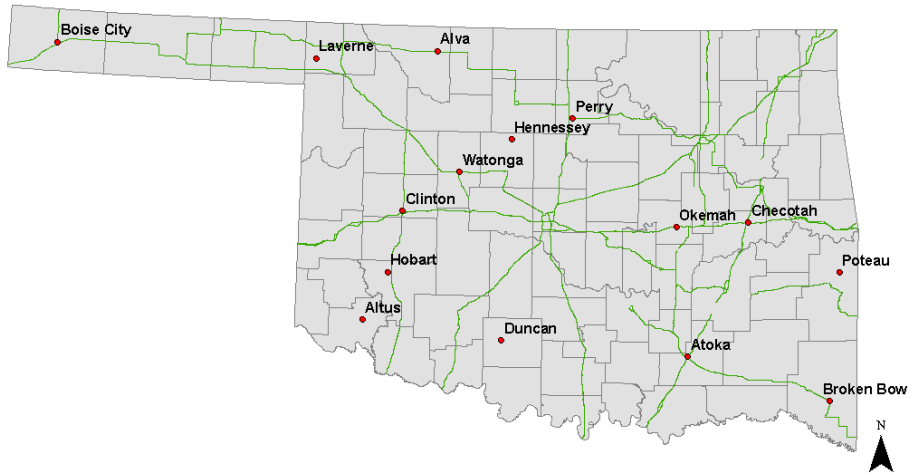
III. Eligible EV Charging Site Categories

With consideration for existing and planned investments of electric charging stations within Oklahoma, the ChargeOK Grant Program offers incentives for additional projects based on site locations chosen to fill in the EV charging network in Oklahoma. The locations chosen are listed below. Only projects located within 10 miles of the listed locations will be considered for the grant.

- | | |
|---------------|--------------|
| 1. Altus | 9. Hennessey |
| 2. Alva | 10. Hobart |
| 3. Atoka | 11. Laverne |
| 4. Boise City | 12. Okemah |
| 5. Broken Bow | 13. Perry |
| 6. Checotah | 14. Poteau |
| 7. Clinton | 15. Watonga |
| 8. Duncan | |



ChargeOK FY2021 Electric Charging Locations



We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.

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such as a letter or service notice, indicating power supply availability for the proposed project.

- c. **Register:** Upon completion of the project, applicant shall register the location with the Alternative Fuel Data Center station locator tool at www.afdc.energy.gov/ and <https://www.plugshare.com/>.

3. Ongoing Services:

- a. **Customer Service:** Projects shall include a customer service support telephone number available 24 hours per day, 7 days a week and clearly posted to assist customers with difficulties accessing or operating the charging station.
- b. **Parking:** Projects shall include paved parking spaces enabling the maximum number of vehicles capable of being charged simultaneously, and shall include adequate space for future expansion.
- c. **Networking:** Projects shall be connected to a network by Wi-Fi or cellular connection. Furthermore, projects shall maintain appropriate EV charging network hardware and software that include the capabilities for: remote diagnostics, remote start of the equipment, and collecting and reporting usage data.
- d. **Payment Options:** If charging service is not provided as a free service/amenity, then charging stations must be Payment Card Industry compliant to allow direct use of a credit or debit card at the charging station itself. Stations may also offer additional payment methods including subscription methods, smart cards, or smart phone applications. Real-time pricing and fee information shall be displayed on device or payment screen. Charging station equipment shall allow for flexible pricing including, but not limited to, per minute or per hour, by space, or by time of day.
- e. **Signage:** “Electric vehicle charging only” signs are required on each side of each charging station along with “electric vehicle charging only” stenciled graphics on each striped parking stall.
- f. **Compliance:** Site development, project installation, and maintenance shall be done in compliance with all applicable laws, ordinances, regulations and standards, including, but not limited to, the Americans with Disabilities Act (ADA).
- g. **Maintenance:** Projects (charging units) must come with a minimum of 5-year manufacturer’s warranty and continually be in full-working order to the extent possible. Should repair be necessary, charging units shall be fully operating within 72 hours of equipment issue/breakdown to ensure a 95% annual uptime guarantee. Proof of the charging station equipment warranty and a maintenance plan must be submitted to ODEQ prior to project completion as a condition of final payment approval.

4. Equipment Requirements:

- a. Each charging unit must offer both CHAdeMo and SAE CCS (Society of Automotive Engineers Combined Charging System) charging protocol connectors. Each Level 2 charging unit must offer a J1772 compatible connector.
- b. All charging station equipment must come with a minimum of a 5-year warranty.
- c. Charging stations shall use Open Charge Point Protocol.
- d. Charging equipment must be certified through the Nationally Recognized Testing Laboratory (NRTL) program to demonstrate compliance with appropriate product safety test standards. A complete list of accredited NRTLs can be found online at <https://www.osha.gov/dts/otpca/nrtl/nrtllist.html>. Supporting evidence must be provided.
- e. If Level 2 EVSE is included, it must be capable of providing electric power at each plug at a minimum of 6.6 kW continuous with electric service rated at 208V (30A continuous).
- f. Future Proofing: Conduit and an electrical service box of adequate size and disconnect capacity that will allow additional electrical cable to be run to the site for future installation of two additional 50 kW charging stations or a higher power station up to 350 kW must be included in the installation. The charging enclosure must be constructed for use outdoors in accordance with UL50, Standard for Enclosures for Electrical Equipment, NEMA, Type 3R exterior enclosure or equivalent.
- g. Charging equipment shall be capable of operating without any decrease in performance over an ambient temperature range of minus 22 to 122 degrees Fahrenheit with a relative humidity of up to 95%.
- h. Projects shall incorporate a cord management system or method to eliminate potential for cable entanglement, user injury and connector damage from lying on the ground.

VI. Project Reporting, Monitoring, and General Conditions

Semiannual reporting will be required from the project start date until the project is completed and project funds are received. More information on semiannual reporting, including deadlines and report templates, will be provided to recipients after award notification.

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Only applications meeting the eligibility criteria will be considered for scoring. Reviewers will evaluate proposals per project using the criteria listed in Appendix 2. The potential maximum number of points is listed to the right of each category. Any member of the Scoring Committee may request clarification of submitted information from one or more applicants. The applicant may provide written responses to the request for clarification; such responses may be considered along with the original proposal for application scoring.

Note: DEQ is not required to distribute all funds available for this funding opportunity and reserves the right to award partial grants.

All applicants will receive email notification from DEQ, addressed to the contact person specified in the application, notifying the applicant whether or not they are being offered grant funding. Applicants selected for funding will also be notified through email concerning the next steps in the award process, including execution of a Memorandum Of Agreement. This agreement will establish project timelines, the reimbursement process, reporting requirements, ensure the grant recipient will adhere to the competitive bid/procurement process, if applicable, and other applicable information. Once the MOA has been signed by both parties, then the applicant will receive an email notification from DEQ with a Notice to Proceed. Again, applicants who begin a project and previously incur costs before receiving a Notice to Proceed does so with the understanding that the costs will not be reimbursed.

VIII. Glossary

501(c)(3) Organization – an organization recognized by the United States (U.S.) Internal Revenue Service as tax-exempt under Section 501(c)(3) of the U.S. Internal Revenue Code.

Air Quality or Transportation Organizations – local, regional or multi-state air quality or transportation organizations that include a Oklahoma state government agency, a municipal government, or a municipal authority as a member, and

1. own or operate a diesel fleet located or operating in Oklahoma, or
2. have partnered with or are acting as a project manager for another eligible entity listed in this section.

Business – corporations, partnerships, sole proprietorships, limited liability companies, business trusts or other legal business entities incorporated in or registered with the Oklahoma Secretary of State to do business in Oklahoma.

Combined Charger System (CCS) Type 1 – a type of special electrical connector used in DC charging certain battery electric vehicles and using the Type 1 connector adopted for use in North American charging systems.

Direct Current Fast Charging (DCFC) – a high power (50KW – 350KW), fast charging method used to resupply an EV battery using direct current electricity, typically 208/480V 3 phase.

Federal Government Agency – Federal agencies that have custody, control, or management of land within or contiguous to the territorial boundaries of Oklahoma.

Government – a State or local government agency (including a school district, municipality, city, county, special district, transit district, joint powers authority, or port authority, owning fleets purchased with government funds), and a tribal government.

Level 2 EV Charging – EV Supply Equipment that provides alternating current at 208/240V up to 19.2 kW for charging an EV battery.

Light-duty vehicles – Class 1 and 2 vehicles that have a Gross Vehicle Weight Rating of less than 10,000 lbs.

Metropolitan or Rural/Regional Transportation Planning Organizations – organizations as defined by the U.S. Department of Transportation at 49 U.S.C. § 5303(b) that are located in Oklahoma.

“Operation and Maintenance Costs” – shall mean the costs necessary for, and directly connected to, the operation and maintenance of new light duty electric vehicle supply equipment. †

Publicly Accessible – filling station that is available for public use, without restrictions, 24 hours per day, 7 days per week. Examples of restrictions include: club or membership card access restrictions, or site limitations, such as, a station being located behind a gated fence.

Site host agreement – A legal agreement which includes rules and responsibilities for the party(s) to manage, operate, and maintain the charging station in the future. This agreement shall be between land owner and the applicant/equipment operator for the establishment of a charging station.

Trustee – Wilmington Trust, N.A., the firm approved by the Court in *In re: Volkswagen “Clean Diesel” Marketing, Sales Practices, and Products Liability*

Oklahoma Electric Vehicle Charging Grant Program / July 7, 2020

Litigation, MDL No. 2672 CRB (JSC), on March 15, 2017 to administer the State Trust Agreement and disburse the funds from the State Mitigation Trust.

