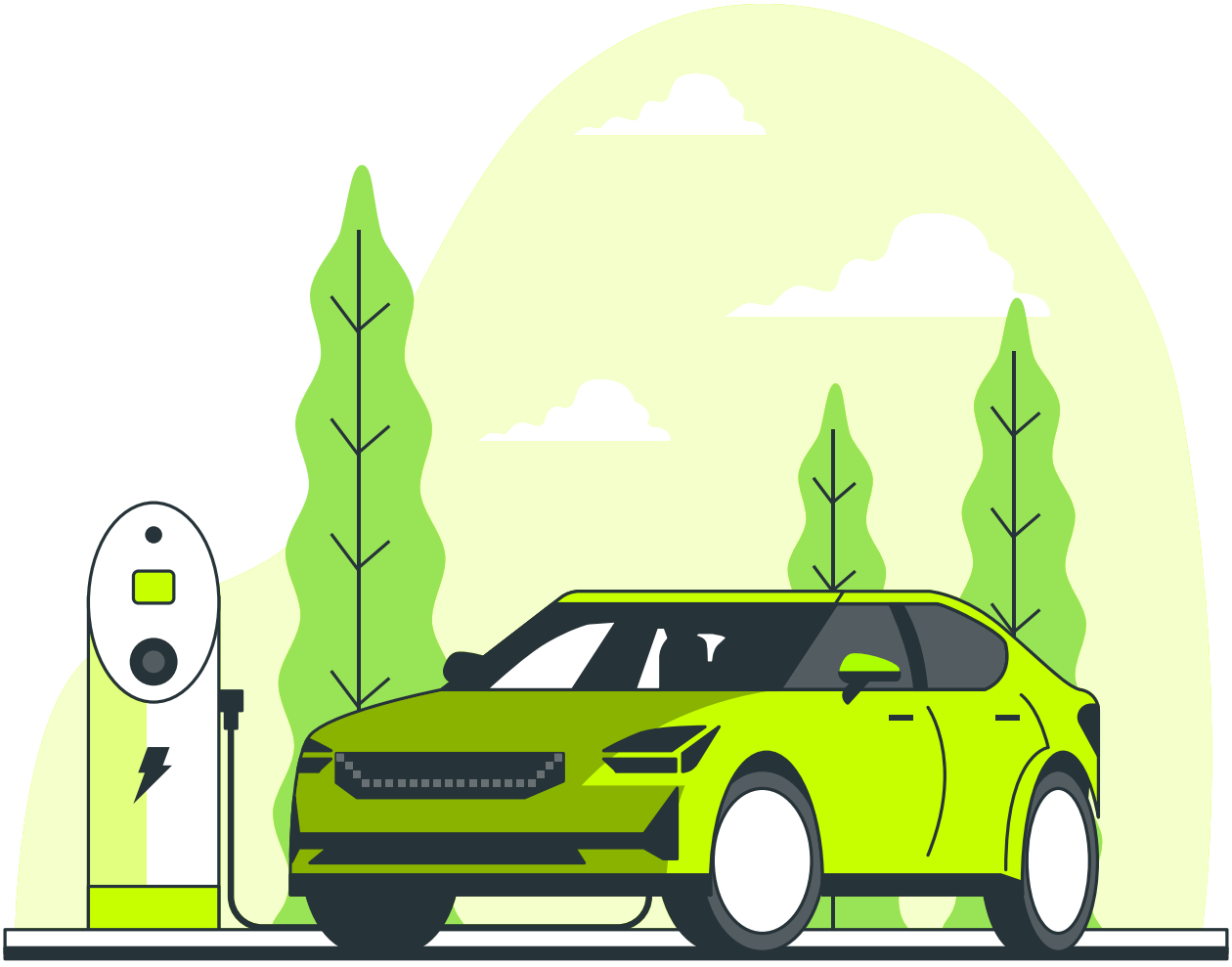
MISSOURI DEPARTMENT OF REVENUE



Electric Vehicle Task Force

December 2022

MISSOURI DEPARTMENT OF REVENUE

Governor Mike Parson
State Capitol Building
Jefferson City, MO 65101

RE: Electric Vehicle Task Force

Dear Governor Parson:

The Electric Vehicle Task Force has met pursuant to Section 142.1000 RSMO. The Task Force has taken testimony and concluded its review. The Task Force is submitting the attached report as required prior to termination of the Task Force. The below listed Task Force members are pleased to submit the attached report and recommendations:

Zachary Wyatt
Task Force Chairman
Missouri Department of Revenue

Ryan Silvey
Missouri Public Service Commission

Senator Justin Brown

Senator Greg Razor

Representative Josh Hurlbert

Representative
Steve Butz

Matt Ellis
Francis Energy

Chris Haffenreffer
Enterprise Rent-A-Car

Caleb Jones
Missouri Electric Cooperatives

Chris Lutick
United Parcel Service

Patrick McKenna
Missouri Department of Transportation

Tony Reinhart
Ford Motor Company

Lynn Wallis
Wallis Companies

Sincerely,

Zachary Wyatt
Task Force Chairman

CC: Missouri House Speaker
Missouri Senate Pro-tem

Electric Vehicle Task Force

TABLE OF CONTENTS

MISSOURI DEPARTMENT OF REVENUE

Electric Vehicle Task Force

INTRODUCTION AND SUMMARY OF PUBLIC TESTIMONY

The Electric Vehicle Task Force (Task Force) was created by Senate Bill 262 (SB 262) adopted during the 2021 legislative session. The Task Force was to answer specific questions designated in SB 262 and to make recommendations on the future of transportation funding. The Task Force was given authority to hold public meetings and seek testimony from experts. The Task Force is required to submit a written report to the Governor and General Assembly detailing its findings and identifying any recommendations that may require legislation.

The legislation required the Task Force be made up of certain members. They are:

- Director of the Department of Revenue or his designee – Zach Wyatt, Chairman (designee)
- Chairman of the Missouri Public Service Commission – Chairman Ryan Silvey
- Director of the Department of Transportation or his designee – Elizabeth Prestwood, (designee)
- Two Senators with jurisdiction over transportation issues:
    - Senator Greg Razor
    - Senator Justin Brown
- Two Representatives with jurisdiction over transportation issues:
    - Representative Steve Butz
    - Representative Josh Hurlbert
- One member of the trucking or heavy vehicle industry – Chris Lutick, United Parcel Service
- One member of the electric vehicle manufacturers or dealers – Chris Haffenreffer, Enterprise Rent-A-Car
- One member of the conventional motor vehicle manufacturers or dealers- Tony Reinhart, Ford Motor Company
- One member of the petroleum industry or convenience stores – Lynn Wallis, Wallis Oil
- One member of the electric vehicle charging station manufacturers or operators – Matt Ellis, Francis Energy
- One member of the electric utilities – Caleb Jones, Missouri Electric Cooperatives.

The Task Force held its first meeting in Jefferson City on July 20, 2022. It started with a presentation by Emily Wilbur, Deputy Director of the Missouri Division of Energy at the Department of Natural Resources. Ms. Wilbur gave a presentation about the history and status of the Volkswagen trust fund settlement which is funding the creation of electric vehicle charging stations. Detailed information about the settlement can be found in Chapter 2: Volkswagen Settlement.

Then Elizabeth Prestwood, Policy and Innovation Program Manager at MODOT gave a presentation on the National EV Charging Initiative. MODOT is in the process of filing paperwork with the NEVI group to receive federal funding to build electric vehicle charging stations. Detailed information about NEVI and its requirements can be found in Chapter 3: the National EV Charging Initiative. (See Appendix 1, 2, 3, & 4)

The Task Force met again on August 3, 2022 in Jefferson City to review the questions the Task Force is charged with answering per statute. The Task Force members suggest speakers they believe will help to provide information on the questions. A schedule of future meetings was distributed to the Task Force members.

On September 7, 2022 the Task Force met in Jefferson City to hear a presentation by Jimmy Williams of the Missouri Department of Agriculture's Weights and Measures Division. He spoke about the future regulation of EV Charging Stations including testing and inspections. (See Appendix 1 & 5)

The Task Force met via webex on September 21, 2022 to hear a presentation by Brent Baker, Cara Schaefer and Hallie Heinzler from City Utilities of Springfield. They are a municipal owed utility. They talked about how they have an integrated resources plan that outlines the use of electricity and the sources for generating it. They are moving slowly and working to education citizens on electric vehicles. They are working on plans to give discounted rates for utility use during non-peak hours. Especially encouraging people to charge their electric vehicles during the night. (See Appendix 1)

On October 4, 2022 the Task Force met in Jefferson City and via webex to hear presentations from ChargePoint+ and Caleb Arthur, CEO of Missouri Sun Solar. ChargePoint+ presented on the issue of chargers since they are one of the companies that have built chargers in the State of Missouri. Caleb Arthur came in and presented to the Task Force as a private citizen and a SME when it comes to the various energy sources that are being used to power EV Charging Stations across the state. Mr. Arthur brought the Task Force first-hand experience of the trials that come with having an EV. (See Appendix 1)

The Task Force on October 19, 2022, via webex, heard a joint presentation from Missouri's Investor Owned Utilities (IOU). Ameren, Liberty, and Evergy teamed up to speak about how they are working together with the Public Service Commission to deploy electric vehicle charging stations within their areas. Each IOU have various programs for private Missouri citizens and businesses. (See Appendix 1 & 6)

On November 9, 2022, the Task Force heard a presentation from John Eichberger, Executive Director of the Fuels Institute. The Fuels institute is a non-advocacy research organization dedicated to studying transportation-energy. They consider fuel to be any type of energy being used to power a vehicle, and their research encompasses issues affecting the vehicles and fuels markets. The Fuels Institute creates a place in which stakeholders of all persuasions can come together to collaborate, share perspectives and commission objective research analyzing the challenges and opportunities facing the market. (See Appendix 1 & 7)

The Task Force on November 16, 2022 had a presentation from Amy Brink, the Alliance for Automotive Innovation. Automotive Innovation is a trade group based in Washington DC representing automakers along with suppliers and technology companies. There was also a presentation from Bill Ehrlich, Tesla Senior Policy Advisor, about what they are doing regarding EVs. (See Appendix 1 & 8)

On December 7, 2022 Chris Haffenreffer, vice president of strategy development at Enterprise Holding Inc, discussed the challenges facing the rental car company as they mitigate the challenges of electric vehicle rental. He said while the company is planning infrastructure changes, they are doing so to continue to make the customer service experience as positive as possible. EHI is working closely with regulators, policymakers and utility companies to make certain they are building their infrastructures in the right way as technology changes quickly. Much of EHI rental business takes place at concessionary locations, specifically airports, which makes it challenging to work together to build up the needed infrastructure on another company's real estate. (See Appendix 1 & 9)

Per Section 142.1000 the Task Force was to analyze transportation funding, and make recommendations as to any actions the state should take to fund transportation infrastructure in anticipation of more widespread adoption of electric vehicles. Specifically answering the following questions outlined in Section 142.1000:

1. Removal or mitigation of barriers to electric vehicle charging, including strategies, such as time-of-use rates, to reduce operating costs for current and future electric vehicle owners without shifting costs to electric ratepayers who do not own or operate electric vehicles;
2. Strategies for managing the impact of electric vehicles on, and services provided for electric vehicles by, the electricity transmission and distribution system;

3. Electric system benefits and costs of electric vehicle charging, electric utility planning for electric vehicle charging, and rate design for electric vehicle charging;
4. The appropriate role of electric utilities with regard to the deployment and operation of electric vehicle charging systems;
5. How and on what terms, including quantity, pricing, and time of day, charging stations owned or operated by entities other than electric utilities will obtain electricity to provide to electric vehicles;
6. What safety standards should apply to the charging of electric vehicles;
7. The recommended scope of the jurisdiction of the public service commission, the department of revenue, and other state agencies over charging stations owned or operated by entities other than electric utilities;
8. Whether charging stations owned or operated by entities other than electric utilities will be free to set the rates or prices at which they provide electricity to electric vehicles, and any other issues relevant to the appropriate oversight of the rates and prices charged by such stations, including transparency to the consumer of those rates and prices; and
    a. (9) The recommended billing and complaint procedures for charging stations;
9. Options to address how electric vehicle users pay toward the cost of maintaining the state's transportation infrastructure, including methods to assess the impact of electric vehicles on that infrastructure and how to calculate a charge based on that impact, the potential assessment of a charge to electric vehicles as a rate per kilowatt hour delivered to an electric vehicle, varying such per-kilowatt-hour charge by size and type of electric vehicle, and phasing in such per-kilowatt-hour charge;
10. The accuracy of electric metering and submetering technology for charging electric vehicles;
11. Strategies to encourage electric vehicle usage without shifting costs to electric ratepayers who do not own or charge electric vehicles; and
12. Any other issues the task force considers relevant.

The Task Force is submitting this report to meet the requirements of Section 142.1000. The Task Force has collected information from various sources to answer the questions posed by the General Assembly when creating the Task Force. This report will dive deeper into each of these questions.

The purpose of this report is to explore the evolving world of electric vehicles and their charging stations and make recommendations for future General Assembly action. The information in this report is intended to provide the reader with information on electric vehicles and transportation funding in the future. It includes a discussion on electric vehicles and their charging stations including their past, present and future. It includes how EV chargers operate today, and what the future of EV Chargers may look like.

This is not intended to be a comprehensive accounting of all electric vehicle and EV Charger information but is intended to provide background information, as members of the General Assembly begin to look at rules and regulations needed to protect the consumers dealing with EV Chargers in the future and to provide adequate transportation funding in the future. This technology is so new and ever changing. This report will only scratch the surface of what the State of Missouri will need to do in order to be prepared for electric vehicles in the future.

There will need to be a continued effort of the General Assembly and stakeholders to decide how the State of Missouri will move forward with the issue of electric vehicles and its ever changing technology.

CHAPTER 1:
ELECTRIC VEHICLE TASK FORCE RECOMMENDATIONS

This chapter includes the recommendations the Task Force identified during its multiple meetings held in 2022. First, these are just recommendations. The Task Force knows the General Assembly will have final say on many of these and ultimately set the pace in which the State of Missouri is to adopt EV policies.

The following is a list of recommendations the Task Force proposes for the General Assembly, various departments of the Executive Branch and various private stakeholders.

1. The Task Force sees that there needs to be more discussion and research regarding the issues that surround electric vehicles and new technologies associated with these vehicles. Due to this the Task Force recommends the General Assembly to extend the Electric Vehicle Task Force edict for at least another year. (See Appendix 10: Missouri Department of Transportation Letter to Task Force Chairman)
    - The Department of Revenue request to make MODoT the overseer of the Task Force and keep the Department of Revenue as a member.

2. The General Assembly and Missouri Department of Revenue to work together to ensure the EV decal not only pays for the usage of the Missouri highway system, but also it is simple and easy to obtain for the Missouri driver.
    - Ensure the decal issuance is lined up with the vehicle registration.
    - Ensure the decal can be purchased online.
    - Work with Highway patrol to identify a better way for customers to display the decal.

3. The General Assembly, Missouri Department of Transportation, and Missouri Department of Revenue to work together to replace the outdated registration method of using horsepower to figure the cost of registration. This method is only being used by Missouri and cars are no longer being classified by the horsepower.

4. This Task Force recommends the General Assembly, MODOT and Missouri's Department of Agriculture work together to establish a motor fuel tax for a kilowatt hour [or other policy through which declining gas tax revenues are replenished by electric vehicle operators].

- Additionally, the Task Force recommends the simplification of the motor fuel tax rate with one rate for gallons and one rate for kilowatt hour.

5. As the NCWM implements new regulations on EV and their chargers that the Department of Agriculture notify the General Assembly of any additional statutory changes they believe will be needed to enforce these new electric charger safety and inspection requirements.

6. The General Assembly and Department of Agriculture discuss the current rolling compliance of the Division of Weights and Measures and whether it is better to decouple from the federal government.

7. The Department of Natural Resources research and report to the General Assembly requires a systematic plan for the recycling of the batteries from EVs. The DNR also reviews the fee associated with batteries in the State of Missouri.

CHAPTER 2:
HISTORY OF ELECTRIC VEHICLES

Prior to making recommendations about the future of electric vehicles (EV) and their chargers, we are providing some background information about the history of electric vehicles and the current initiatives by the federal government to encourage the use of more electric vehicles.

While the federal government push for more electric vehicles and the infrastructure to run them seems relatively new, electric vehicles have been around more than 100 years. This chapter takes a look at the history of electric vehicles.

Prior to the 1800's there were limited sources of transportation in the world. Usually, animals, were the main source. Horses, camels and mules but these often proved limiting. People were looking for something better. In 1804 the first train, powered by steam was put into service and this opened the possibility of traveling further. However, steam was limiting. Steam vehicles required long startup times especially in the cold and needed to be refilled with water, limiting their range.

Innovators in Hungary, the Netherlands and the United States all began toying with the concept of a battery powered vehicle in the early part of the 1800's. Additionally, a British inventor, Robert Anderson, was also working on the first crude electric carriage at the same time. The concept of a personal vehicle was begin considered. Then on January 29, 1886, Carl Bens applied for a patent for a vehicle powered by gas engine. The birth of the automobile industry was born.

Numerous manufacturers of personal vehicles came onto the market. And in 1890, William Morrison debut the first successful electric car. It was an electrified wagon, but it began the interest in electric vehicles. By the 1900, electric cars accounted for a third of all vehicles on the road. Many automakers were creating electric vehicles. New York City even owed a fleet of more than 60 electric vehicles they used as taxis.

At the same time, the interest in personal vehicles was growing. As society became better off they saw the benefits in owning personal vehicles. However, they also recognized the limitation of steam vehicles to get around. They began to turn more to the gasoline powered engines and electric vehicles.

The first gasoline powered cars were easy to mass produce but required effort to drive, from switching gears and hand cranking to get them started. They also were noisy and they produced a smelly exhaust. The electric vehicles at the time were easier to drive, did not smell and were quiet when driving. They were easier to operate and seemed to be a favorite of women for driving in the city. The biggest limitation was the access to electricity at the time. Electricity was not available in all houses in the U.S. in the early 1900. Limiting the access to the electric vehicles to only those wealthy enough to have electricity and live in a major city.

Many innovators worked on versions of vehicles that could run on electricity or some hybrid. Ferdinand Porsche, found of the Porsche Company created the first hybrid electric/gas powered engine in 1898. Thomas Edison at the same time was improving the technology of vehicle batteries in order to extend the range of an electric vehicle.

In 1903, Henry Ford built his first plant to mass produce gasoline engine vehicles and started what has become the mass production of vehicles. By 1912, it would cost $650 to purchase a gasoline powered vehicle but $1,750 for an electric vehicle. The creation of the mass production of the Model T, a gasoline powered vehicle, seemed to end the electric vehicle craze. A partnership in 1914, between Ford and Edison, for Edison's improved battery technology was applied to the gasoline powered vehicles and propelled gasoline powered cars ahead of electric vehicles in the marketplace.

By the 1920's the U.S. had a system of roads connecting cities and the discovery of crude oil lead to the production of cheap gasoline. As filling stations began popping up all across the nation from the 1920's through the 1930's the last of the electric vehicles disappeared by 1935.

During the oil embargo in the late 1960's and 1970's interest again was sparked in electric vehicles. Cheap and abundant gas was suddenly in short supply and what was available was extremely expensive. People expressed interest in alternative fuel vehicles including electric vehicles. In 1976, the U.S. Government passed the Electric and Hybrid Vehicle Research, Development, and Demonstration Act to encourage research and development of electric and hybrid vehicles.

As several companies began research on electric or alternative fuel vehicles the same concerns about them arose again. They had limited performance compared to gasoline powered vehicles. Typically they could not be driven more than 40 miles before needing to be recharged and could not exceed 45 miles per hour. The national speed limit on the interstate in 1970 was 55 miles per hour.

While research continued, the federal government passed the Clean Air Act Amendment in 1990 which implemented emission standards for vehicles. All vehicles were needing to be modified to meet the new standards. Additionally, in 1992 the

California Air Resources Board passed even stricter requirements for vehicles driven in California. Plus the Volkswagen entities settlement, in which they must pay $2.9 billion for violating the Clean Air Act emission standards, have led to a renewal by automobile manufactures desire to create alternative fuel vehicles, including electric vehicles.

Throughout the early 2000's environmental concerns have continued to push for better alternative fuel vehicles. Automobile manufacturers are continually improving the technology of the vehicles to compete with the function of the gasoline powered vehicles. Due to the Volkswagen settlement, funding to improve the electric vehicle infrastructure has been provided to states. Over the next 10 years, it is expected that Electric Vehicle charging stations will be available every 50 miles along the interstate road system.

Today's alternative fuel vehicles include:

- Battery Electric Vehicles (BEV or LEAF) – they run solely on electric battery operated power.
- Hybrid Electric Vehicles (HEV) – gas and electric propulsion system in which the battery in gas-electric hybrids is charged from the engine and through braking.
- Plug-In Hybrids (PHEV) - they run on an electric battery, and when the battery is depleted it switches to gasoline.
- Natural Gas vehicles – they use compressed or liquefied natural gas to power the vehicle.
- Fuel cell electric vehicles (FCEV) - they have on-board fuel cells that run on compressed hydrogen. The fuel cells convert hydrogen and oxygen into electricity and in turn power an electric motor.
- Flexible Fuel Vehicles (FFV) - run on a mixture of gas and ethanol.

Though the history is extensive for EVs, one might also say we are just scratching the surface when it comes to this ever evolving technology.

CHAPTER 3:
VOLKSWAGEN SETTLEMENT

This chapter takes a look at the Volkswagen Settlement and how the decision in the case is helping to propel the creation of an electric vehicle charging station infrastructure across the country.

The U.S. Environmental Protection Agency (EPA) oversees the Clean Air Act (CAA). A portion of the CAA requires manufacturers of light duty vehicles to demonstrate that their vehicles meet certain tailpipe emission standards. Specifically that they are low in nitrogen oxide (NOx) a noxious pollutant that cause harm to human's health and environment. Each vehicle manufacturer must bring vehicles to be tested by the EPA and certified for compliance.

On January 4, 2016 and on October 7, 2016 the EPA on behalf of the United States filed a complaint against the Volkswagen entities listed below that alleged violations of the CAA with regards to 590,000 diesel vehicles. The EPA alleged that these vehicles contained an engine control module that could be calibrated to cause the emission control system to perform differently during the EPA test than when driven on the road by their owners. The EPA alleged that the Volkswagen entities were attempting to violate the CAA and its low emission requirements by having the test show a low emission rather than the higher emission when driven by owners.

The Volkswagen entities include:

- **Volkswagen AG** which is headquartered in Wolfsburg, Germany and is one of the world's leading automobile manufacturers and the largest carmaker in Europe. This is the parent company of Volkswagen Group of America, Inc., Volkswagen Group of America Chattanooga, LLC, and Audi AG.
- **Volkswagen Group of America, Inc.** is a wholly owned subsidiary of Volkswagen AG. It operates a manufacturing plant in Chattanooga, Tennessee and houses the U.S. operations of several brands of cars.
- **Volkswagen Group of America Chattanooga Operations, LLC** operates a manufacturing plant in Chattanooga, Tennessee and is as a subsidiary of Volkswagen Group of America, Inc.
- **Audi AG** has been owned by Volkswagen since 1969 and produces Audi vehicles.

- **Dr. Ing. h.c. F. Porsche AG** is a German corporation, headquartered in Stuttgart, Germany, that is owned by Volkswagen AG. The company designs, develops, manufactures, and distributes vehicles, engines, and other technical products.
- **Porsche Cars North America, Inc.** is a wholly-owned subsidiary of Dr. Ing. h.c. F. Porsche AG, headquartered in Atlanta, Georgia. Porsche Cars North American, Inc. is the exclusive importer of Porsche vehicles for the United States. The company provides Porsche vehicles, parts, service, marketing and training for its 189 dealers in the United States.

The Federal Government and the Volkswagen entities reached a settlement on October 25, 2016, in which the Volkswagen entities admitted they violated the CAA and are to provide $2.9 billion to the Environmental Mitigation Trust Fund. Funds from the trust fund are to be used to fully remediate the excess emissions from the illegal vehicles by requiring the investment of the settlement money to be used to support Zero Emission Vehicles (ZEV).

The settlement agreement indicated that customers purchased the Volkswagen entities' vehicles because they were told they were lower emitting vehicles which were better for the environment. The Volkswagen entities are required to pay the settlement, which is to be used to try to undo the damage caused by the higher emission vehicles.