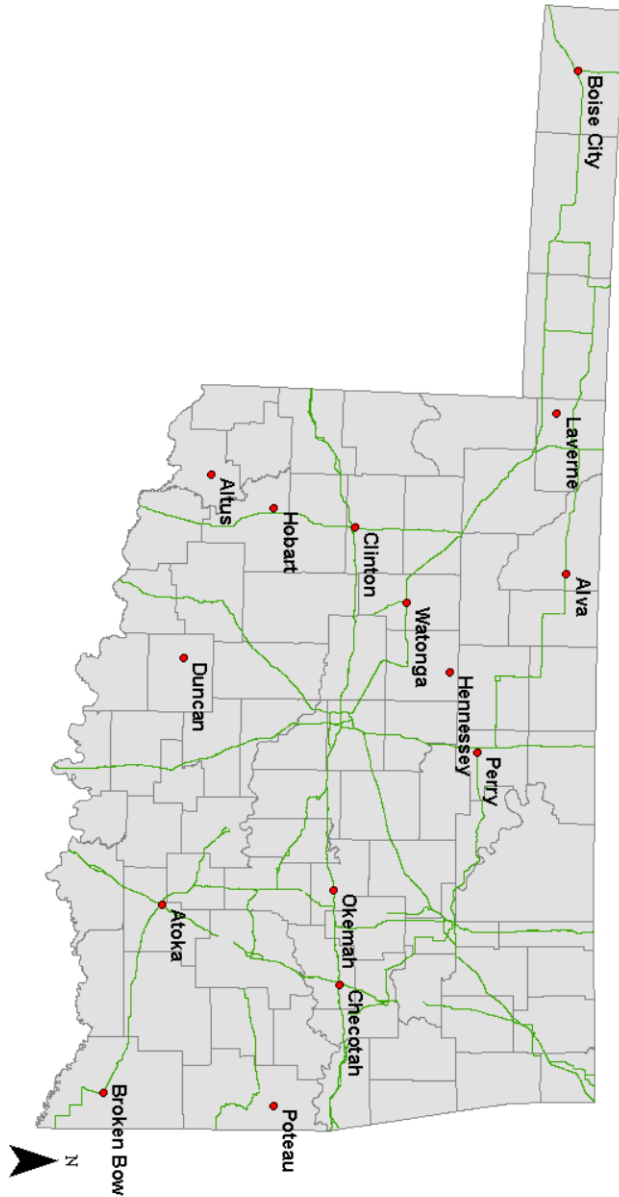
Zero Emission Vehicle (ZEV) – a vehicle that produces no emissions from the onboard source of power.

Zero Emission Vehicle Supply Equipment (ZEVSE) – equipment permanently installed at a site for recharging or refueling an electric vehicle.

THIS GRANT SOLICITATION WAS PREPARED ON: February 13, 2020

THIS GRANT SOLICITATION WAS MODIFIED ON: June 29, 2020

Appendix 1: Target Cities for Installation of Electric Vehicle Charging Equipment



We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided for informational purposes only. The user assumes all responsibility for any errors, omissions, or actions undertaken on the basis of such data and information are the sole responsibility of the user.



ChargeOK FY2021 Electric Charging Locations

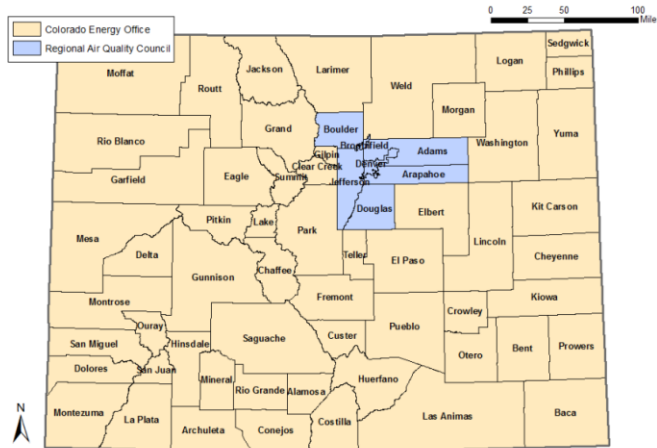
CRITERIA	MAXIMUM POSSIBLE POINTS
Project Narrative	5
Station Location and Access to Amenities	20
Cost Effectiveness: <ul style="list-style-type: none"> • Matching Funds requested • Budget Narrative • Business Model 	20
Station Design, Facilities Requirements, Minimum Station Specifications	20
Organization, Staff Experience, Qualifications	15
Project Partnerships: <ul style="list-style-type: none"> • Key Partners Identified • Site Agreement Attached • Utility Service Notice 	10
Innovation and Sustainability: <ul style="list-style-type: none"> • Future Proofing • Use of Renewable Energy 	5
Detail and Completeness	5
TOTAL	100

Appendix B Charge Ahead Colorado Application Form



**Charge Ahead Colorado
Grant Application Form**

The Regional Air Quality Council (RAQC) and Colorado Energy Office (CEO) provide grants for electric vehicle charging stations. The RAQC administers grant funding for charging stations to entities located in the seven-county Denver Metro Area, including Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas and Jefferson counties and the following zip codes in Weld County: 80504, 80513, 80601, 80603, 80621, 80623, 80642, and 80651.



CEO administers grant funding for charging stations for entities located outside the seven-county Denver Metro Area. The Charge Ahead Colorado Grant Application serves applicants applying for both RAQC and CEO funding.

The purpose of the application is to provide the evaluation team with an understanding of the applicant’s level of planning and commitment to electric vehicle charging stations.

All applications must be submitted online [here](#). Applicants must review the Charge Ahead Colorado Grant Program Application Guide prior to submitting an application. This guide is intended to lead participants through the program’s funding process. The guide can be found [here](#). In the online version, applicants must confirm that they have read the Application Guide.

Applicants are encouraged to complete proposals in Word, save and then transfer the information to the online application. Applicants should print the completed online application and keep a copy on file. The Evaluation Committee is not responsible for any lost proposals. Please note, the online application will not allow applicants to paste tables or charts into text boxes. Please answer all questions in the narrative. If the applicant would like to additionally present information in tables or charts, please upload the documents in Section IX of the application, Additional Relevant Information.

Section I. Contact Information and Background Information

One organization must be designated as the applicant and be responsible for implementing the entirety of the submitted project.

Organization Name:	
Organization Type:	
Organization Address:	
County:	
Contact Name:	
Title:	
Contact Office Phone Number:	
Contact Email Address:	
Organization Website:	
Organization DUNS Number:	
Secondary Contact Name:	
Secondary Contact Title:	
Secondary Contact Email:	
Secondary Contact Phone:	

Number of Level II, Multi-port Charging Stations Requested:	
Number of Level III (DCFC), Multiple Connection Standard Charging Stations Requested:	
Total Charging Stations Funding Requested (Dollar Amount)	

"I understand that all iron and steel components including conduit, brackets and bollards etc. must be manufactured in the United States."

Yes
No

"I understand that my organization must be in Good Standing with the Colorado Secretary of State's Office. I can provide a Certificate of Good Standing, if requested."

Yes
No

I understand that accessible design features must be incorporated into the charging station project in order to receive grant funding. Not less than 5%, but no fewer than one (1) of all EVCS provided on site must be accessible. Please refer to the [Access Board](#) for [details](#) on accessibility and charging stations.

Yes
No

Section II. Mandatory Criteria

The requirements below are based on the grant funding for these projects and are non-negotiable. Applicants must adhere to the following criteria to be eligible for project funding.

1. Projects implemented prior to receiving an award AND confirmation to proceed given by the awarding agency (RAQC or CEO) are not eligible for funding.
2. Repeat applicants are eligible for additional funding for new projects.
3. RAQC and CEO will allow researched estimates for EV charging stations to be utilized in the application process. However, awards will be made based upon the amounts applicants include in their application. No awards will be adjusted upwards based on an underestimation of cost by the applicant. Therefore, it is strongly recommended that applicants perform their due diligence by contacting vendors for estimates and having them perform site visits for charging stations to ascertain solid estimates.
4. Upon award, RAQC and CEO will meet with program applicants to discuss and review their procurement processes to ensure it meets our requirements. Do not run a bid process prior to this meeting. Do not mention any specific vendors in your application. RAQC and CEO must approve all bid documents after award but before the competitive process begins. Applicants may use the State of Colorado price agreements.
5. Charging stations must be purchased and not leased to be eligible for funding. Electric vehicle charging stations are eligible for C-Pace financing.
6. Applicants must have title ownership of the site or facility where the proposed charging station is being installed. If not, applicants must provide written approval for charging station installation from the title owner of the site. We request that all HOA applicants include a formal resolution or letter of intent from the applicant's HOA Board with their application.
7. The station(s) must be kept operational and in service for a minimum of 5 years. Exceptions may be considered under circumstances of severe hardship as determined by the Evaluation Committee. Applicants must notify the awarding agency within 48 hours if a station becomes inoperable.
8. If a station is sold prior to 5 years of operation, the applicant may be required to pay a pro-rated portion of the station back to the awarding agency or transfer data reporting responsibilities to the new ownership. If a station is destroyed or otherwise disposed of, the applicant must notify the awarding agency and under certain circumstances may be required to pay a pro-rated portion of the station cost back to the awarding agency.
9. The station(s) must have a dedicated parking space for EV Charging only.
10. For multi-family residences, the charging stations must be commonly accessible and not dedicated to individual units.
11. All charging stations must be certified by [Underwriters Laboratories](#), [ETL Listed](#) or an equivalent certification and must have a minimum one year warranty. Units must be compliant with the current version of the National Electrical Code (NEC) Article 625.
12. Charging stations installation must be performed by an electrician licensed to transact business in the State of Colorado and who maintains appropriate types and levels of insurance coverage.
13. Applicants must apply for any required local government, utility and/or electrical permits and approvals.
14. Applicants must comply with all applicable federal, state and local permitting, zoning and code requirements. Certification that all requirements have been met is required from the installing electrician.
15. RAQC applicants may be subject to Davis-Bacon Act prevailing wage requirements if the project is linked to a Federal Highway based on impact or is within the existing right-of-way of a Federal Highway. To date, no RAQC project has triggered this requirement. Please contact the RAQC for more information.

16. Awarded grantees are expected to incorporate accessible design standards into their charging station projects. Guidance on accessibility for charging stations can be found [here](#) and [here](#).
17. Applicants must work with their awarding agency to share data on overall energy consumption and interval data for the operational life of the station(s). Additional information and data may be requested upon availability.
18. Applicants must allow CEO and RAQC to make all applications and bid documents public.
19. Applicants must provide location(s) of funded sites with their awarding agency and submit station information to the DOE's Alternative Fuels Data Center.
20. Applicants must provide a minimum of 20% matching funds or cash match for each charging station. For any questions regarding charging station match, please contact the RAQC or CEO.
21. In order to be reimbursed, all claimed eligible costs and final invoicing must be provided in a legible format and are required on a form provided by the RAQC or CEO. Backup original invoicing will be required at the time of submittal. It is the responsibility of the applicant to ensure documents are clear. If documents are illegible, confusing or incorrect in any manner, the project documents will be returned to the grantee for resubmission. If the grantee does not comply, the project may not be funded.
22. For RAQC projects, all steel and iron (for example, conduit or protective bollards, etc.) must be manufactured in the United States.
23. Replacement stations are eligible for funding however CEO and RAQC will prioritize new stations over replacement stations. Replacement stations will be funded at the same level as new stations. Replacement stations must meet the following criteria:
 - a. The existing charger is not smart or networked and is not collecting data
 - b. The charging station no longer has maintenance support from the manufacturer
 - c. The existing charger station is not functional
 - d. The existing charging station has a single port and the need for a dual port has been established. CEO and RAQC will consider applications for replacement of dual cord stations if they meet criteria a, b and c.
24. Workplace or multi-family applicants must conduct and submit an employee/tenant survey to demonstrate current and future anticipated demand for the charging stations. A model survey template is available at <http://cleanairfleets.org/programs/charge-ahead-colorado>
25. Access to the charging stations by the public
 - a. Because public funding is being utilized for this project, charging stations that have fair and reasonable rates are a higher priority.
 - b. For DCFC, applicants should provide a detailed explanation of the business model including utility rates, operational costs, cost to charge at the stations, and anticipated revenue. The pricing model should be clearly described including the approach used to develop rates. The price to charge for drivers should be fair and reasonable, and the pricing model should be clearly described including the approach used to develop rates.

As the project applicant, I hereby certify and agree to the aforementioned Mandatory Criteria.

Sign and Print Name

As the project applicant, I hereby certify and agree that I have not contracted with a charging station vendor or car dealership and agree to not mention vendors by name in this application to maintain impartiality and the fair and competitive bid process. Previous awardees who have met Charge Ahead Colorado's fair and competitive bid process and plan to continue purchasing under prior agreements are eligible for funding.

Sign and Print Name

Section III. Scope and Project Justification

1. Please provide a description of the project that you are submitting. Please indicate your entity's top priorities for funding if grant funds are limited due to demand.
2. Please describe major phases of the project and the estimated completion date of each phase. Provide milestones that indicate your project can be completed within 4-6 months upon award. Please also describe any resources in place to ensure an expeditious completion of the project.

Section IV. Planning Criteria

Organizations applying for funding need to demonstrate to the Evaluation Committee their ability to sustain the funds invested in this charging station project. The Evaluation Committee requires applicants to address planning areas below.

All applicants must answer the following questions:

1. Does your organization have specific or general planning documents related to EV charging stations? For example, fleet implementation plans, Smart Charging plans, or sustainability plans. If yes, please attach the documents to your application. Below, please describe how your proposed project aligns with the goals and strategies of these sustainability plans.
2. Please describe any renewable energy or energy efficiency or energy storage assets that may reduce the overall environmental impact of your charging station.
3. Has your organization secured the matching funds for this project? Please clearly describe your current project match. Describe any budget approvals you have received, or need to receive, from Town Councils, County Commissioners, HOA boards, company management etc.
4. If awarded funding, do you anticipate any barriers for successful implementation of the project (political, purchase order approvals by management, etc.)?

Applicants applying for charging stations must answer the following additional questions:

1. Has your organization received any interest from stakeholders/employees/owners/lessees that own EVs for charging stations at your location? Please describe.

2. Workplaces and HOAs should complete employee / resident surveys to demonstrate demand for charging station requests. Has your organization completed such a survey? A draft survey is available [here](#) and is mandatory for workplace and HOA applicants. Hotels and retail locations are exempt from this requirement. Please attach the results and provide a summary of the survey results here:

3. Please provide the address(es) of the charging stations.

Location Name	Address	City	State	Zip

4. Please provide a description of the site location including nearby amenities (i.e. public facilities, museums, parks, etc.) and hours of access.

5. Will all the charging stations be open to the public? If not all units, how many? Please explain.

6. Is your organization planning to charge parking/charging fees for users in the next five years?

7. If your organization is planning to charge parking/charging fees for users in the next five years, please explain how parking transactions will be handled and the anticipated fee structure. Otherwise, please type "N/A" in the box below.

8. For DCFC, please indicate the kW of your proposed station (50, 62.5, 150 kW, etc.). Provide a detailed explanation of the business model including utility rates, operational costs, cost to charge at the stations, and anticipated revenue. The price to charge for drivers should be fair and reasonable, and the pricing model should be clearly described including the approach used to develop rates. Applicants should clearly demonstrate that they have discussed the project with your local utility, understand the implications of the technology with your utility and have a clear understanding of utility rates and costs.

9. Have you contacted your utility to discuss the implications of installing a Level III (DCFC) charging station?

10. If applying for a Level III (DCFC) charging station, please provide documentation demonstrating the discussion that took place around your utility rates and costs. Please attach here.

11. If you are applying for replacement stations, please clearly explain your project's need and eligibility.

12. Are electric vehicle stations mandated in your community by local code? Are you applying for stations that go beyond compliance with local code?

13. If you have previously received an award from Charge Ahead Colorado, please clearly describe the utilization of your current stations. Why are additional stations needed in this setting?
14. Have you spoken with a ReCharge Colorado Coach?
15. If your project is new construction, are you pre-wiring for additional charging stations?
16. Is your charging station in an advantageous location, such as along a scenic or historic byway, National Park, charging station gap etc.? If so please explain.

Section V. Funding Request

Please indicate the types of charging stations that will be publicly accessible and not publicly accessible with researched costs below. Both RAQC and CEO will award 80% of charging station, labor, construction and permitting costs up to the amounts listed in the Application Guide. Awards will not be adjusted upwards based on an underestimation of cost by the applicant. Therefore, it is strongly recommended that applicants perform their due diligence by contacting vendors for estimates. Upon award, RAQC and CEO will meet with program applicants to discuss and review their procurement processes to ensure it meets RAQC and CEO requirements. Do not run your bid processes prior to this meeting. RAQC and CEO must approve all bid documents before the competitive process begins. Please do not mention any vendors that you may have received cost information for as a part of your due diligence.

Location Name					
Type (Level II or III)					
Number of Vehicles that This Unit Can Charge at Once					
Charging Station Equipment Cost per Unit					
Charging Station Labor Cost per Unit					
Charging Station Construction Cost per Unit					
Charging Station Permitting Cost per Unit					
Charging Station Additional Reporting Cost per Unit*					
Expected Date of Purchase					
Proposed Installation Date					
Publicly Accessible (Yes or No)					

*Additional Reporting Costs may include subscription fees, data plans, etc.

Section VI. Federal Certifications

All applicants must agree to the following Federal Certifications and Assurances. The online application will ask applicants to provide e-signatures and upload a current W-9.

1. [Certification Regarding Lobbying](#)

2. [Certification Regarding Debarment, Suspension and Other Responsibility Matters](#)
3. [W-9: Request for Taxpayer Identification Number and Certification](#)

Section VII. Reporting Requirements

Within six months of installation, RAQC and CEO will send out a form requesting information on charging stations usage (i.e. time of use, duration of use, # of customers, mileage, kWh used etc.). RAQC and CEO require read-only access to the charger network information. The grantee will be asked to report data at six-month intervals for a minimum of five years. The grantee will be expected to provide information that is readily available.

As the project applicant, I hereby certify and agree to the aforementioned Reporting Requirements.

Sign and Print Name

Section VIII. Final Documentation Required

Upon completion of the installation, the following documentation is required for RAQC and CEO to reimburse for eligible costs on all projects:

1. Final Report.
2. Summary Invoice/Reimbursement Request.
3. Legible copies of all sales/invoices that show the purchase price and amount paid by the applicant for the charging stations, number of units purchase and serial numbers from the units.
4. Copies of canceled checks or credit card statements as proof of payment for all costs.
5. Digital photograph(s) of the completed unit(s).
6. A copy of the installer's written certification that the unit(s) have been installed, in working order and operating in accordance with local, state and federal codes.
7. Copies of all required permits.
8. Date(s) of installation, installation completion and when the unit(s) is operational.
9. Confirmation that the charger is networked and collecting data
10. Confirmation that the charger is registered on AFDC.
11. Confirmation that the chargers have been promoted on the awardees' social media, newsletters, and/or website.