The settlement money is being distributed to the states using a formula based on the number of vehicles sold in the state. The Department of Natural Resources' Division of Energy is designated to handle the distribution of Missouri's funding. Missouri has received $41.1 million that it is awarding to specific projects by October 2027. The federal government has provided guidance as to appropriate uses of the settlement money which includes replacement of old diesel engines with newer cleaner fuel types and installation of an EV charging infrastructure. DNR released a report entitled "Missouri's Beneficiary Mitigation Plan" in which they identified how the settlement funding would be appropriated. The report indicates:

Award Categories	Overview	Amount (in millions)
School Buses	School Buses with 2009 and older engines can be replaced with a new bus or engine	$12
Government Trucks	Large and medium government-owned trucks with 1992 to 2009 engine can be replaced with a new vehicle or engine	$6
Transit and Shuttle Buses	Transit and shuttle buses with 2009 and older engines can be replaced with a new bus or engine	$4
Nongovernment Trucks	Large and medium nongovernment-owned trucks with 1992 to 2009 engine can be replaced with a new vehicle or engine	$6
Locomotive & Marine	Older switchyard locomotives can be replaced or repowered; older ferries and tugs can be repowered	$2
Airport & Cargo Equipment	Older airport ground support equipment can be replaced with electric vehicles or electric engines; forklifts can be replaced with electric vehicles or electric engines	$2
DERA Option	The Department can use VW Trust funds as their non-federal voluntary match for the federal DERA program, which expands allowable project types for this category to include all DERA-eligible projects.	$3
Electric Vehicle Charging Stations	Electric vehicle charging stations can be built for light-duty vehicles near highways, workplaces, or multi-unit dwelling.	$6

Courtesy of the Volkswagen Trust - Missouri's Beneficiary Mitigation Plan, DNR

The federal government is allowing up to 15% of a state's allocation to be used for the EV charging infrastructure. The money for the electric charging stations is to install direct current fast chargers at specific locations. The stakeholder's goal was to create a minimum practical highway charging network that would allow citizens to be able to access EV chargers at designated points. The sites chosen are near Branson, Cabool, Chillicothe, Collins, Farmington, Hannibal, Macon, Maryville, Poplar Bluff, Sedalia, Bethany, Cameron, Columbia, Harrisonville, Kingdom City, Joplin, Nevada, Perryville, Rockport (Tarkio), Rolla, Sikeston, and Springfield.

The funding for the EV Charging infrastructure is being done through a competitive application process with specific requirements for the chargers and their location. Applicants for the funding must commit to a minimum 5 years of operating the station to receive any funding.

A copy of the "Missouri's Beneficiary Mitigation Plan" is included in Appendix 1 and additional information can be found on the DNR website at https://dnr.mo.gov/air/what-were-doing/Volkswagen-trust-funds.

CHAPTER 4:
NATIONAL EV CHARGING INITIATIVE (NEVI) AND FEDERAL LAWS

NEVI

With the passage of the Infrastructure Investment Act the federal government has sought to encourage the use of electric vehicles. The Task Force was asked to identify the strategies in place to encourage electric vehicle use. This chapter looks into the requirements established for building the EV infrastructure.

The National EV Charging Initiative (NEVI) was established in the Infrastructure Investment and Jobs Act signed into law on November 15, 2021. The U.S. Departments of Transportation and Energy are overseeing the distribution of $5 billion to build a national electric vehicle charging network through the Joint Office of Energy & Transportation. The network is to provide charging stations along designated Alternative Fuel Corridors and hopes to install 500,000 DC fast chargers. These corridors would allow drivers to have access to charging stations at set increments (generally every 50 miles). Missouri's Department of Transportation (MODOT) is tasked with overseeing the distribution of the funds Missouri receives.

It should be noted that this is a separate second program designed to fund EV charging stations. The Volkswagen settlement program and the NEVI program have different requirements for the EV chargers installed and placement of the chargers. In Missouri, MODOT and the DNR are coordinating to discourage duplication of EV chargers.

NEVI has established that all of the EV chargers must be the DC Fast Charger and have at least 4 combined charging system ports available. Therefore, the minimum number of vehicles capable of being charged simultaneously has to be at least four (4). They must also be within a one mile radius of the Alternative Fuel Corridor and the chargers be located in an area open to the public 24 hours a day and have access to services such as restrooms. There are also minimum wattage capabilities with the ability to expand in the future necessary.

The funding is allowed to be used to for the following:

- Install the EV charging stations,
- Upgrade on-site power storage,
- Signage and traffic control means for identifying the location of the station
- Operation and maintenance of the station for a minimum of 5 years.

Additionally, NEVI is requiring that the Justice40 Initiative be followed when placing these stations. Justice40 Initiative is a requirement by the federal government that 40% of the overall benefits of a federal investment flow to disadvantages communities that are marginalized, underserved and overburdened by pollution. MODOT has received a map indicating the Justice40 areas of the state. They are working to calculate the 40% benefit given the no more than one mile radius from the designated Alternative Fuel Corridor requirement.

Just like all other transportation projects, NEVI will require a 20% match from local governments in order to receive the 80% federal funding. Missouri's state constitution prohibits the use of our State Road Fund money to be used for this purpose. Therefore, the local portion of the funding cannot use their motor fuel tax money and must be raised from private sources or other government funding sources. The following amounts are expected to be received and the local match amount is indicated:

Federal Fiscal Year	Forecasted NEVI Funds	Local Match Required	TOTAL Funding
2022	$14,647,722	$2,929,544	$17,577,266
2023	$21,078,366	$4,215,673	$25,294,039
2024	$21,078,366	$4,215,673	$25,294,039
2025	$21,078,366	$4,215,673	$25,294,039
2026	$21,078,366	$4,215,673	$25,294,039
TOTAL	**$98,961,186**	**$19,792,237**	**$118,753,423**

Courtesy: MODOT

Each state must submit a plan to administer the funding that is approved by the Joint Office of Energy and Transportation. Once approved the state can start accepting bid proposals and awarding the funding. Missouri's initial report on how they plan to administer this funding was filed on August 1, 2022 and approved on September 22, 2022.

CHAPTER 5:
FEDERAL ELECTRIC VEHICLE TAX CREDIT

The federal electric vehicle tax credit program began on January 1, 2010. It allowed for a tax credit for the purchase of a qualified plug-in electric drive motor vehicle including a passenger vehicle or light truck. The credit was $2,500 for a vehicle that had a battery with at least 5 kilowatt hours of capacity. An additional $417 could be added for each additional kilowatt hour of batter capacity, with a cap of $7,500 for the credit.

This credit was phased out when a vehicle manufacture sold more than 200,000 qualifying vehicles.

The federal Inflation Reduction Act passed August 16, 2022, included an extension of this existing electric vehicle tax credit. However, it made changes to the credit including:

- The credit is extended from January 2023 – December 2032.
- The qualifying vehicle must be a new vehicle not a used to qualify.
- A person is only allowed up to $7,500 based on their tax liability. Therefore, you cannot receive more in credit than what you owe in tax liability.
- They eliminated that 200,000 vehicles sold limit on the manufacturers.
- The tax credit may be given up front at the dealership and applied to the purchase of the car but that doesn't start until January 2024.
- The vehicle must be assembled in North America.
- The majority of the components must come from North America.
- A percentage of the critical minerals must come from North America.
- In order for the vehicle to qualify for the credit it must have an MSRP below $55,000.
- The purchasers of the vehicle must report an adjusted gross income of less than $150,000 as an individual and $300,000 of joint filers.

This tax credit program along with the Volkswagen Settlement discussed in Chapter 2 and the NEVI program discussed in Chapter 3 show the federal government is encouraging the use of more electric vehicles and the growing of the infrastructure needed to fuel these electric vehicles. This report in the following chapters will address the issues and questions that arise when electric vehicle infrastructure is discussed.

CHAPTER 6:
MISSOURI TRANSPORTATION FUNDING

Current Missouri Funding

The Missouri Department of Transportation (MODOT) per Article IV, Section 29 of the Missouri Constitution is charged with maintaining Missouri's entire transportation system. That system includes 33,832 miles of highways, 97,000 miles of county roads and city streets, and 14,000 bridges. It additionally includes a network of aviation, railways, waterways and transit systems. Missouri's transportation system is the 7th largest in the United States.

Missouri's transportation system is funded primarily through a collection of user fees including fuel taxes, registration and licensing fees and motor fuel sales taxes. Those fees and sales tax are to be used to cover the cost of repair, maintenance and replacement of the state's transportation system. The user fees are used to help draw down federal funds. In fiscal year 2020 the state collected nearly $2.9 billion in transportation revenue. Those sources include approximately 55% from state user fees, 36% from the federal government and the rest from bond issuances and the state's general sales tax (for the sale of motor vehicles).

The purpose of the fees and sales tax are to generate enough revenue to pay for the repair, maintenance and replacement of the state's transportation system without the state needing to contribute general revenue dollars to pay for it. The idea is that those that use the transportation system will pay to maintain it.

Missouri's constitution in Article IV, Section 30(a) requires that "a tax upon or measured by fuel used for propelling highway motor vehicles shall be levied and collected as provided by law." The motor fuel tax is the largest of the user fee. It is apportioned and distributed as follows:

- 15% to counties
- 12% to cities
- 73% to the State Road Fund

Section 142.803 RSMO, currently levies the following tax on motor fuel used or consumed to propel a motor vehicle as required by Article IV, Section 30(a):

- Gasoline and Diesel - $0.225 per gallon (this is increasing to $0.29 per gallon over a period of years)
- Aviation fuel - $0.09 per gallon
- Compressed Natural Gas - $0.11 per gallon (this is increasing to $0.17 per gallon on 1/1/2025)
- Liquefied Natural Gas - $0.11 per gallon (this is increasing to $0.17 per gallon on 1/1/2025)
- Propane - $0.11 per gallon (this is increasing to $0.17 per gallon on 1/1/2025)
- Electricity - $0.00

The motor fuel tax is the largest of the user fees and is collected when vehicles fill up at a retail service station. The tax is collected at the retail service station as part of the price of the motor fuel sold. It is collected on all fuel sold by the gallon.

So to combat the problem of electric vehicles using the state transportation system without paying for its maintenance Senator McKenna in 1998 established the alternative fuel decal program.

The alternative fuel decal in SB 619 was established to require vehicles powered by a source sold other than by the gallon to pay their portion of the repair, maintenance and replacement of the state's transportation system. Citizens that drive vehicles powered by an alternative fuel are required to obtain the decal each year from DOR. In 1998 the legislature set the rates of the decal at:

- $75 for each passenger vehicle, school bus and commercial motor vehicle with a weight of less than 18,000 pounds.
- $100 for motor vehicles over 18,000 pounds but less than 36,000 pounds used for farm or farming transportation and registered with an "F" license plate
- $100 for motor vehicles over 18,000 pounds but less than or equal to 36,000 pounds & passenger-carrying motor vehicles subject to a registration fees under Sections 301.09, 301.061 & 301.063
- $200 on vehicles over 36,000 used for farm or farming transportation and registered with an "F" license plate
- $1000 for vehicles over 36,000 pounds.

Other States Funding of Transportation with Electric Vehicles

Other states grappled with the challenge of how to assess a user fee on electric vehicle and other alternative fuel vehicles. Thirty states now have special registration fees for plug-in electric vehicles in lieu of paying their state motor fuel tax. The fees can range from $50 per year to $225 depending on the state.

Seven states Maine, Nevada, New Mexico, Oregon, Utah, Virginia and Washington have enacted Road User Charge (RCU) taxes. These RCU or Vehicle Miles Traveled (VMT) taxes a person based on the number of miles driven on the roadways. These states often have a special registration fee for alternative fuel vehicles but allow a person to pay a fee per mile up to the special registration fee amount instead of the special registration fee. This way if you drive less, you pay less but those that drive the most, only pay the full registration amount. Such as in Utah where owners of electric and hybrid vehicles have two options: pay the additional alternative fuel flat fee during annual vehicle registration or enroll in the Road Usage Charge program and be charged 1.52 cents per mile up to the additional flat fee amount. The miles are recorded by installing a device in the vehicle that records the miles driven. Participants can review those reports on-line and pay the RUC charge monthly rather than yearly. If a person drives more than $120 worth of miles the fee is capped at the $120. This provides choice for the taxpayers.

Other States Electric Vehicle Fees (which include regular registration and alternative fuel fees):

- Washington - $225 electric vehicle
- Idaho - $140 all-electric vehicle and $75 for plug-in hybrid vehicle
- Oregon - $153 electric vehicle
- Illinois - $251 electric vehicle
- Arkansas - $200 electric vehicle, $100 hybrid vehicle
- Tennessee - $123.75 electric vehicle
- Iowa - $130 for battery electric vehicles, $65 for plug-in hybrid vehicles
- Nebraska - $90 all alternative fuel vehicles
- Kansas - $100 all electric vehicle, $50 plug-in hybrid
- Oklahoma – fee varies by weight of the electric vehicle from $110 -$2,250, reduced rates for plug-in hybrids (also by weight)
- Mississippi - $165 electric vehicles, $90 for hybrid vehicles

Starting January 1, 2023 the National Conference on Weights and Measures (NCWM) is requiring that all sales of electricity for use in a motor vehicle must be sold by the kilowatt hour (kWh). The Missouri Department of Agriculture's Weights, Measures and Consumer Protection Division will be enforcing this requirement in Missouri. Prior to the adoption of this kilowatt hour rule, charger companies were not required to sell electric fuel in any uniform way making a motor fuel tax impossible. With the adoption of the kilowatt as the unit of measure, a motor fuel tax could be set per kilowatt hour similar to the motor fuel tax on a gallon. Though due to Direct Current Fast Charger (DCFC), there currently is no technology to actually test the amount coming out is the actual amount.