Section IX. Additional Relevant Information

1. How did you hear about the Charge Ahead Colorado program?
2. Is there any additional relevant information that will assist the Evaluation Committee in understanding the proposed project?
3. Are there any additional documents that help support your application? Please attach any additional relevant information. If you are attaching documents, please include a description of the documents attached.

Automotive Dealership Questions

These additional questions will display if the grant applicant selects “Automotive Dealership” for the organization type.

1. Are you required by the original equipment manufacturer (OEM) to install charging stations in order to be allocated electric vehicles?
2. If so, what are the requirements? How many Level 2 and/or DCFC?
3. Does the OEM provide any financial support for the stations?
4. What is the purpose of these stations (e.g. for use by the public, for use by dealer to charge dealer and/or customer vehicles, for dealer, customers, and the public)?
5. Do you currently sell electric vehicles at your dealership? What are your future plans to sell electric vehicles?
6. What other resources could CEO, RAQC or our partners provide to you in order to help you sell more electric vehicles? (general EV charging training, certifications, programs, recognition, etc.?)

Appendix C Summary of BEV and Hybrid Vehicle Fees and Revenue Distribution Models

State	EV Fee	Hybrid Fee	Revenue Distribution
Alabama ¹	\$200 annual fee (Increase of \$3 every 4 years beginning in 2023)	\$100 annual fee for plug-ins (Increase of \$3 every 4 years beginning in 2023)	The first \$100 of EV revenue and \$75 of hybrid revenue is allocated as follows: 66.67% state, 25% counties, 8.33% cities; remainder is deposited in the Rebuild Alabama Fund which funds electric charging infrastructure.
Arkansas	\$200 annual fee	\$100 annual fee	Revenue is classified as “special revenue” and allocated to the State Highway and Transportation Department Fund.
California	\$100 annual fee for a zero-emission vehicles model year 2020 or later. The fee is tied to the Consumer Price Index and increases each year according to the index.		After Department of Motor Vehicles administrative costs, the revenue is allocated to the Road Maintenance and Rehabilitation Account, of which 50% is allocated to local governments.
Colorado ²	\$50 annual fee	\$50 annual fee	60% of revenue is allocated to the Highway Users Tax Fund (of this 22% is allocated to counties and 18% to cities) with the remaining 40% allocated to the Electric Vehicle Grant Fund which provides grants for charging infrastructure installation and operating costs.
Georgia ³	Non-commercial vehicle annual fee of \$213.70; commercial vehicle fee of \$320.65 (both current as of 2021)		Revenues must be used for “transportation purposes” only
Hawaii ⁴	\$50 annual fee		Revenue collected from this fee is allocated to the State Highway Fund.
Idaho	\$140 annual fee	\$75 annual fee (plug-in)	Revenue is collected and distributed from the Highway Distribution Account: 60% to the state highway account and 40% to local governments for construction and maintenance of roads and bridges, bond repayment.
Illinois	\$100 annual fee		All but \$1 of each fee is allocated to the State Road Fund; the \$1 is allocated to the Secretary of State Special Services Fund.
Indiana	\$150 annual fee (indexed for inflation with motor fuels tax)	\$50 annual fee (indexed for inflation with motor fuels tax)	Revenue is allocated to the Local Road and Bridge Matching Grant Fund, which supports local road and bridge projects.
Iowa	\$97 annual fee (increasing to \$130 in 2022)	\$48.75 annual fee for plug-ins (increasing to \$65 in 2022)	Revenue is allocated to the Road Use Tax Fund (32.5% allocated to counties and 20% to cities).
Kansas	\$100 total registration fee (higher than regular registration, but not a separate fee)	\$50 total registration fee for hybrid and plug-ins (higher than regular registration, but not a separate fee)	Revenue is allocated to the State Highway Fund.
Michigan ⁵	\$135 annual fee for EVs <8,000 lbs.; \$235 annual fee for EVs >8,000 lbs.	\$47.50 annual fee for plug-ins <8,000 lbs.; \$117.50 annual fee for plug-ins >8,000 lbs.	Revenues are allocated to the Michigan Transportation Fund (39.1% allocated to counties and 21.8% to cities) and to the Scrap Tire Regulation Fund.

State	EV Fee	Hybrid Fee	Revenue Distribution
Minnesota	\$75 annual fee		Revenue is allocated to the Highway User Tax Distribution Fund (29% allocated to counties and 9% to cities).
Mississippi	\$150 annual registration fee (to be annually adjusted by CPI)	\$75 annual registration fee (to be annually adjusted by CPI)	"The department shall apportion the proceeds of the taxes among the various purposes specified for gasoline and diesel fuel taxes in the same proportion that those taxes were apportioned for those purposes during the previous state fiscal year."
Missouri	\$75 annual fee (includes other alternative fuels such as propane, natural gas, etc.)	\$37.50 annual fee for plug-ins	Revenue is allocated to the State Highway Fund (10% allocated to counties and 15% to cities).
Nebraska	\$75 annual fee (covers alternative fueled vehicles to include electric, solar, or anything not subject to motor fuels taxes)		Revenue is allocated to the Highway Trust Fund (23.3% each allocated to counties and cities).
North Carolina	\$130 annual fee		Revenue is allocated as follows: 85% goes to the Highway Fund to support existing infrastructure projects such as repaving, bridge replacement, etc.; the remaining 15% is allocated to the Highway Trust Fund.
North Dakota	\$120 annual road use fee	\$50 annual road use fee (plug-ins)	Revenue is allocated to the Highway Tax Distribution Fund (34.5% allocated to counties).
Ohio ⁶	\$200 annual fee	\$100 annual fee	Revenue is allocated as follows: 55% to the Highway Operating Fund; 45% to the Gasoline Excise Tax Fund. Of that 45% allocated to the Gasoline Excise Tax Fund, it is split amongst municipalities, counties, and townships as follows: 42.86%, 37.14%, and 20% respectively.
Oklahoma	\$110 annual fee for EVs < 6000 lbs.; \$158 annual fee for EVs >6,000 lbs. & <10,000 lbs.; \$363 for EVs >10,000 lbs. & <26,000 lbs.; \$2,250 annual fee for EVs >26,000 lbs.	\$82 annual fee for plug-ins < 6000 lbs.; \$118 annual fee for plug-ins >6,000 lbs. & <10,000 lbs.; \$272 for plug-ins >10,000 lbs. & <26,000 lbs.; \$1,687 annual fee for plug-ins >26,000 lbs.	Revenue is allocated to a new Driving on Road Infrastructure with Vehicles of Electricity (DRIVE) Revolving Fund until July 1, 2027; after July 1, 2027 the revenue is divided 85% between the DRIVE Fund and 15% to county governments.
Oregon ⁷	\$110 annual fee	Additional fees are based on miles per gallon; hybrids could be subject to a slightly higher fee of \$33 for vehicles with 40 mpg or greater.	Revenue is allocated 50% to the Department of Transportation, 30% to counties, and 20% to cities.

State	EV Fee	Hybrid Fee	Revenue Distribution
South Carolina	\$120 biennial fee	\$60 biennial fee	Revenue is allocated to the Infrastructure Maintenance Trust Fund, to provide funding for maintenance and repair of existing infrastructure.
South Dakota	\$50 annual registration fee		Revenue is allocated to the state highway fund.
Tennessee	\$100 annual registration fee		Revenue is allocated to the Highway Fund.
Utah ⁸	\$120 annual fee	\$52 annual fee (plug-ins); \$20 annual fee for other hybrids	Revenue is allocated to the Transportation Fund (30% allocated to local governments).
Virginia	\$64 annual license tax	\$64 annual license tax	Revenue is allocated to the Highway Maintenance and Operating Fund and is required to be used by districts for transportation.
Washington	\$225 annual registration fee	\$75 annual registration fee	Revenue collected from the EV fee is allocated 70% to the motor vehicle fund, 15% to the transportation improvement account, and 15% to the rural arterial trust account; revenue collected from the hybrid fee termed the “Hybrid Vehicle Transportation Electrification” fee is allocated to EV charging stations.
West Virginia	\$200 annual fee	\$100 annual fee	Revenue from EV fees is allocated to the Transportation Fund; revenue from hybrids is allocated to the State Road Fund.
Wisconsin	\$100 annual fee	\$75 annual fee	Revenue is allocated to the state Transportation Fund (25% of this is distributed to local governments).
Wyoming	\$200 annual fee		Revenue is allocated to the state highway fund.

1. These fees may be reduced by \$50 and \$25 respectively if a federal fee is enacted and the revenue is directed to highway transportation purposes in the state.
2. Applies to all vehicles that fall under the term “plug-in electric drive” in 26 U.S.C. sec. 30D whose definition is a motor vehicle “which is propelled to a significant extent by an electric motor which draws electricity from a battery...that is capable of being recharged by an external source”.
3. “These fees must be adjusted each year according to a statutory formula based on the percentage increase or decrease in average motor vehicle fuel efficiency as measured by the United States Department of Energy.” See: <https://dor.georgia.gov/alternative-fuel-vehicles-annual-licensing-fees-policy-bulletin>. They apply to any *alternative fueled vehicle*, which includes EVs.
4. Some revenue is allocated to local governments as per the following language: “The department of transportation shall establish county subaccounts within the state highway fund... funds in each county subaccount shall be expended for state highway road capacity projects in the respective county.”
5. Fees are indexed to the motor fuels tax; for each penny increase in fuel tax above 19 cents results in an increase in the EV fee of \$5 and the plug-in fee of \$2.50. Current fees are based on a motor fuels tax of 26.3 cents.
6. EVs are defined as a plug in electric motor vehicle that is powered in full or partly by a rechargeable battery; Hybrids are defined as those that include both a combustion engine and stored electricity.
7. Electric vehicle owners can opt to participate in Oregon’s road usage charge program, OReGo, in lieu of paying the annual fee. The current charge per mile is 1.8 cents.

8. Starting in 2022 these fees will be indexed to the Consumer Price Index. EV owners can elect to participate in the state's Road Usage Charge Program with a charge of 1.5 cents per mile up to the annual fee. Those that chose to participate will never be charged more than the annual fee.

Appendix D Legislation Proposed in 2021 Related to EVs

State	Bill	Brief Summary	Status
Arizona	H 2437	<ul style="list-style-type: none"> Levied annual EV fees of \$111 in FY21-22, \$139 in FY22-23, and \$166 in FY23-24; subsequent annual adjustments tied to GDP deflator Levied annual fees on vehicles powered by a combination of gas and electricity of \$45 in FY21-22, \$56 in FY22-23, and \$67 in FY 23-24; subsequent annual adjustments tied to GDP deflator 	Failed
California	S 542	<ul style="list-style-type: none"> Provides tax exemptions for zero emissions trucks 	Pending- Carryover
Florida	S 138	<ul style="list-style-type: none"> Establish Electric Vehicle Infrastructure Grant program to provide financial assistance to encourage the installation of electric vehicle charging infrastructure. Requiring the department to develop a supplemental master plan to address electric vehicle charging station infrastructure Prohibiting certain rules adopted by the Department of Agriculture and Consumer Services from requiring specific methods of sale for electric vehicle charging equipment 	Failed
	H 819	<ul style="list-style-type: none"> Levied annual EV registration fee; \$150 for vehicles <10,000 lbs. and \$235 for vehicles > 10,000 lbs. Levied annual registration fee for plug-in hybrids of \$50 	Failed
	S 1276	<ul style="list-style-type: none"> The Department of Highway Safety and Motor Vehicles is required to provide notice when EVs make up >5% of the total vehicles registered Assesses annual EV registration fee of \$200 Assess annual hybrid registration fee of \$50 	Failed
Hawaii	S 1309	<ul style="list-style-type: none"> Electric and alternative fuel vehicle registration surcharge fee of \$50, non-electric of \$45 Luxury vehicle tax for non-electric vehicles over \$60,000 Set up a rebate program that incentivizes the installation or upgrade of an electric vehicle charging system, with various incentives based on the type of system ranging from \$3,000 for a system upgrade up to \$35,000 for a direct current fast charging station 	Pending-Carryover
Indiana	S 125	<ul style="list-style-type: none"> Annual supplemental fee for EVs of \$150 and hybrid vehicles of \$50; adjustments to fee occur every 5 years Electric of hybrid motorcycles are subject to a \$25 fee 	Failed
Louisiana	H 582	<ul style="list-style-type: none"> Imposes annual EV road use fee of \$200 and hybrid road use fee of \$100 	Failed
	H 615	<ul style="list-style-type: none"> Levies annual EV tax of \$400 and hybrid tax of \$275 	Failed
Minnesota	S 314	<ul style="list-style-type: none"> Requires the calculation and imposition of an alternative fuel vehicle tax; calculation is based on total gas tax revenues from the prior year divided by the total number of registered vehicles (tax must be equal to this result). 	Pending-carryover
	S 1086	<ul style="list-style-type: none"> Requires EV surcharge of \$229, plug-in hybrid surcharge of \$114.50 Electric motorcycles are also subject to a surcharge of \$46 and plug-in hybrid motorcycles surcharge of \$23 	Pending-carryover
	H 1878	<ul style="list-style-type: none"> Adds a tax to electric charging stations of 5-1/10 cents per kilowatt hour including both public and private stations; certain exemptions are made for transit agencies, medical and community transport, and ambulance services 	Pending-carryover
	H 2250	<ul style="list-style-type: none"> Requires EV surcharge of \$229, plug-in hybrid surcharge of \$114.50 	Pending-carryover

State	Bill	Brief Summary	Status
		<ul style="list-style-type: none"> If gas tax is increased or decreased these fees must change by a matching percentage 	
Montana	H 188	<ul style="list-style-type: none"> Sets a fee schedule for different types of EVs; standard vehicle less than 1 ton \$195, truck with GVW of 26,000 lbs. or less \$375, truck with GVW greater than 26,000 lbs. \$1,300, and a motor home \$450 For vehicles that are not registered in the state but is operated on an itinerant basis a fee is required based on trip distance: \$12 for each trip of 200 miles or less; \$20 for each trip of over 200 to 400 miles; and \$30 for each trip of over 400 miles. 	Vetoed
New Jersey	S 231	<ul style="list-style-type: none"> Establishes the Alternative Fuel Vehicle Transportation Financing Commission to study ways in which EVs could be taxed to contribute to the maintenance of the state's transportation system 	Pending in Senate Transportation Committee
North Dakota	H 1464	<ul style="list-style-type: none"> Imposes an annual EV fee of \$135, plug in hybrid fee of \$70, and an electric motorcycle fee of \$35 	Failed
Oklahoma	S 656	<ul style="list-style-type: none"> Levies sales tax of 4.5% on EVs with 60% of proceeds accruing the Construction and Maintenance Fund and 40% to county highway funds; EVs that are subject include those "propelled solely or to a significant extent by an electric motor which draws electricity from a battery or other portable sources of electric current and is capable of being recharged from an external source of electricity." 	Pending-carryover
	H 2234	<ul style="list-style-type: none"> Imposes a tax of three cents (\$0.03) per kilowatt hour on electricity used for EV charging as well as requires charging stations to register with the state and be tested for accuracy (private chargers exempt and legacy and pre-existing public stations are exempt until 2041) Registration fees for EVs and hybrid vehicles are based on vehicle class: Class 1 gross weight <6,000 lbs., Class 2 gross weight >6,000 lbs. but <10,000lbs, and Class 3, 4, 5, & 6 gross weight >10,000 lbs. by < 26,000 lbs., and Class 7 & 8 gross weight >26,000 lbs. Annual registration fee for EVs: Class 1 fee is \$110, Class 2 fee is \$158, Class 3, 4, 5, 6 fee is \$363, and Class 7 & 8 fee is \$2,250 Annual registration fee for plug-in hybrids: Class 1 fee is \$82, Class 2 fee is \$118, Class 3, 4, 5, 6 fee is \$272, and Class 7 & 8 fee is \$1,687 Revenue collected from these fees is divided 85% to the Driving on Road Infrastructure with Vehicles of Electricity (DRIVE) Fund to administer the act and 15% to counties 	Enacted
Pennsylvania	H 1358	<ul style="list-style-type: none"> Road use fee for EVs and hybrids based on weight; hybrids less than 26,000 lbs. and not a motorcycle the fee is \$75 per year, for EVs less than 26,000 lbs. the fee is \$380 per year, and for EVs greater than 26,000 lbs. the fee is \$450 per year; allows for some exemptions 	Pending in House Transportation Committee
South Dakota	H 1053	<ul style="list-style-type: none"> Establishes an annual EV registration fee of \$50, but does not apply to motorcycles Defines an EV as a "noncommercial motor vehicle that is propelled by an electric motor that draws electricity from a battery that is capable of being recharged from an external source of electricity" 	Enacted
Texas	H 427	<ul style="list-style-type: none"> Levies annual renewal fee on hybrid vehicles of \$100 and EVs of \$200 	Failed

State	Bill	Brief Summary	Status
		<ul style="list-style-type: none"> • Defines an EV as “a motor vehicle that uses electricity as its only source of motor power and a hybrid vehicle as a “a motor vehicle that uses gasoline or conventional diesel fuel and electricity as its sources of motor power” 	
	S 1728	<ul style="list-style-type: none"> • Establishes Texas Transportation Electrification Council and denotes membership selection • Requires the Council to assess existing and planned public electric vehicle charging infrastructure and develop a comprehensive Electric Vehicle Charging Infrastructure plan with specific requirements including network/locations • Mandates involvement of identified stakeholders in plan development • EV owners can pay an annual registration fee of \$190 for vehicles up to 6,000 lbs. and \$240 for those >6,000 lbs. but <10,000 lbs., or they can opt to participate in a mileage fee alternative (paid annually, based on odometer reading); they are also subject to an additional \$10 surcharge • For EVs <6,000 lbs. the fee schedule is: 3,000 miles or less \$30, 3,001 to 6,000 miles \$70, 6,001 to 9,000 miles \$110, 9,001 to 12,000 miles \$150, 12,001 miles or more \$190 • For EVs >6,000 lbs. the fee schedule is: 3,000 miles or less \$40, 3,001 to 6,000 miles \$90, 6,001 to 9,000 miles \$140, 9,001 to 12,000 miles \$190, 12,001 miles or more \$240 • Plug-in hybrid owners can pay an annual registration fee of \$30 for vehicles up to 6,000 lbs. and \$40 for those >6,000 lbs. but <10,000 lbs., or they can opt to participate in a mileage fee alternative (paid annually, based on odometer reading) • For plug-in hybrids <6,000 lbs. the fee schedule is: 3,000 miles or less \$5, 3,001 to 6,000 miles \$10, 6,001 to 9,000 miles \$20, 9,001 miles or more \$30 • For plug-in hybrids >6,000 lbs. the fee schedule is: 3,000 miles or less \$10, 3,001 to 6,000 miles \$20, 6,001 to 9,000 miles \$30, 9,001 miles or more \$40 	Failed
Virginia	S 453	<ul style="list-style-type: none"> • Directs the Secretary of Transportation to analyze how increased fuel efficiency and hybrid and EVs will impact revenue as well as options to address funding with a sustainable revenue source. 	Failed
Washington	S 5085	<ul style="list-style-type: none"> • Requires annual fee for EVs of \$100 which includes any vehicle that “uses at least one method of propulsion that is capable of being reenergized by an external source of electricity”, electric motorcycles fee is \$30 • Prescribes the fund distribution process when anything over \$1 million is collected 	Pending-carryover