At least four states (Iowa, Kentucky, Oklahoma and Pennsylvania) are trying to recoup lost fuel tax revenue from a different angle: taxing the electricity used at public charging stations, according to the National Conference of State Legislatures.

It is unclear how many of these states with the alternative fuel system will be changing how their motor fuel tax will be collected on electric vehicles given the new kilowatt per hour rule.

Future Transportation Funding

The average miles driven by a gas powered vehicle on a gallon of gas is 25 miles. An electric vehicle can drive 4 miles on each kilowatt hour of power. Therefore, it takes 6 kilowatt hours to go the same 25 miles in an electric vehicle. Given the motor fuel rate for a gas powered vehicle will be $0.29 per gallon, a motor fuel tax of $0.05 per kilowatt hour could be established on an electric vehicle for the same number of miles driven. (These numbers were compiled through multiple sources during researching this issue)

CHAPTER 7:
GOVERNING EV CHARGING STATIONS

The Task Force was asked to specifically identify the scope of the jurisdiction of the Public Service Commission, Department of Revenue and any other state agency in regards to EV Charging stations (142.1000.2(7)). Additionally, the Task Force was charged with identifying what current safety standards and inspections standards are being applied to the charging of electric vehicles (142.1000.2(6)). This chapter hopes to provide information on the current rules and regulations.

The Task Force found that neither the Public Service Commission nor the Department of Revenue are currently involved in monitoring or overseeing electric vehicles or their chargers. The Department of Agriculture's Weights, Measures and Consumer Protection Division is charged with enforcing motor fuel standards for all vehicles including electric vehicles.

When a person goes to a gas station to fill their car with motor fuel, that station had undergone several different inspections and is required to meet certain safety standards. The National Conference on Weights and Measurers (NCWM) is responsible for setting standards on the storage and distribution of motor fuel. The Missouri Department of Agriculture's Weights, Measures and Consumer Protection Division is tasked with enforcing those standards. For retail service stations those include making sure that when the pump says you are buying a gallon it is actually a gallon. They also perform fuel quality inspections to ensure the quality of the fuel meets certain certified standards. For example, they ensure you are actually getting Premium fuel when you are purchasing premium and Regular fuel when you are purchasing regular. These inspections also help to ensure that the customer receives the product they pay for and that the motor fuel is handled safely and properly.

NCWM requirements include:

- Ensuring that all workers installing or repairing the pumps is licensed
- Pump controls that only allow the operation when moved from the off position.
- Pump controls that shut off if someone drives away still attached to the pump.

- Protection of the pumps themselves from vehicles by placing them on concrete barriers.
- Dispenser wiring installed in explosion proof conduit and components.
- Limits on dispensing hose lengths.
- Dispensing area with fire extinguisher that can help stop a fuel fire.

The Division of Weights and Measures is statutorily required to comply with the testing and inspection standards established by the NCWM per Section 413.055 RSMo. As new standards are adopted by the NCWM, Missouri has rolling compliance to implement those new standards on all motor fuels.

With the encouragement by the federal government of the use of electric vehicles, the NCWM has been working on establishing standards for the testing and inspection of motor fuel stored and distributed by EV Chargers. In July 2022, they adopted the first ever testing and inspections standards. Those standards become enforceable starting January 2023.

Those standards include but are not limited to:

- All electricity kept, offered or exposed for sale or sold at retail as a vehicle fuel must be dispensed in terms of megajoule (MJ) or kilowatt-hour (kWh).
- Additional fees are allowed for other services like based on time measurement (15 minute charge) or fixed fees.
- The retail electric vehicle supply equipment (EV charger) labeling requires the unit price be displayed in whole cents or tenths of one cent on the basis of price per MJ or kWh.
- If the electrical energy is disbursed for free then that fact must be clearly stated on the retail electric vehicle supply equipment.
- Rules regarding how the testing of the EV Chargers is to be carried out.

The Department of Agriculture explained to the Task Force they are unsure if EV Chargers currently in use are built to the new adopted standards established by the NCWM. With the recent adoption of the new standards and the requirement that all chargers by compliant starting January 1, 2023 it is too soon to know how many may not be compliant.

Additionally, while the NCWM has created new standards for the selling by the kilowatt hour by the chargers and the requirements of the states to inspect and certify the kilowatt hour there are still limitations on being able to perform the required testing. Current testing technology has not caught up to the implemented standards. The Department of Agriculture is undergoing a review of the newly adopted standards to determine how they are to enforce the new standards.

Missouri is not the only state undergoing such a review. All states that have rolling compliance with the NCWM are facing these challenges. The Department of Agriculture noted that the State of California has set out to create its own testing and inspection standards rather than rely on the NCWM standards. They are facing the same limitations on equipment for testing as the rest of the states.

While the NCWM is working on setting standards on testing of EV Chargers, these chargers pose some of the same safety risks as traditional retail service stations. Both retail service stations and EV Chargers face some of the same dangers. Both are working with an energy source that is flammable (gas and electricity). Both can have a person drive off with the hose still connected to the pump or EV charger, causing a spark and then a fire. Both the pump and chargers run the risk of being hit by a motor vehicle which could cause a fire.

A JD Power survey found that 11,554 electric vehicle owners between January 2022 and June of 2022 reported that while there has been a growth in EV Chargers available in the U.S. customer's satisfaction with them is declining. The decline in satisfaction comes from inoperable equipment (chargers broken). Most drivers indicated that public charging stations are often inoperable leaving drivers with a problem and discouraging others from even considering the purchase of an electric vehicle. Unlike a gas station which has a competitor down the block from them, EV chargers are often more difficult to locate.

CHAPTER 8:
WHAT ARE EV CHARGING STATIONS?

This chapter explores the types of electric vehicle supply equipment (EV Chargers) available and how they currently operate. Additionally it provides information required of the Task Force about how chargers bill customers, how much electricity they distribute, electric metering and sub metering technology.

Just as there are different brands of vehicles, there are different types of chargers. Currently there are three types of EV chargers on the market. They are referred to as: Level 1 chargers, Level 2 chargers and DC Fast chargers. Below is a description of each type:

- Level 1 charger - is a charger that allows your vehicle to be plugged into a regular wall outlet. Typically, these chargers come from the manufacturer with the vehicle. Level 1 chargers will deliver 1.2 kW of electricity to the vehicle. A Level 1 charger is slower to charge usually 11-20 hours to get fully charged, which provides about 4 miles of driving range per one hour of charge.
- Level 2 charger – is a charging station that delivers an electrical current from an outlet or hardwired unit to the vehicle via a connector. The outlet must be a 208-240 Volt, 40 Amp circuit. This requires the installation of a 240V plug in place of a regular wall outlet on a separate circuit. A 240V outlet is the same one stoves run on. They deliver around 6.2 to 19.2 kW to the vehicle. The Level 2 charger will be fully charged in 3-8 hours and will provide about 32 miles of driving range per one hour of charge.
    - Both of the Level 1 & Level 2 chargers are converting the alternating current (AC) power from an outlet to direct current (DC) power to put it in the battery. All batteries use DC power. Given that electric vehicles use batteries they need a mechanism to convert AC power to DC power. The way that is done determines the speed of which an item is charged.
- DC Fast charger - A DC Fast charger bypasses the on-board charger and required conversion process and instead provide DC power into a battery directly. This allows the batteries to charge faster, usually within 60-90 minutes and to receive 350 kW. As part of the evolution of the electric vehicle and the charging stations to run them, DC Fast chargers are becoming more prevalent.

The price of each type of charger depends on the brand and install needs. The charger and plugs can vary in price from $300 to a couple thousands depending on the brand and level of charger purchased. Additional costs for the installation of a 240V outlet will increase costs especially when an electrician is needed to install. Additionally, since the 240V outlets require a dedicated circuit, depending on your household availability of circuit lines, additional lines may be needed to accommodate. Generally the prices can be expected in the following ranges (the highest assuming an electrician needed):

EXHIBIT 1

Cost ranges for charging infrastructure components.

COST ELEMENT	LOWEST COST	HIGHEST COST
Level 2 residential charger	$380 (2.9 kW)	$689 (7.7 kW)
Level 2 commercial charger	$2,500 (7.7 kW)	$4,900 (16.8 kW); outlier: $7,210 (14.4 kW)
DCFC (50 kW)	$20,000	$35,800
DCFC (150 kW)	$75,600	$100,000
DCFC (350 kW)	$128,000	$150,000
Transformer (150–300 kVA)	$35,000	$53,000
Transformer (500–750 kVA)	$44,000	$69,600
Transformer (1,000+ kVA)	$66,000	$173,000
Data contracts	$84/year/charger	$240/year/charger
Network contracts	$200/year/charger	$250/year/charger
Credit card reader	$325	$1,000
Cable cost	$1,500	$3,500

Note: DCFC denotes direct-current fast chargers.

CHAPTER 9:
ENVIRONMENTAL ISSUES

Emissions

Battery Electric Vehicles are cited as being better for the environment as there are not tailpipe emissions and they do not create noise pollution. They generally have fewer moving parts which may save in maintenance over the lifetime of the vehicle. However, they currently are more expensive than a gasoline powered vehicle, and only get about 150-400 miles on a full battery charge. The battery must be charged using electricity. The electricity which is made from fossil fuels, which may negate the "better for the environment" argument.

- Environment argument is that gas powered vehicles use the grid to convert crude oil to petroleum and then puff emissions out the tailpipe of the vehicle – 2 pollution sources
- EV vehicle- only uses the electricity- 1 pollution source

EVs allows for the concentration of what would normally be considered "tailpipe" emissions into one large source that is easier to clean and regulate rather than a million individual mobile sources. In addition, the emissions from the large source can be further modified with cleaner options such as wind and solar, which is not true of ICE vehicles.

Electric Vehicle Battery Recycling

One of the biggest arguments for people to purchase electric vehicles is that they are friendlier to the environment. Whether the vehicle is gas powered or electric they are on a battery. Those batteries lose effectiveness after a while and must be replaced.

Gas powered vehicle batteries are called lead acid batteries. They are comprised of electrodes made of sulfuric acid and lead oxide. Currently, 99% of all lead acid batteries are recycled. During the recycling process the battery is broken into small pieces and the chemicals are separated out. The broken pieces are formed into plastic pellets that can be sold back to manufacturers for creating more batteries. The lead is removed and melted back into lead plates to be formed into batteries

again. The old battery chemicals are processed into sodium sulfate which is used to make soap, glass and textiles. The current battery recycling for the lead acid batteries allows the batteries to become new again.

However, electric vehicles batteries are made of cobalt, lithium, manganese, nickel and other chemicals that are considered harmful to the environment. Except for the cobalt there is no cheap or easy way to recycle the other chemicals in the batteries.

To encourage the recycling of batteries many states require a fee when you buy a battery that is returned to you when you return the battery to the store. The store then sends the battery to a recycling center to ensure they are recycled. However, many of these laws are for lead acid batteries and not electric vehicle batteries.

In Missouri, per Section 260.262 RSMO, a battery fee of fifty cents ($0.50) is added to the price of a lead acid battery. The fee is collected by the retailer at the time of sale and transfers to the Department of Revenue for deposit into the Hazardous Waste Fund. The Fund uses the funding to clean up illegal hazardous waste sites in the state. We do not return the fee to the owner of the battery upon return. However, purchasers of batteries are required to return batteries to an approved recycling center or retailer. As currently written electric vehicle battery purchasers would not be required to pay the battery fee.

Currently, the only EV battery material worth recycling is cobalt. That leaves lithium, manganese, and nickel, among a host of other materials that may not be economically recyclable or require additional processing that drives cost. That's not only bad for the environment since there is a ton of leftover material, it's also bad for recyclers because unless there's a buyer lined up for lithium and manganese, they could be out of luck.

The two main methods for recycling batteries involve either extreme temperatures or acid. Both processes generate emissions and create waste, which can end up in the environment. Then there's the matter of economics, as many battery companies look to use less cobalt. If that ends up being the case, recyclers' already meager profit margins will take a beating. There is a method known as direct recycling, which leaves the cathode mixture intact, but it's not yet ready for primetime.