Appendix E State-Level Incentives for EV Purchases

State	Incentive (EV, Plug-in Hybrid, and/or EVSE)
Arizona	Alternative fueled vehicles can receive an occupant exemption via a special license plate to use HOV lanes.
	Alternative fueled vehicles have lower vehicle license taxes.
California	Clean Transportation Program (administered by the California Energy Commission) invests up to \$100 million annually from registration, plate, and smog abatement fees in a variety of projects and incentives such as ESVE and EV adoption.
	The California Air Resources Board administers the Hybrid and Zero Emission Truck and Bus Voucher Incentive Project and Low NOx Engine Incentives which offer vouchers to fleets to assist with affordability of EV and hybrid vehicles. Vouchers are available in amounts from \$2,000 to \$315,000 dependent on the vehicle and if the vehicle will be located in a disadvantaged community.
	The Clean Vehicle Rebate Project provides rebates for qualified vehicles that have been approved by the Air Resources Board. Amounts are based on the vehicle type and are available not only to individuals but businesses and government agencies: \$4,500 for fuel cell vehicles, \$2,000 for EVs, \$1,000 for plug-in hybrids, and \$750 for zero-emission motorcycles.
	The Property Assessed Clean Energy Loss Reserve Program helps finance the purchase and installation of EVSE though they are run by local governments; borrowers repay via a special assessment on the property. The maximum amount to be financed is limited to 15% of up to \$700,000 of property value and 10% of any remaining value over \$700,000.
	Zero-emission transit buses are exempt from state sales and use taxes when purchased by public agencies that are eligible for the Low Emission Truck and Bus Purchase Vouchers.
Colorado	EVs titled and registered in Colorado are eligible for a tax credit of varying amounts dependent on the year and vehicle type. The tax credit differs depending on the income tax year and the vehicle category, which includes light-duty EVs, light-duty electric trucks, medium-duty electric trucks and heavy-duty electric trucks.
	The Colorado Energy Office and Regional Air Quality Council offer grant opportunities via the Charge Ahead Colorado program to support EV and EVSE adoption.
	The Colorado Department of Local Affairs administers the Energy/Mineral Impact Assistance Fund Grant program that offers local governments funding to assist with the cost of alternative fueled vehicles.
	Colorado exempts EVs from state motor vehicle emissions inspections.
Connecticut	The Connecticut Hydrogen and Electric Automobile Purchase Rebate Program offers rebates of up to \$9,500 for an EV or hydrogen fuel cell powered vehicle (to be eligible vehicles must not be greater than \$60,000 for hydrogen and \$42,000 for EVs).
	The Connecticut Department of Energy and Environmental Protection utilized funding from the Volkswagen Environmental Mitigation Trust to support the Diesel Emissions Mitigation Program. The program covers costs needed to replace or repower heavy-duty vehicles with varying amounts available for public and private entities as well as whether a vehicle is being replaced or repowered.
	EVs qualify for a reduced biennial vehicle registration fee of \$38.
Delaware	A Clean Vehicle Rebate Program is available for new alternative fueled vehicles with amounts varying by vehicle type such as \$1,000 for a plug-in hybrid and \$2,500 for an EV (max. purchase price to qualify is \$60,000).
	EVSE rebates for Level 2 chargers are available for qualified installations at commercial, government, or multifamily locations. Rebates cover 75% of commercial installations and 90% for others (max. rebate is \$3,500 for single port and \$7,000 for dual port).
	EV owners that have a grid-integrated EV can receive a credit per kilowatt-hour for energy discharged from the EV battery at the same rate paid for charging the battery.
	A heavy-duty vehicle rebate program offers up to \$20,000 for heavy-duty natural gas fueled vehicles.

State	Incentive (EV, Plug-in Hybrid, and/or EVSE)
Florida	Local governments are authorized to assess non-ad valorem taxes to fund certain infrastructure including EVSE installation; individual property owners can apply for funding and financing through the local government for ESVE installation.
Georgia	Tax credits are available for alternative fuel medium duty vehicles (max. \$12,000) and heavy-duty vehicles (max. \$20,000). Alternative fueled vehicles with designated license plates are eligible to use HOV and HOT lanes (expires Sept. 30, 2025).
Hawaii	Hawaii Energy administers a public utilities commission program for varying EVSE incentives. To install a Level 2 charger the rebate is \$4,500 while an upgrade to an existing station is \$3,000; DC fast chargers qualify for \$35,000 for an install and \$28,000 for upgrade (max. total rebates offered per fiscal year is \$500,000). Total rebates per fiscal year are capped at \$500,000.
Idaho	EVs, plug in hybrids, and hybrid electric vehicles are exempt from state inspection and maintenance programs. Using funding from the Volkswagen Environmental Mitigation Trust Idaho’s EVSE “program provides cost-shared funds for direct current fast charger equipment. EVSE stations located along highways and interstates will be prioritized to create a network of electric vehicle charging services for the public.”
Illinois	The Illinois Department of Education provides reimbursements school districts for the costs of changing gasoline buses to either more fuel-efficient engines or alternative fuels. EV fleet owners are exempt from the annual \$20 vehicle registration fee (applies to fleets of 10 or more vehicles). EVs are exempt from state emissions inspections.
Indiana	Using funding from the Volkswagen Environmental Mitigation Trust, Indiana is supporting the replacement or conversion of medium and heavy-duty vehicles. Funding is allocated via grants based on responses to a request for proposals.
Iowa	Using funding from the Volkswagen Environmental Mitigation Trust, the Iowa Department of Transportation offers funding to either repower or replace medium and heavy-duty vehicles provides funding to repower or replace certain medium- and heavy-duty vehicles. Funding is allocated through a competitive application process.
Louisiana	Louisiana offers an income tax credit for 30% to support alternative fuel infrastructure including the cost of fuel conversion equipment, alternative fueling equipment or related property. Additionally, a credit of 10% is offered for new alternative fueled vehicles (max. \$2,500).
Maine	Using funding from the Volkswagen Environmental Mitigation Trust, Efficiency Maine offers consumers varying rebates for EV and plug-in hybrid purchasing and leasing. provides rebates for purchasing or leasing a BEV or PHEV. Individual consumers are eligible for up to \$3,000 for an EV and \$1,500 for a plug-in hybrid if their income meets requirements. This program ended Dec. 21, 2021. A seller of electricity solely for EV battery charging is not regulated as an electricity provider and an EVSE provider can only charge for kilowatt-hours used.
Maryland	The Maryland Energy Administration administers the Maryland Alternative Fuel Infrastructure Program which provides support for charging and alternative fuel infrastructure; DC fast chargers are included and have a maximum award amount of \$55,000. EVs can utilize HOV lanes required they have a permit and a maximum speed of 65 mph. Vehicles with zero emissions are exempt from inspections requirements.
Massachusetts	The Massachusetts Electric Vehicle Incentive Program (MassEVIP) offers grants to public fleets for purchasing or leasing EVs and Level 2 EVSE along with zero-emission motorcycles. Grant amounts are up to \$7,500 for purchased EVs, \$5,000 for leased EVs. \$5,000 for purchased plug-in hybrids, \$3,000 for leased plug-in hybrids, and \$750 for motorcycles. EVSE is also available for up to \$7,500 if at least 2 EVs are also purchased.

State	Incentive (EV, Plug-in Hybrid, and/or EVSE)
	"The Department of Energy Resources' Massachusetts Offers Rebates for Electric Vehicles (MOR-EV) program... support qualifying battery electric vehicles (BEVs) and fuel cell electric vehicles (FCEVs) up to a \$50,000 final purchase price with a \$2,500 rebate. Additionally, plug-in hybrid electric vehicles (PHEVs) with an all-electric range of 25 miles or greater and with a final purchase price up to \$50,000 are eligible for a \$1,500 rebate." Trucks are also included in this program with purchases of alternative fueled medium and heavy-duty trucks with rebates based on gross vehicle weight rating.
	EV are exempt from emissions inspection.
	MassEVIP Workplace & Fleet Charging offers incentives for installation of Level 1 and 2 charging stations; applicants must have 15 or more employees and funding is provided up to 60% of the cost (max. \$50,000). Grants are also available for the same terms for multiunit dwellings where the charger is accessible a minimum of 12 hours per day.
Michigan	Alternative fueled vehicles are exempt from emissions inspections.
Minnesota	Using funding from the Volkswagen Environmental Mitigation Trust, an electric school bus pilot program was funded to replace diesel buses with electric buses with wards up to \$275,000 or 75% of project costs (applications ended in 2020).
	A pilot program provides a MnPass account credit so EV owners can use toll lanes; credits are available for EVs in the amount of \$250 and plug-in hybrids of \$125. Program runs from 2019-2022.
Missouri	Alternative fueled vehicles are exempt from emissions inspections.
Montana	Using funding from the Volkswagen Environmental Mitigation Trust, the Montana Department of Environmental Quality offers grants to replace medium and heavy-duty vehicles with electric and diesel hybrid vehicles. Funding is also being used to fund electric charging stations across the state.
	An income tax credit of up to 50% of costs to convert vehicles to alternative fuels is available for both businesses and individuals.
Nebraska	The Nebraska Energy Office administers the Dollar and Energy Saving Loan Program; this program offers low cost loans for alternative fuel projects such as purchase of alternative fuel vehicles, conversion of existing vehicles, and construction of stations to support alternative fuel vehicles. These loans are available up to \$500,000 with an interest rate of 5% or less.
Nevada	Public school districts are eligible for a grant program that covers 75% of the costs to install EVSE or purchase electric school buses.
	Alternative fuel vehicles are exempt from emissions inspections and hybrids are exempt for the first five model years.
New Jersey	Zero emissions vehicles are exempt from state sales and use tax (applies to those sold, rented, or leased in New Jersey).
	The New Jersey Board of Public Utilities provides a rebate to those purchasing or leasing an EV or plug-in hybrid (MSRR must be less than \$55,000) of \$25 per mile of all-electric range, with a max. of \$5,000. Program starts in 2020 with the plug-in rebate expiring in 2022 and the EV rebate in 2030.
	New Jersey Turnpike Authority's manages a Green Pass Discount Plan which provides a 10% discount on off-peak toll rates for vehicles that attain 45 mpg or higher and meet the California Super Ultra Low Emission Vehicle standard.
New Mexico	The New Mexico Energy, Minerals and Natural Resources Department's Alternative Fuel Acquisition Revolving Loan Program provides loans to government agencies to purchase alternative fueled vehicles.
	New Mexico is developing a grant program to assist with grid modernization to include EV charging stations.
New York	The New York State Energy Research and Development Authority offers rebates up to \$2,000 for purchasing or leasing a new EV.