Beyond the fact that it's labor-intensive and sometimes dangerous to recycle the materials inside a battery, as explained by Science.org, the costs involved with transporting the batteries from one place to another are considerable expenses. Estimates peg the costs of transporting EV batteries to constitute as much as 40% of the overall costs of recycling. Additionally, due to the fire risk, some shipping and transport companies have strict guidelines on how and when EVs can be transported. Those who accept the loads might charge extra for the risk and hassle involved.

Electric Vehicle Task Force

APPENDIX

MISSOURI DEPARTMENT OF REVENUE

Electric Vehicle Task Force

APPENDIX 1

MISSOURI DEPARTMENT OF REVENUE

Electric Vehicle Task Force

Meeting Minutes

July 20, 2022 | 1 – 2:30 p.m.
Harry S Truman Building, Rm 493/494

Introductions of Task Force Members

- **Zachary Wyatt** - Missouri Department of Revenue (Chairman)
- **Missouri Senator Justin Brown**
- **Missouri Senator Greg Razer**
- **Missouri State Representative Josh Hurlbert**
- **Missouri State Representative Steve Butz**
- **Ryan Silvey** - Missouri Public Service Commission Chairman
- **Patrick McKenna** - Missouri Department of Transportation Director
- **Chris Haffenreffer** - Enterprise Holdings
- **Lynn Wallis**- Wallis Oil Co. Inc.
- **Caleb Jones**- Missouri Electric Cooperatives
- **Tony Reinhart**- Ford Motor Company
- **Chris Lutick**- United Parcel Service
- **Matthew Ellis**- Francis Energy, LLC

Chairman Zach Wyatt called the meeting to order with opening remarks. Wyatt thanked everyone for taking time to serve on this task force as the State of Missouri paves the way for the developing industry of electronic vehicles by helping ensure the state has the necessary infrastructure in place. He explained to members that this task force is charged with making recommendations on issues relevant to the subject.

Presentation by Missouri Department of Natural Resources (DNR), Division of Energy

- Emily Wilbur, Deputy Director, Division of Energy, DNR

Emily Wilbur, deputy director of the Missouri Division of Energy, gave a presentation regarding the division's administration of the Volkswagen Trust settlement funds allotted to Missouri for electric vehicle infrastructure funding. See attached PowerPoint.

Presentation by Missouri Department of Transportation (MoDOT)

- Elizabeth Prestwood, Policy and Innovation Program Manager, MoDOT

Elizabeth Prestwood, manager of the Missouri Department of Transportation's Policy and Innovation Program, gave a presentation regarding the National Electric Vehicle Infrastructure Formula Program (NEVI). The $5 billion NEVI Formula Program will provide dedicated funding to states, including Missouri, to strategically deploy electronic vehicle charging infrastructure and establish an interconnected network to facilitate data collection, access and reliability. See attached PowerPoint.

Open Discussion among Task Force Members

Following the presentations, Wyatt opened the meeting for a roundtable discussion among task force members. Members agreed to continue the meetings every three weeks through the end of 2022. Meetings will continue to be held at the Truman Building in Jefferson City with members able to attend in person or by WebEx.

Wyatt suggested the task force request input at a future meeting from representatives of utility companies, counties and municipalities, the convenience stores industry and the fuel industry.

Reinhart suggested the group have a representative from the automobile industry provide perspective on how electronic vehicle innovation is affecting their industry.

Wyatt asked members to submit issues they would like to discuss at future meetings. He said he will define issues and post them to the task force webpage.

Electric Vehicle Task Force

Meeting Minutes

August 3, 2022 | 2 – 3 p.m.
Harry S Truman Building, Rm 400/WebEx

Discuss the 13 objectives per legislation

Discuss upcoming meetings/presenters

Zachary Wyatt called the meeting to order with members present in person and via Webex. The goal for today's meeting was to review the 13 informational tasks assigned to the task force. Members discussed each point below and made recommendations for future meetings and presentations which will allow the team to gather information necessary for the final report due in December.

The task force analyzed the following in the context of transportation funding, and potential recommendations for any actions the state should take to fund transportation infrastructure in anticipation of more widespread adoption of electric vehicles:

1. Removal or mitigation of barriers to electric vehicle charging, including strategies, such as time-of-use rates, to reduce operating costs for current and future electric vehicle owners without shifting costs to electric ratepayers who do not own or operate electric vehicles;
2. Strategies for managing the impact of electric vehicles on, and services provided for electric vehicles by, the electricity transmission and distribution system;
3. Electric system benefits and costs of electric vehicle charging, electric utility planning for electric vehicle charging, and rate design for electric vehicle charging;
4. The appropriate role of electric utilities with regard to the deployment and operation of electric vehicle charging systems;
5. How and on what terms, including quantity, pricing, and time of day, charging stations owned or operated by entities other than electric utilities will obtain electricity to provide to electric vehicles;
6. What safety standards should apply to the charging of electric vehicles;
7. The recommended scope of the jurisdiction of the public service commission, the department of revenue, and other state agencies over charging stations owned or operated by entities other than electric utilities;
8. Whether charging stations owned or operated by entities other than electric utilities will be free to set the rates or prices at which they provide electricity to electric vehicles, and any other issues relevant to the appropriate oversight of the rates and prices charged by such stations, including transparency to the consumer of those rates and prices; and
9. The recommended billing and complaint procedures for charging stations;
10. Options to address how electric vehicle users pay toward the cost of maintaining the state's transportation infrastructure, including methods to assess the impact of electric vehicles on that infrastructure and how to calculate a charge based on that impact, the potential assessment of a charge to electric vehicles as a rate per kilowatt hour

delivered to an electric vehicle, varying such per-kilowatt-hour charge by size and type of electric vehicle, and phasing in such per-kilowatt-hour charge;

11. The accuracy of electric metering and submetering technology for charging electric vehicles;
12. Strategies to encourage electric vehicle usage without shifting costs to electric ratepayers who do not own or charge electric vehicles; and
13. Any other issues the task force considers relevant.

After discussion on each point, it was determined that future meetings will involve presentations from representatives from the following: Missouri Department of Transportation; Public Service Commission; Division of Weights and Measures; Division of Energy; Department of Revenue; car manufacturers, utility companies, convenience stores, energy companies; firefighters; battery manufacturers and others as needed.
The next meeting of the Electric Vehicle Task Force Meeting will be at 2 p.m. August 24, 2022, in the Harry S. Truman Building – room location to be determined and posted.

Electric Vehicle Task Force

Meeting Minutes

September 7, 2022 | 2 – 3 p.m.
Harry S Truman Building, Rm 493/494 (WebEx)

Discussion with Missouri Department of Agriculture, Division of Weights and Measures

Jimmy Williams, Director of the Missouri Department of Agriculture Weights and Measures Division, discussed his division's involvement with electric vehicle charging stations. According to Williams, MDA/Weights and Measures follows national standards regarding weights and measures through involvement with the National Conference on Weights and Measures. The job of NCWM is to promulgate standards for all inspection protocols, including electricity and federal and state standards for electric vehicle charging stations. Williams said most EV charging stations today are charging based upon usage time, and payment is based upon usage time. Beginning in January 2023, stations will have to charge by kilowatt hour per NWCM standards. California is currently attempting to begin regulating charging stations, but they are the only state at this time. Regulatory guidelines were only tentative until July 2022. Now states will have to venture into the area of regulation per new federal guidelines. Williams said regulation is very much in its infancy from a weights and measures perspective. Testing of stations is also presenting a challenge as technology currently allows for testing of AC vehicle chargers but not DC chargers. AC chargers are considerably slower. DC charging is different. Because it involves significant levels of voltage, states don't have the ability to test to see if a charger is truly working as the company claims. He said we are going to see development in this area, but at this point there is no state that can test DC chargers. DC chargers produce a significant amount of heat that testing companies are learning to work around.

Meeting attendees suggested utility companies come to future meetings to discuss how they are charging for electricity to these charging stations.

Discuss the various articles that were sent out

Zach Wyatt, Electric Vehicle Task Force Chairman, pointed out the EV webpage available to the public on the Department of Revenue website. Electric Vehicle Task Force (mo.gov)

The next meeting of the EV Task Force will be at 3 pm. September 21 in the Harry S. Truman Building, 301 West High Street, Jefferson City MO.

Electric Vehicle Task Force

Meeting Minutes

September 21, 2022 | 3 – 4 p.m.
Harry S Truman Building, Rm 400 (WebEx)

Presentation by Springfield City Utilities

- Brent Baker, Vice President and Chief Customer Officer

Brent Baker presented. Discussed what Springfield has been doing for the past couple of years to deploy the city's charging strategies and how they can best help customers.

Cara and Hallie:

Cara Shaefer with Springfield City Utilities also spoke. Said EVs are going to have significant impact on municipal utilities, so preparation is necessary. Over 100,000 electric customers as well as natural gas and transit systems. We know this is a smart growth opportunity if we can develop the program the right way. How can we optimize our system? There are lots of environmental benefits to electric vehicles. WE had a demand/response utility study and they projected the forecast for EVs on our system. A conservative view would be an average annual growth rate of about 23% per year for 15 years. Customer survey on residential and commercial customers responded to questions as well. 31% of residential say they are likely to purchase EV within 5 years and over 40% within 10 years. One of biggest takeaways from survey was the utility needs to play role in promoting EVs. Over 50% of customers want rebates for using home charging systems. We want to be a trusted adviser to our customers. Lot of good and bad information being put forth to the public, so we want to only provide factual information. WE want to beef up our website to add content for customer education on EVs and to provide calculators to show benefits of driving EVs.

Hallie Heinzler: City utilities back in 2014 first installed first level 2 charging station. We wanted to provide it to community as a service and to glean data. Who is charging; how long are they charging? The answer was people used it all the time for multiple times a day and several repeat customers from both local and outside the area who travel through. This helped us know that we need to build infrastructure for both customers and transit system. In 2019 we were awarded an FTA program grant to allow us to purchase two electric buses. We are learning a lot from those. We are evaluating the good and bad points of these buses to develop future plans. City utilities has two Hyundai Konas as well. We should own EVs and have experience. We have learned a lot by driving and using an EV ourselves. Also involved in project in town that took advantage of VW settlement funds. Partnered with local businesses to put two level two dual port charging and two DC fast chargers at a local corridor which is highly traveled. We are looking at that to see who charges and how long. Still studying for future data and development. Also have plans to upgrade fleets to electric vehicles. WE know that the infrastructure will be expensive, so we will upgrade strategically. We also have a suite

of electric vehicle rebates for our customers. This was great customer service for builders to install a 240 volt outlet before sheetrock was installed. In May of this year, we rolled out two additional rebates: EV home upgrade for existing customer and home to add 240 volt outlet in their garage. Rebate is 50% of the cost up to $500 to add a new up to $500. Seen quite a bit of participation.

Cara: As Hallie mentioned, using study data to continue EV development strategy. We will recommend time of use rates as well to incentivize customers to charge away from peak usage times.

Brent: Pretty comprehensive plan and great organization for our program. Questions:

Zach: Does Missouri Municipal Utilities collaborate to take about best practices with other municipalities as well? Brent: We are part of MPUA – Missouri Public Utilities Association – learn from each other. Partner together. Improve EV charging and strengthen grids. We want to create revenue to invest in our Scott – Associated Electric in Springfield – we offer $250 customer rebates in MO, IA and OK for any level 2 charger –

Pat Justis: Ameren Missouri – don't have rebate for homeowner but do have rebates for business customers installing EV chargers. We are working to educate customers as well.

Brent Baker: We are working to encourage charging at the off peak times to keep rates down and keep strain from grid.

Robin from Liberty Utilities: Publicly launching programs on Monday. We will have rebates for residential customers to wire house with outlet and rebates for off peak usage times.

Lynn Wallis: Convenience stores and petroleum. I have a lot of questions and concerns. Time of us rate: Can you explain that? How does that help with infrastructure? Tax per gallon of gas gives funding to state so how does your program contribute? Also, what are grid restraints with electric usage from these chargers? Smaller cities have issues with this. What happens when there is a storm or too much pressure on system and everything just shuts down? It's a safety issue to me and an area of concern.

Brent: Those go hand in hand – What are we doing to make sure grid has enough energy? Encourage time of use rates so we don't have an overload of usage to stop grid shutdowns. Most people charge overnight at their homes which helps. When our peaks of energy hit throughout the day, we will set our time of use rates to move peak to overnight hours for people. First question: How does this help fuel tax? That is not part of our equation. WE are focused to keep system strong. As a utility industry, that is our focus. California issue – most utility companies are encouraging off peak charging to stop overload on grids. This will be an evolution as the programs grow, but I think we are comprehensive in our planning as an industry to keep customers safe and comfortable.