State	Incentive (EV, Plug-in Hybrid, and/or EVSE)
	The New York State Energy Research and Development Authority’s Charge Ready NY program offers rebates of up to \$4,000 per port for Level 2 chargers installed in public parking, workplaces, and multiunit dwellings.
	The New York State Energy Research and Development Authority has vouchers for the purchase of alternative fuel heavy-duty trucks and school buses. Vouchers are good for 80% of costs (max. \$150,000) for electric school buses, 95% of costs (max. \$185,000) for electric trucks, 90% of the costs (max. \$120,000) for plug-in hybrid trucks.
	An income tax credit for 50% of the cost of alternative fuel infrastructure including EVSE, up to \$5,000. This program expires in 2022.
	EVs are exempt from emissions inspections.
North Carolina	EVs are exempt from emissions inspections.
	EVs are eligible to use HOT lanes (expires 2025).
Ohio	EVs are exempt from emissions inspections following an initial visual inspection.
	Using funding from the Volkswagen Environmental Mitigation Trust, the Ohio Environmental Protection Agency is providing grants for charging stations. Grants cover 100% of the cost for chargers on government property and up to 80% on non-government-owned property. Another program assists with replacing diesel powered engines and replacing them with, among other options, electric powered engines.
Oklahoma	A tax credit is available for up to 45% of the cost of installing alternative fuel infrastructure such as EVSE.
Oregon	Oregon’s Clean Vehicle Rebate Program offers consumers up to \$2,500 for the purchase or lease of an EV or plug-in hybrid; those with lower incomes (“the income requirement is up to 400% of the federal poverty guideline and are based upon the applicant’s household size”). can qualify for a rebate up to \$5,000. MSRP must be less than \$50,000 and rebate amounts vary by battery type: \$750 for zero emission motorcycles, \$1,500 for battery under 10 kWh, and \$2,500 for battery of 10 kWh or more. If applicants meet the income thresholds, the rebate rises to \$4,000 for a battery under 10 kWh and \$5,000 for a battery of 10 kWh or more.
Pennsylvania	The Alternative Fuels Incentive Grant Program offers \$5 million in grants per year to support <ul style="list-style-type: none"> • “Incremental cost expenses relative to retrofitting vehicles to operate on alternative fuels as a bi-fuel, dual-fuel, hybrid or dedicated vehicle. • Incremental cost expenses to purchase bi-fuel, dual-fuel, hybrid or dedicated vehicles. • The cost to purchase and install the necessary fleet refueling or home-refueling equipment for bi-fuel, dual-fuel, hybrid or dedicated vehicles. • The cost to perform research, training, development, and demonstration of new applications or next-phase technology related to alternative fuel vehicles.”
	The Alternative Fuel Vehicle Rebate program offers consumers rebates on the purchase of certain vehicles with an MSRP less than \$50,000 including \$750 for an EV and \$500 for a plug-in hybrid. Low income residents can receive an extra \$1,000.
	Using funding from the Volkswagen Environmental Mitigation Trust, Pennsylvania is funding some DC fast charging stations and offer rebates for public Level 2 chargers. Additional funding is being directed to support truck and bus repowering or replacement with alternatives including electric.
Rhode Island	EVs are exempt from emissions inspections but still must pass a safety inspection.
South Carolina	Electric utility companies can seek to recover costs associated with, among other things, EV charging.
South Dakota	Using funding from the Volkswagen Environmental Mitigation Trust, the South Dakota Department of Agriculture & Natural Resources is offering funding for school bus and truck conversion and replacement to lower emissions options including electric and “light duty Zero Emissions Vehicle supply equipment”.
Tennessee	Using funding from the Volkswagen Environmental Mitigation Trust, the Tennessee Department of Environment and Conservation offers grants for school bus repower or

State	Incentive (EV, Plug-in Hybrid, and/or EVSE)
	replacement with lower emissions options including electric (max. \$750,00 per grantee), transit bus replacements, freight truck replacement, light duty EV equipment supporting the Fast Charge TN Network in partnership with the Tennessee Valley Authority.
Texas	The Light-Duty Motor Vehicle Purchase or Lease Incentive Program administered by the Texas Commission on Environmental Quality offers a rebate of up to \$5,000 for EVs.
	The Texas Commission on Environmental Quality has an Alternative Fueling Facilities Program that includes electric charging.
	Using funding from the Volkswagen Environmental Mitigation Trust, the Texas Commission on Environmental Quality is offering grants for DC Fast Charge stations (can request \$150,000 per unit installed with a max. of \$600,000 per site with reimbursement rates varying by location) and previously offered grants for Level 2 charging equipment and bus repower or replacement.
Utah	EVs are exempt from emissions inspections.
	EVs that have a Clean Vehicle Pass can use HOV lanes regardless of passenger counts.
	The Alternative Fuel Grant Program offers up to \$2,500 per vehicle for converting vehicles lower emissions alternatives including electric.
	Through the Workplace Electric Vehicle Charging Funding Assistance Program, businesses and government agencies can apply for grants to reimburse up to 50% of the cost of installing EVSE.
Vermont	The Vermont Agency of Transportation offers varying incentives for both EVs and plug-in hybrids based on different income thresholds with the maximum available amount for an EV is \$4,000 and \$3,000 for a plug-in hybrid.
	Using funding from the Volkswagen Environmental Mitigation Trust, The Department of Housing and Community Development has an EVSE Grant Program that includes Multiunit Dwelling electric vehicle Charging grants (max. of \$80,000 per site, \$300,000 per applicant).
	The Electric Vehicle Charging Station Loan Program through the State Infrastructure Bank offers financing for EVSE projects. Projects can receive financing of up to \$100,000 at 1%.
Virginia	EVs are exempt from emissions inspection.
	EVs with a Clean Special Fuel license plate can use HOW lanes; annual fee for plate is \$25.
Washington	The Washington State Department of Transportation oversees the Zero emission vehicle infrastructure grant program; priority is given to EVSE projects along highway corridors. awards grants to support EVSE deployment projects along the state's highway corridors.
	EVs and EVSE can be exempt from sales and use tax.
	EVs are exempt from emissions control inspections; plug-in hybrids that are rated at least 50 mpg city are also exempt.
	Business that use commercial vehicles can qualify for a tax credit for purchasing alternative fuel vehicles (75% of incremental cost or \$25,000 whichever is less) or modifying vehicles to run on alternative fuels (50% of conversion costs or \$25,000 whichever is less); this includes electricity as an alternate fuel. Additional credit is available for installing infrastructure such as charging (50% of the cost).
	Green Transportation Capital grants offer funding for transit agencies to electrify fleets and facilities to support EVs.
Wisconsin	Using funding from the Volkswagen Environmental Mitigation Trust, grants are available through the Electric Vehicle Charging Station Grant Program (removed from statute due to Supreme court decision) for the installation of EVSE with varying shares based on location and the Transit Capital Assistance Grant Program offering funding for replacing buses with alternative fuel including electric.