Cara: part of planning is integrated resource plan looking 20 years out. How do we meet resources and load. We are planning now for growth in the future. We use a lot of wind energy as well which helps overnight charging avoid system overload. We want to be ahead of this to measure growth on system to foresee impacts instead of reacting to an impact.

Lynn: I hear your position but doesn't address bigger picture. I'm on I-44 and watching traffic and I don't feel that all of these people are going to be able to go home and charge. Purpose of task force is what is the plan to submit to legislature of how we are going to utilize funds that we are getting from feds in best way and economic and environmentally safe way for everyone.

Brent: This isn't a new conversation. Same thoughts about how to keep system whole. How do we meet needs of customers? Utilizing wind and solar to help ease traditional electric grid. Our people had to learn how to plan day ahead loads so we are ever changing to new challenges.

Lynn: We sell carbon based fuels. We spend billions of dollars to figure out what is the best energy source. I'm looking at our task on this committee – you have 120,000 customers – we have 45,000 customers a day who are motoring public. We need to figure out what is the most immediate and best use of these dollars.

Brent: There is a long road ahead for all of us but we think we will eventually balance.

Tony Reinhardt: I've brought up before. If we go through this, we need to think of near term and long term. Whether or not we are looking at these vehicles as second vehicle vs commuter vehicle. People won't be using electric vehicles as main vehicle for many years in my opinion. When they are traveling across the country, they will keep another gas vehicle due to range anxiety.

Brent: Range anxiety is real for customers. That's why we need to invest across the state in a heavy way.

Zach: MacADoodles for example has an EV charging station. Are utility companies working with gas stations who have stations?

Cara: economic development team – we work on a case by case basis with gas stations who are installing chargers, but we are available for them to reach out to us to work together to build up infrastructure with VW funds.

Hallie: Largely we have partnered with Lily Pad and Kum n Go – we need to make sure infrastructure is ready for EVs around town with no barriers to install as long as they are willing to pay the price for it. Customers need to know what additional electric usage will do to utility bills and be prepared for that.

Zach: I do know a little about where Ford is going. In Missouri some infrastructure limitations have limited ford's ability to get EVs out to the rural areas. Tony: sales are not heavy at this time, but we are offering charging stations. I am more worried about tesla conversation because they put in chargers only adaptable to teslas, but most other car manufacturers are trying to make universal chargers

Zach: Like to have car manufacturers speak at future meetings. I love talking with all sides of this program and how it is affecting everyone in different ways. Also reached out to fuel industry to talk to group in the future.

Lynn: I do want to say I am not saying that our industry is defensive. We are participating and have charging stations installed

Chargepoint is going to present in the future as well.

Will be getting a rough draft of the plan out to task force members to start commenting.

Electric Vehicle Task Force

Meeting Minutes

October 4, 2022 | 10 – 11 a.m.
Harry S Truman Building, Rm 750 (WebEx)

ChargePoint+ - Justin Ackley

SunSolar - Caleb Arthur, CEO

Lilly Pad - Keith Anderson

Presentation from ChargePoint+

- Justin Ackley

Background- largest in North America. Independent company. Hardware, software and services manufacturing.

Pricing & Fees- Very supportive for charging by the kWh. Currently working with other states so that it is across the states. If you have an older vehicle then it could coast more vs. the newer cars that charge faster. There is not a mile to mile "reasonable" price is charging to equivalent to miles per gallon. Issue is per kW tax is the remittance assoc. with the fee is different and a burden for Administrative.

Metrology and testing – Charge point pushes that the meter tolerance is held to a certain standard. A.1 (refer to the slide 5).

Fast charging will be exempt until 01/01/2028 because there is no testing equipment at this time.

Address the utilities and rates- Supportive to rate design alternatives.

Q- How many locations do you have in MO-

A- 1140 or 140? stations in MO all together not sure how many are just theirs.
B- Charging or connection billed through the utilities or sometimes charge on your own?

a. Depends on the partner- If it is 7/11 then they charge themselves and they are not involved in.

C- Lynn- Q- No field test for fast charge until 2028. What is the difference between the charges, - They are the same charge and they are looking to install across the state. The field testing shouldn't be delayed or extended in anyway. ChargePoint- when the station leaves the site, they are already compliant with the law and the

customers are getting exactly what they are paying for. If the charger was installed today, there is 3 years before the testing would need to be done again.

Liz- Q- 3 states that have an EV testing, what are the other 2 states? Cali, Iowa, Ok, Penn. The remittance is not anywhere near the rec. There is a coast to everything. The systems have not been integrated to collect and remit those tax at this time. If this is something the states will peruse, they will need to update that.

Chris- Q- with UPS are there anything set up for heavy equipment? Med &Heavy duty are their focus. They do at home charging, public charging etc.

Tony -Ford-Q- When you talk about the kW issues you just think there is
-Issues- How to implement a kW fees for like gas tax. How to figure out how to charge/identify the collection of the tax.
-To get an actual figure what the tax should be is an issue at this time.

Presentation from SunSolar

- Caleb Arthur, CEO

First in solar- Missourian view point.

Sun Solar- 250 employees, Cover areas in KS, Springfield, St. Louis.

Wasn't a lot of super charging at the time so driving to larger cities he had to think about and plan the charging? Electric vehicles loose range in cold weather for longer distance. Driving around home- house to office never had issues. The technology since 2015 has changed a lot.

Charging stations at home charges over night and could last about a week. Tesla has a specific plug for their car and only their cars, but there is some out there that will charge any electric car. Tesla recommends to only charge the car to 90% unless you need that extra 10%. Tesla has a battery bank and are large like 4X-6X larger than what the house has. Could run a house if electric were to go out. There is some buy and selling electricity going back and forth from the electric companies and someone like tesla.

App- people in Florida are using solar, batteries, and able to charge their cars off that and still able to have power.

Tesla charger vs. standard charger- tesla has their specific charger so he would have to use an adapter to charge if he goes to a normal charging port.

Some electric charging could cost- $1,000-10,000 depending how complex the install would be.

EV chargers could have rebate from the utility company and tax credits for things like that.

Ford Lighting- when the truck is plugged in at home by battery (utility grid) or solar.

Some private port owners generate solar power for their chargers and these ports are be able to charge vehicles.

Electric Vehicle Task Force

Meeting Minutes

October 19, 2022 | 2 – 3 p.m.
Harry S Truman Building, Rm 750 (WebEx)

Presentation from Ameren, Liberty and Evergy Utilities

Pat Justice- Ameren
Robin McAlister- Liberty
Wendy Marine- Evergy

Q&A

Q- Electric system benefits and costs of electric vehicle charging, electric utility planning for electric vehicle charging, and rate design for electric vehicle charging;

Zach- Q- Has any of the investors started having the conversation how the backup can charge when the power goes out.

Robin- There will need to be more research on how to use that as a resource.

Wendy- There is not any vehicle (maybe a bus could in the future) to grid at this time. Ford Lighting can do the home but not to the grid unless it is aggregated.

Brent- Q- Did you guys get the time of rates and do you have the time of use separate for vehicles and homes?

- Yes they did get a time of use programs for EV time use. Residential program for EV charger, level 2 in the homes, Fleet program. They measure the usage for residential and the car charger separate.

Windy- It is costly for those 3rd parties to invest in putting chargers in and they are trying to still figure it out

Ameren- Current program for them to incentivize other to invest/buy chargers. $20,000 for a DC charging port,

Zach- Q- Are the investors and utilities working with the 3rd parties to have the infrastructure in now, before they want to install the ports?

Pat- Ameren- Yes. Ameren recommend them do the infrastructure beforehand because it is costly but their focus at this time is to get the chargers installed as quickly as possible for the ones needing them installed now.

- Pat- Ameren- EV charging without enough power in their area, and they want to put in chargers that will/could be an issue. It is not uncommon for customers to put in subpanels to install a charger at their house. It could also be smaller issues that would need to be done.

The utility company will bill the customer that owns the chargers but the owners would charge their own rates.

Ron Leone- How are rates charged with the time of use? How is that allowed? You could charge more when demand is higher and charge lower when it is not in demand.

Pat- because of the infrastructures- they encourage customers that can move high power usage to off peak time get rewards. These rates are long term or until it is brought to the commission and it is changed. They do this to encourage this because it is less on the grid if people use the charger the peak is lower.

- Time of use rate is more optional and the owner of the charger is charged a certain fixed rate but incentivized for lower peak of usage times.

Ron Leone- Concerned with the time of use – price depending on the time of day and not because of the demand.

- Time of day is considered demand for DC fast charging which is most convenience for convenience store. If you put a lot of fast charger in and they are all used all at once, pumps being used, etc. It may increase and set the demand charge. The port charges could take over the bill. So the utilities incentivize them to offset the time of use of the chargers.
- If a customer or commercial want to partake in the program they pay the monthly.

Zach- Other states have put wireless chargers and on the road ways, is that something Missouri has thought/talked about?

- This would be something to talk about later in the future but at this time the cost is very high.

Electric Vehicle Task Force

Meeting Minutes

November 9, 2022 | 2 – 3 p.m.
WebEx

Presentation from Fuels Institute- John Eichberger, Executive Director

The Fuels Institute is a non-advocacy research organization dedicated to studying transportation-energy. They consider fuel to be any type of energy being used to power a vehicle, and their research encompasses issues affecting the vehicles and fuels markets. The Fuels Institute creates a place in which stakeholders of all persuasions can come together to collaborate, share perspectives and commission objective research analyzing the challenges and opportunities facing the market.

Three years ago the Fuels Institute launched an electric vehicle council relative to electric vehicles and electric vehicle infrastructure. They believe EVs will play a very important role in the fuel market future; however, the challenge is perception vs reality.

Their research shows the hype of electric vehicles is much larger than the actual market at this time, although the market will continue to increase. By 2030, Eichberger reported that FI still believes sales of EVs will be less than 10% of the market and under 30% by 2040. He said markets choosing to implement EV infrastructure will need to monitor their respective areas to determine how to invest at this time. Their research shows the global forecast is modest. Missouri is not projected to be in the top 15 states using electric vehicles by the end of the decade. However, Missouri will see a lot of electric vehicles using roadways due to highway and interstate travel, so electric vehicle charging stations will be necessary.

The question was asked how people will be charged for electric energy. Eichberger said the Fuels Institute has not researched that topic yet, but that will be a future project as there are many questions. Weights and Measures said it should be sold by kilowatt hours; the challenge is how does someone value a kilowatt hour? There needs to be transparency by utility companies in the same manner petroleum companies. A company cannot compare a kilowatt hour to a gallon of gasoline as the vehicle capabilities are very different at this time.

More information is available at fuelsinstitute.org/research.

The next Electric Vehicle Task Force meeting will be 11/16/2022 in Room 400 of the Harry S. Truman Building, 301 West High Street, Jefferson City MO. Ford and Tesla representatives will give the presentation.

Electric Vehicle Task Force

Meeting Minutes

November 16, 2022 | 2 – 3 p.m.
WebEx

Presentation from Alliance for Automotive Innovation

- Amy Brink, Vice President of State Government Affairs

Automotive Innovation is a trade group based in Washington DC representing automakers along with suppliers and technology companies. Brink said the auto industry is undergoing a significant transformation as we speak. Tectonic. It is massive. Something we haven't seen in 100 years. Changing all facets of business and future plans. Just over six percent of all light vehicle sales this year have been light EV sales. EV SUVs are beginning to expand in the market. EV, PHEV and fuel cells with hydrogen are erupting into the market. Missouri has 2.6% of EV market share through June 2022. California is over 18% of the market. Trends show these percentages will increase globally by 2030. There are efforts at the national level to upgrade building codes to include EV charging in new construction homes and buildings as that is more economically sound than trying to retrofit. Grid resiliency is something they are encouraging states to look at. It is a matter of load balance. Most people charging at home tend to charge overnight which is when electricity is the cheapest. Utilities need to think how to deal with load shifts for customers. They need to prioritize low to moderate income communities. Infrastructure for EV chargers has to be made available to all types of communities. Purchasers have been wealthier so far, but this will change and states must get cleaner technologies out to underserved communities such as housing complexes and apartment buildings. Missouri needs an additional 199,000 chargers installed throughout the state to handle a projected 25% increase in EVs owned by citizens by 2035.

Presentation from Tesla

- Bill Ehrlich, Senior Policy Advisor, North America Charging

Bill Ehrlich, Senior Policy Advisor, Tesla North American Charging, spoke to the task force. He said at the state regulatory level it will be crucial to develop utility programs related to charging. The charging piece is so critically important to EV adoption and acceptance in states. He said it is exciting to see more and more people becoming involved in rural corridors. Charging needs to be ubiquitous and increase in an equitable way. Maybe don't have home charging and need to charge elsewhere, charge while traveling, etc.by use of supercharging, destination charging, park space charging. Anyone who has driven an EV and comes up to a charger that isn't working can have a bad experience. Tesla is working to make charging easy and seamless and to improve the chargers. How does charging industry move forward to provide more charging for more customers? Missouri HB 355 from 2019 – Missouri considered EV charging parameters. How to charge customers was addressed which is $1 per kilowatt hour basis so good that a precedent has been set. Currently 21 sites across Missouri, focused in KC, Columbia and STL. We are expanding that footprint to rural corridors.

Important part is calling this a transportation-electric utility nexus which is critical to EV infrastructure development. There are things that states can do, utilities can do, legislators can do to develop infrastructure and remove barriers. Demand chargers can be a barrier as low usage customers can pay extremely high KWH rates. Many chargers today are low load users and without rates contemplating this, they can be overcharged. Solution: lots of options from across the country. One way is time of use rates, demand charge discounts, rate limiters, load factor relief, rates should be opt in and available to new and existing chargers. Recommendations: Provide EV charging utility rate options in all areas.

Q&A

Is Tesla changing current charging to gain NEVI funds and are they adapting to allow other vehicles to use their chargers?

In Europe, we have opened network to other vehicles. Connector in Europe has been standardized. In the US the intent is to open the network, but all chargers are not the same. Industries are working toward efforts to continue down the road to interoperability. Adapters are being considered but there is not a timeline at this point.

Electric Vehicle Task Force

Meeting Minutes

December 7, 2022 | 2 – 3 p.m.
WebEx

Presentation from Enterprise Holding Inc

- Chris Haffenreffer – Vice President of Strategy Development

Chris Haffenreffer discussed the challenges facing the rental car company as they mitigate the challenges of electric vehicle rental. He said while the company is planning infrastructure changes, they are doing so to continue to make the customer service experience as positive as possible. Enterprise Holding Inc (EHI) is working closely with regulators, policymakers and utility companies to make certain they are building their infrastructures in the right way as technology changes quickly. Much of EHI rental business takes place at concessionary locations, specifically airports, which makes it challenging to work together to build up the needed infrastructure on another company's real estate.

EHI is partnering closely with utility companies to understand feasible technology and rate design principles that enable electric vehicle adoption while balancing rate payer impacts. They expect the construction of necessary grid infrastructure to support large sale EV adoption to be a challenge.

Haffenreffer said determining how to continue to support road funding as the transition to EVs disrupts the gas tax funding stream will be critically important. EHI hopes this topic will involve ongoing discussions among diverse stakeholders to ensure it is done right. Funding should be equitable and based on road usage.

Electric Vehicle Task Force

APPENDIX 2

MISSOURI DEPARTMENT OF REVENUE

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Volkswagen Trust

Be Part of the Solution

Missouri's
Volkswagen Trust Funds

EV Infrastructure Funding

What is the Volkswagen Trust?

- In 2015, VW admitted using software that caused certain diesel vehicles to perform differently during emissions tests so they would pass.
- During normal operation, these vehicles emitted nitrogen oxides (NO_x) at levels higher than EPA standards.
- VW paid **$2.9 billion** into a trust fund to mitigate excess emissions
- Based on number of vehicles purchased in Missouri, the State was apportioned **$41 million**

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Beneficiary Mitigation Plan

- As a requirement of the Trust, MoDNR submitted a Beneficiary Mitigation Plan outlining:
  - Overall goal for the funds;
  - Selected mitigation actions to achieve the goals, and percentage of funds for each; and
  - Description of impact on areas that bear a disproportionate share of air pollution burden.
- Trust allows for 10 specific project types, mostly replacement of old diesel engines with newer engines or cleaner fuel types. Also allows for installation of EV charging infrastructure.

Beneficiary Mitigation Plan

- Trust allows for up to 15% of a state's allocation to be used for EV Infrastructure projects – Missouri committed to this level of funding in its BMP
  - About $6.15 million dedicated to EV Infrastructure

> 9. Light Duty Zero Emission Vehicle Supply Equipment. Each Beneficiary may use up to fifteen percent (15%) of its allocation of Trust Funds on the costs necessary for, and directly connected to, the acquisition, installation, operation and maintenance of new light duty zero emission vehicle supply equipment for projects as specified below. Provided, however, that Trust Funds shall not be made available or used to purchase or rent real-estate, other capital costs (e.g., construction of buildings, parking facilities, etc.) or general maintenance (i.e., maintenance other than of the Supply Equipment).

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Stakeholder Involvement

- Early in process, created stakeholder workgroups consisting of the interested public and industry experts, including electric utility representatives

- Workgroup recommendations were used by department in developing the Request for Applications and other program documents

- Workgroup's priority is to ensure an EV driver can go anywhere in the state and know there will be chargers – called the **Minimum Practical Network**

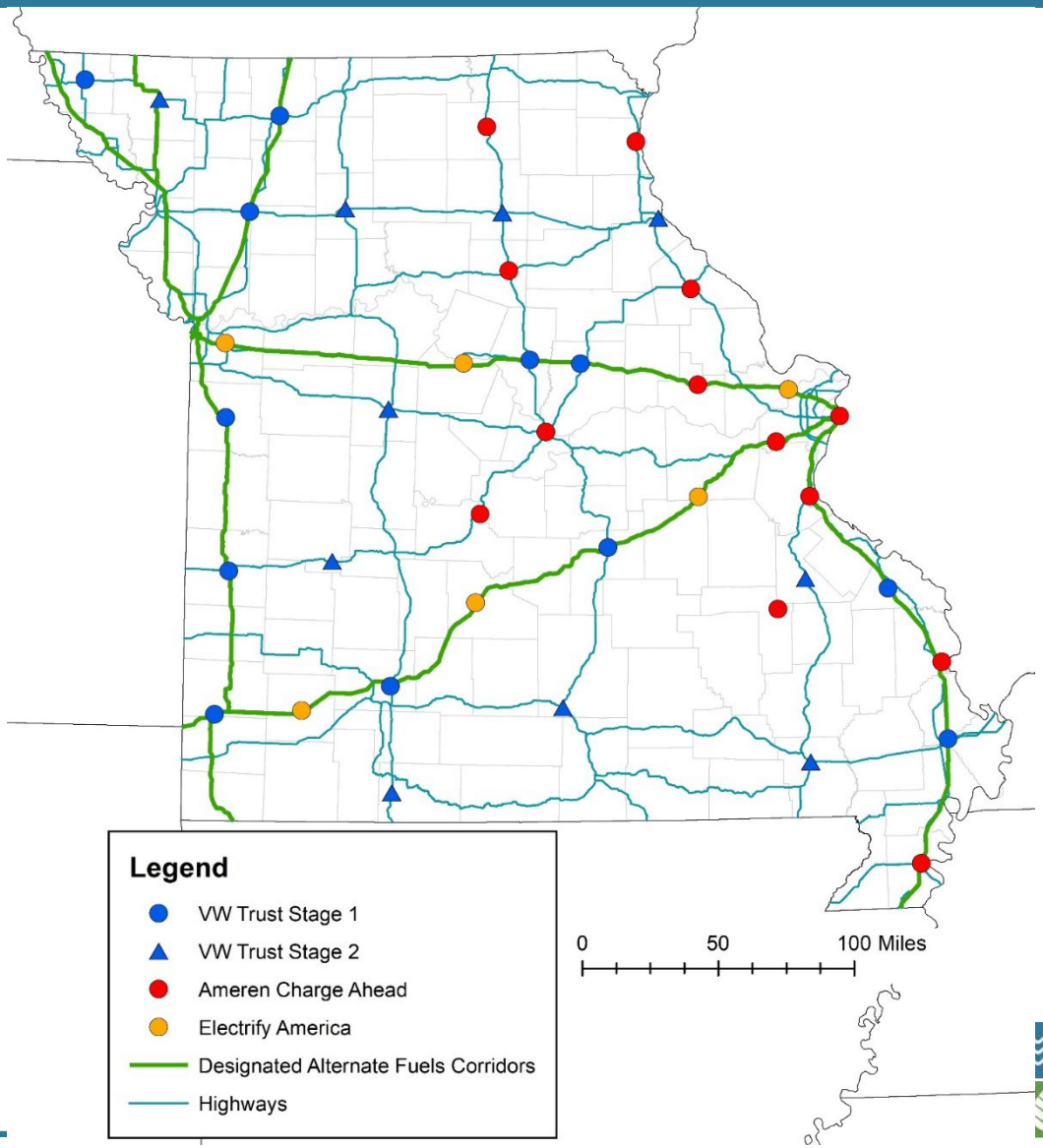
MISSOURI DEPARTMENT OF NATURAL RESOURCES

Minimum Practical Network Siting

- Initial recommendations developed by utility stakeholders before VW Trust finalized
- Focused on Interstates and highways with more than 10,000 daily trips, targeting areas with 2,000+ population
- 41 identified sites:
  - 6 Electrify America sites
  - 12 sites funded by Ameren's Charge Ahead
  - 23 sites to be funded by VW Trust

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Minimum Practical Network Siting



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

VW Trust EV Funding

Legend

- Stage 1 Charging Sites
- Stage 2 Charging Sites
- Designated Alternate Fuels Corridors
- Highways

Charging Sites

1. Bethany
2. Cameron
3. Columbia
4. Harrisonville
5. Kingdom City
6. Joplin
7. Nevada
8. Perryville
9. Rockport
10. Rolla
11. Sikeston
12. Springfield
13. Branson
14. Cabool
15. Chillicothe
16. Collins
17. Farmington
18. Hannibal
19. Macon
20. Maryville
21. Poplar Bluff
22. Sedalia

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

VW Trust EV Funding

- Two Stages of funding:
  1. **Stage 1** – Interstates and high-traffic areas
     - Around $3 million for 12 sites
     - Applications opened in FY21 and FY22

  2. **Stage 2** – Other highways for state coverage
     - Around $3.15 million for 10 sites
     - Applications open now through October 12

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Station Requirements

- VW Trust stations must include:
  - 2 Direct Current Fast Chargers, minimum 50kW charging rate
  - At least 2 methods of payment, one of which must be a toll-free number posted on or near the charger
  - Both CCS (J1772) and CHAdeMO charging ports
  - Ability to be upgraded or expanded
  - Dedicated EV parking spaces
  - Driver amenities (restrooms, shopping, entertainment, etc)
  - Must be located near specific highway intersections
- Optionally applicants may include:
  - Level 2 charging equipment
  - On-site renewable energy generation or energy storage
- Applicants must commit to operating station for 5 years following the award and include a 5-year warranty on installed equipment

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Selection of Applicants

Application Scoring Category	Points Possible
Funds Requested Subject to 80% cap of VW funding per project	25
Lowest funds request gets 25 points, all other scores get fraction of points relative to lowest request: (lowest request/request) * 25	
Host Site Distance from Highway	15
Under ½ mile to highway access point: 15 points 0.5 to 1 mile to highway access point: 10 points 1 to 2 miles to highway access point: 5 points 2 to 12 miles to highway access point: 0 points Further than 12 miles: Disqualified	
Implementation	30
Qualitative scoring of Sustainable Business Model Plan (including discussion of demand charge as a significant cost driver), Commitment, Timeline, Experience, Innovation	
Equipment	30
Maximum DCFC Charging Rate 150kW and higher: 20 points 100kW for 149 kW: 15 points 50kW to 99kW: 5 points	
Payment Options Four or more options: 5 points Three or more options: 3 points Two options: 2 points	
Level 2 Option One dual-port Level 2 charger: 5 points One single-port Level 2 charger: 2 points	
Total Points Possible	**100**
Bonus Points: Renewable Energy Percentage of renewable energy to power the charging station 100% renewable energy: 10 points 51-99% renewable energy: 5 points Up to 50% renewable energy: 2 points Applications should purchase RECs from the local utility first. If those are unavailable, then the application should consider on-site solar installation with battery storage. If on-site renewable generation is impractical or infeasible, describe the plan to purchase RECs on the open market.	10

- Applicants may include as many site proposals as they want, but each is scored individually
- Site is given a score 0-100:
  - Up to 70 points based on technical details of proposal
  - Up to 30 points based on Scoring Committee judgement of business plan
  - Up to 10 bonus points for inclusion of renewable energy
- Scoring Committee is made up of members from MoDOT, DED, and DNR's APCP, Division of Energy, and Division of Administrative Services

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Awardee Requirements

- Once notified of selection, awardees are expected to complete project within 18 months, with various milestones detailed in program requirements.
- Awardees must submit semi-annual progress reports until station is online.
- After station is online, quarterly metrics reports about usage and outages are due for the duration of the project (5 years).
- Awardees are reimbursed for up to 80% of the eligible project costs after station is confirmed to be online and other documentation is submitted.