Appendix F Detailed Estimates for Fuel Tax Revenue Losses

Table F1 Fuel Taxes Paid 2021 Ford Escape SE, 1.5L, 3 Cylinder, Automatic

Miles Driven	MPG	State Gas Tax Paid
5,000	30	\$43.33
7,500	30	\$65.00
10,000	30	\$86.67
12,500	30	\$108.33
15,000	30	\$130.00
16,305	30	\$141.31

Table F2 2021 Toyota Camry LE/SE 2.5 L, 4 Cylinder, Automatic

Miles Driven	MPG	State Gas Tax Paid
5,000	32	\$40.63
7,500	32	\$60.94
10,000	32	\$81.25
12,500	32	\$101.56
15,000	32	\$121.88
16,305	32	\$132.48

Table F3 2021 Ford F-150 Pickup 4WD FFV 3.3 L, 6 Cylinder, Automatic

Miles Driven	MPG	State Gas Tax Paid
5,000	20	\$65.00
7,500	20	\$97.50
10,000	20	\$130.00
12,500	20	\$162.50
15,000	20	\$195.00
16,305	20	\$211.97

Table F4 2021 Ford Transit Connect, 2.0 L, 4 Cylinder, Automatic

Miles Driven	MPG	State Gas Tax Paid
5,000	25	\$52.00
7,500	25	\$78.00
10,000	25	\$104.00
12,500	25	\$130.00
15,000	25	\$156.00
16,305	25	\$169.57

Table F5 Kentucky Registration Breakdowns Under Different Scenarios (391 – 50,000)

Vehicle	391	563	898	1,497	2,273	3,621	10,000	20,000	50,000
Escape	215	310	494	823	1,250	1,992	5,500	11,000	27,500
Camry	78	113	180	299	455	724	2,000	4,000	10,000
F-150	78	113	180	299	455	724	2,000	4,000	10,000
Transit Connect	20	28	45	75	114	181	500	1,000	2,500

Table F6 Kentucky Registration Breakdowns Under Different Scenarios (100,000 – 3,600,000)

Vehicle	100,000	360,000	500,000	1,000,000	1,500,000	2,000,000	2,500,000	3,000,000	3,600,000
Escape	55,000	198,000	275,000	550,000	825,000	1,100,000	1,375,000	1,650,000	1,980,000
Camry	20,000	72,000	100,000	200,000	300,000	400,000	500,000	600,000	720,000
F-150	20,000	72,000	100,000	200,000	300,000	400,000	500,000	600,000	720,000
Transit Connect	5,000	18,000	25,000	50,000	75,000	100,000	125,000	150,000	180,000

Table F7 Kentucky Lost Fuel Tax Revenues Under Different Registration Scenarios (391 – 50,000)

Vehicle	391	563	898	1,497	2,273	3,621	10,000	20,000	50,000
Escape	\$27,957	\$40,255	\$64,207	\$107,036	\$162,520	\$258,902	\$715,000	\$1,430,000	\$3,575,000
Camry	\$9,531	\$13,723	\$21,889	\$36,489	\$55,404	\$88,262	\$243,750	\$487,500	\$1,218,750
F-150	\$15,249	\$21,957	\$35,022	\$58,383	\$88,647	\$141,219	\$390,000	\$780,000	\$1,950,000
Transit Connect	\$3,050	\$4,391	\$7,004	\$11,677	\$17,729	\$28,244	\$78,000	\$156,000	\$390,000
Sum	\$55,786	\$80,326	\$128,122	\$213,584	\$324,300	\$516,626	\$1,426,750	\$2,853,500	\$7,133,750

Table F7 Kentucky Lost Fuel Tax Revenues Under Different Registration Scenarios (100,000 – 3,600,000)

Vehicle	100,000	360,000	500,000	1,000,000	1,500,000	2,000,000	2,500,000	3,000,000	3,600,000
Escape	\$7,150,000	\$25,740,000	\$35,750,000	\$71,500,000	\$107,250,000	\$143,000,000	\$178,750,000	\$214,500,000	\$257,400,000
Camry	\$2,437,500	\$8,775,000	\$12,187,500	\$24,375,000	\$36,562,500	\$48,750,000	\$60,937,500	\$73,125,000	\$87,750,000
F-150	\$3,900,000	\$14,040,000	\$19,500,000	\$39,000,000	\$58,500,000	\$78,000,000	\$97,500,000	\$117,000,000	\$140,400,000
Transit Connect	\$780,000	\$2,808,000	\$3,900,000	\$7,800,000	\$11,700,000	\$15,600,000	\$19,500,000	\$23,400,000	\$28,080,000
Sum	\$14,267,500	\$51,363,000	\$71,337,500	\$142,675,000	\$214,012,500	\$285,350,000	\$356,687,500	\$428,025,000	\$513,630,000

Appendix G One-Page Summary of Electric Vehicle Information



Kentucky Electric Vehicle Snapshot

The momentum behind electric vehicles (EVs) is undeniable. By 2030, Ford claims EVs will account for 40 percent of its total sales, while GM pledges that by 2035 all new vehicles it produces will generate zero emissions. Today, consumers can buy two types of EV. Plug-in hybrid electric vehicles (PHEVs) are powered by battery packs over short distances (20 - 60 miles), after which a conventional internal combustion engine takes over. Battery electric vehicles (BEVs) run entirely on battery power. EVs will transform how people and goods move, but widespread adoption poses challenges to state governments. Replacing lost fuel tax revenues and supporting the growth of public charging infrastructure are perhaps the most important.



Types of Charging Stations

Three kinds of charging stations are available to EV drivers. PHEVs can only use Level 1 and 2 chargers. Costs related to installation and onsite electrical work can vary significantly, which accounts for the broad price ranges seen below.

Type	Characteristics
Level 1 (L1) 	<ul style="list-style-type: none"> Power Output: 1 kW - 3 kW Range Added Per Hour of Charging: 3 - 5 miles Use Case: Residential Cost: New vehicles come with L1 chargers as standard equipment
Level 2 (L2) 	<ul style="list-style-type: none"> Power Output: 3 kW - 19 kW Range Added Per Hour of Charging: 15 - 35 miles Use Case: Residential, Workplace, Public Cost: Residential - \$2,000 to \$5,000; Workplace/Public - \$5,000 to \$15,000
Level 3 (Direct Current Fast Charger, or DCFC) 	<ul style="list-style-type: none"> Power Output: 50 kW - 350 kW Range Added Per Minute of Charging: 2 - 18 miles Use Case: Workplace, Public Cost: \$50,000 to \$300,000

⚡ Kentucky's Current Charging Infrastructure & Future Needs



Distribution of Kentucky's Public Charging Stations

Kentucky has 285 L2 chargers and 23 DCFCs. Chargers are most concentrated in Louisville and Lexington as well as along interstates and parkways.



How many public chargers will Kentucky need? It depends on the level of adoption. The US Department of Energy's EVI-Pro Lite tool generates estimates for different scenarios. The adjacent table provides forecasts for three scenarios. Currently, 3,600 EVs are registered in the state, which existing charging infrastructure can readily accommodate. Significant growth in public charging infrastructure will be necessary as consumer demand increases.



Registered EVs




	3,600	10,000	360,000
Workplace L2 Chargers	98	272	9,065
Public L2 Chargers	78	215	6,097
Public DC Fast Chargers	38	105	2,379

*Assumes a mixture of BEVs and PHEVs and 90 percent of drivers have at-home charging capabilities



Replacing Lost Fuel Tax Revenues

A growing number of states require BEV and PHEV owners to pay additional registration fees to compensate for lost fuel tax revenues. Fee structures generally take one of three forms.


 Flat Fee	• Owners pay a fixed registration fee each year. For BEVs, this ranges between \$50 and \$200. For PHEVs, the fee is typically \$100.
 Flat Fee Based on Vehicle Weight	• Owners pay a fixed registration fee each year based on the weight of their vehicle. Heavier vehicles incur higher fees.
 Road Usage Charge (RUC)	• Owners pay a fee for each mile they travel. Utah and Oregon have introduced optional RUCs, which respectively charge vehicle owners 1.5 cents and 1.8 cents per mile.

Another important consideration is whether commercial EVs should be charged a higher registration fee. Two states currently impose higher fees. Georgia has an annual registration fee of \$320, while in Oklahoma vehicles over 26,000 pounds are charged a \$2,250 fee.

Forecasting Potential Impacts of BEVs on Fuel Tax Revenues

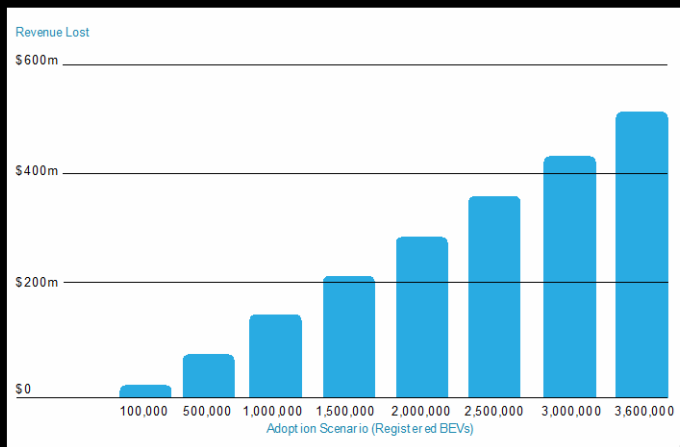


Kentucky will face a revenue crunch as more consumers opt for EVs—especially BEVs because they consume no gasoline. How much fuel tax revenue is lost will depend on the number of EVs registered and what types of vehicles they replace. Replacing a pickup truck with a BEV creates a greater revenue shortfall than replacing a car with a BEV. In the short term losses will be modest. The table below summarizes expected revenue losses for five scenarios up to 360,000 registered BEVs. Estimates assume (1) that BEVs replace a mix of pickups, crossovers/SUVs, and cars proportional to their annual sales, (2) a fuel tax of 26 cents per gallon, and (3) vehicles drive 15,000 miles per year.

	Adoption Scenario (Registered BEVs)				
	3,600	10,000	50,000	100,000	360,000
 Revenue Lost	\$507,488	\$1,410,000	\$7,050,000	\$14,100,000	\$51,363,000

Long-Term Prospects

Revenue losses grow dramatically as the number of registered BEVs climbs above 100,000 and approaches the number of vehicles currently registered in Kentucky (3.6 million). If lost revenue is not replaced, the state and local communities will find it increasingly difficult to deliver transportation projects. Introducing a flat registration fee of \$150 for BEVs would be sufficient to offset lost revenue.



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