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Other Funding Sources

- Remaining VW Trust funding may be reallocated in 2027 to States that have efficiently spent first allocation
  - Missouri likely eligible to receive additional funds, but amounts cannot be predicted

- Bipartisan Infrastructure Law includes competitive *Grants for Charging and Fueling Infrastructure* open exclusively to State and local governments.
  - Around $2.5 billion available nationally, $1.25 billion dedicated specifically for community-level grants

- Bipartisan Infrastructure Law also includes *National Electric Vehicle Infrastructure Formula Program*, apportioned to State DOT's
  - $5 billion available nationally, must build along Alternate Fuels Corridors first

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Questions?

Contact Information:

Emily Wilbur
Missouri Department of Natural Resources
Division of Energy
Phone: 573-751-5567

https://dnr.mo.gov/air/what-were-doing/volkswagen-trust-funds

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Electric Vehicle Task Force

APPENDIX 3

MISSOURI DEPARTMENT OF REVENUE

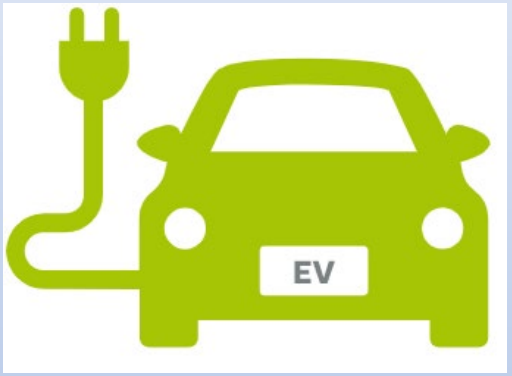
Planning for Electric Vehicle Charging Stations in Missouri

July 20, 2022

Today's Agenda

- Electric Vehicle (EV) and EV Infrastructure Fast Facts
- EV Sales and Registration Trends
- NEVI Overview
- Federal Funding
- Alternative Fuel Corridors
- Minimum Standards and Requirements
- EV Infrastructure Deployment Plan
- Questions and Discussion

Electric Vehicle (EV) Types



Battery Electric Vehicle (BEV)

- Battery Power Only
- Typical Battery Range 150-400 miles

Plug-In Hybrid Electric Vehicle (PHEV)

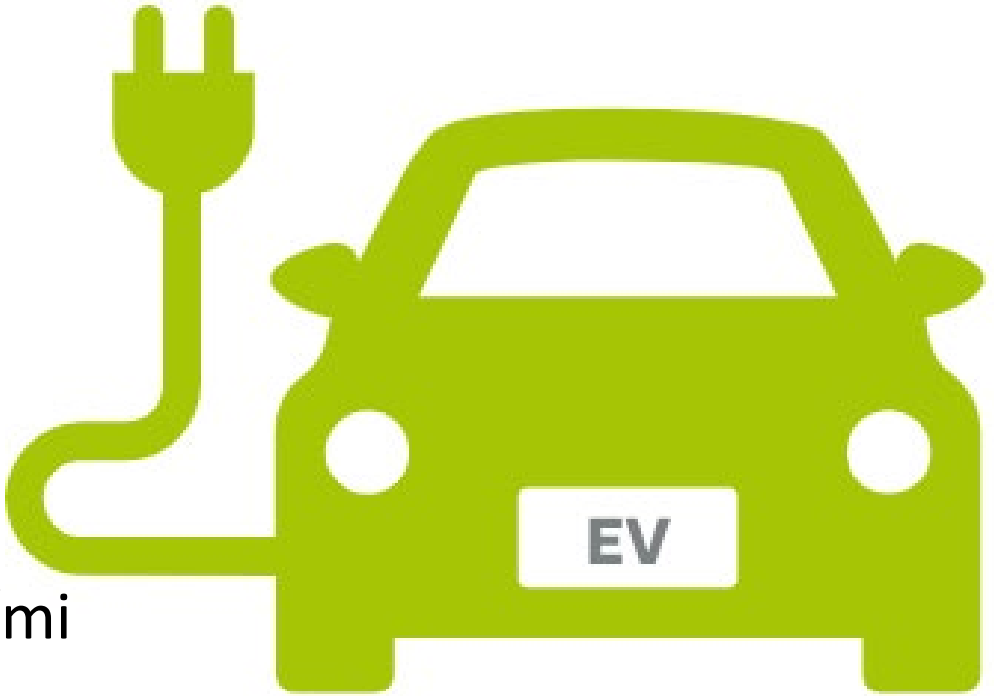
- Battery Power and Internal Combustion Engine (ICE)
- Typical Battery Range 20-40 miles

Hybrid Electric Vehicle (HEV)

- Internal Combustion Engine (ICE) Only
- Battery Charges by Regenerative Braking or Using Engine as a Generator
- Battery Allows for Smaller Engine, Powers Auxiliary Loads, and Reduces idling

Battery Electric Vehicles (BEV)

- Must Charge to Operate
- Most models: $20,000 to >$70,000
- Example operating cost:
  - EV Bolt – $0.21/mi; Trailblazer - $0.31/mi
- Typical Battery Range: 150-400 miles

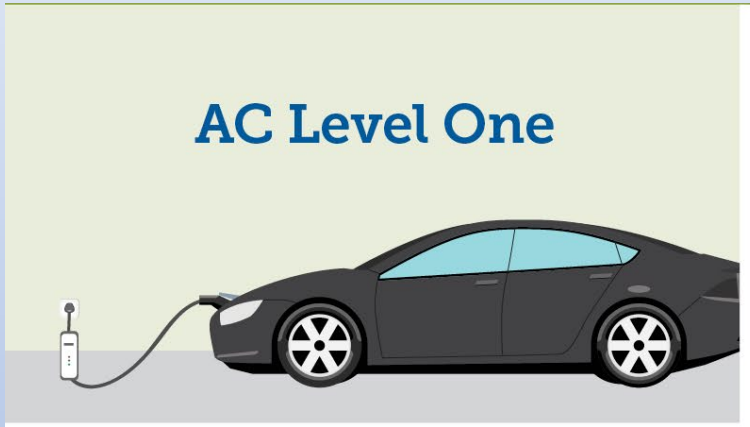


BEV Benefits

- Improved air quality, no tailpipe emissions
- Vehicle efficiency, lower fuel costs
- Fewer moving parts = less maintenance
- Reduction in noise pollution
- Energy diversity; use of renewables

EV Charging Stations

Level 1

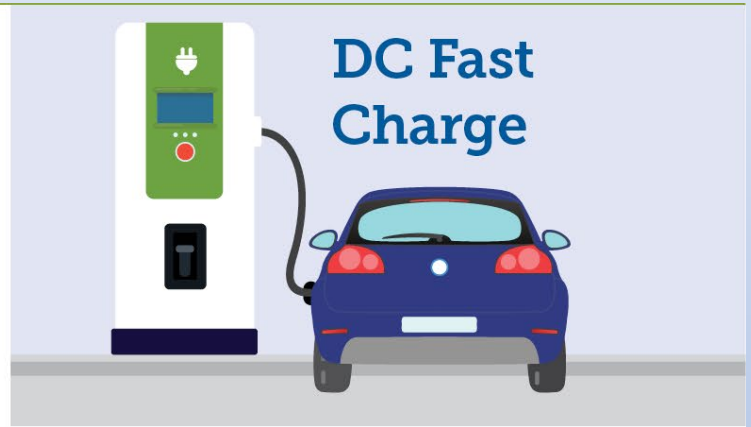


- Standard Outlet
- Slowest Charging
- 250 miles in 48-72 hours
  (~5 miles/hour of charge)

Level 2

- “Dryer Outlet”
- Slow Charging
- 250 miles in 10 hours

Level 3



- Direct Current Fast Charging (DCFC)
- Fastest Charging
- 250 miles in 30 minutes

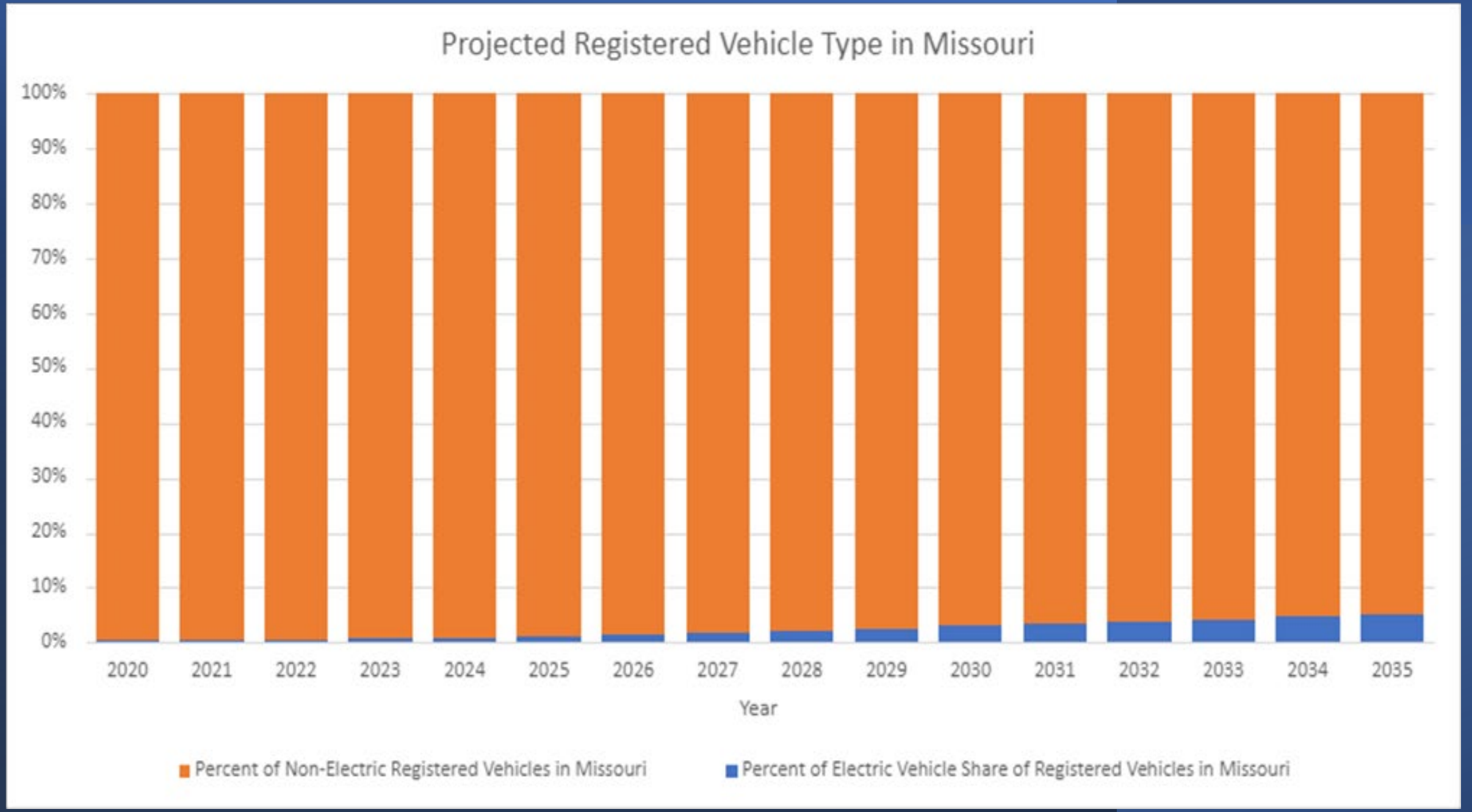
How many EV are there?

Nationally

- Nationally EV is less than 1% of all vehicles on the road
- Nationally EV makes up 3.4% of new vehicle sales
- Some forecast put EV to be 50% of new sales by 2030

Missouri

- Missouri has 6,740 registered EV or about 0.60%
- Missouri EV sales are 0.66% of market share


Projected Registered Vehicle Type in Missouri
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
Year
Percent of Non-Electric Registered Vehicles in Missouri
Percent of Electric Vehicle Share of Registered Vehicles in Missouri

National Electric Vehicle Infrastructure - NEVI

Bipartisan Infrastructure Law (BIL) established $7.5B NEVI funding

- Formula funding to states $5B
- Discretionary Grants $2.5B

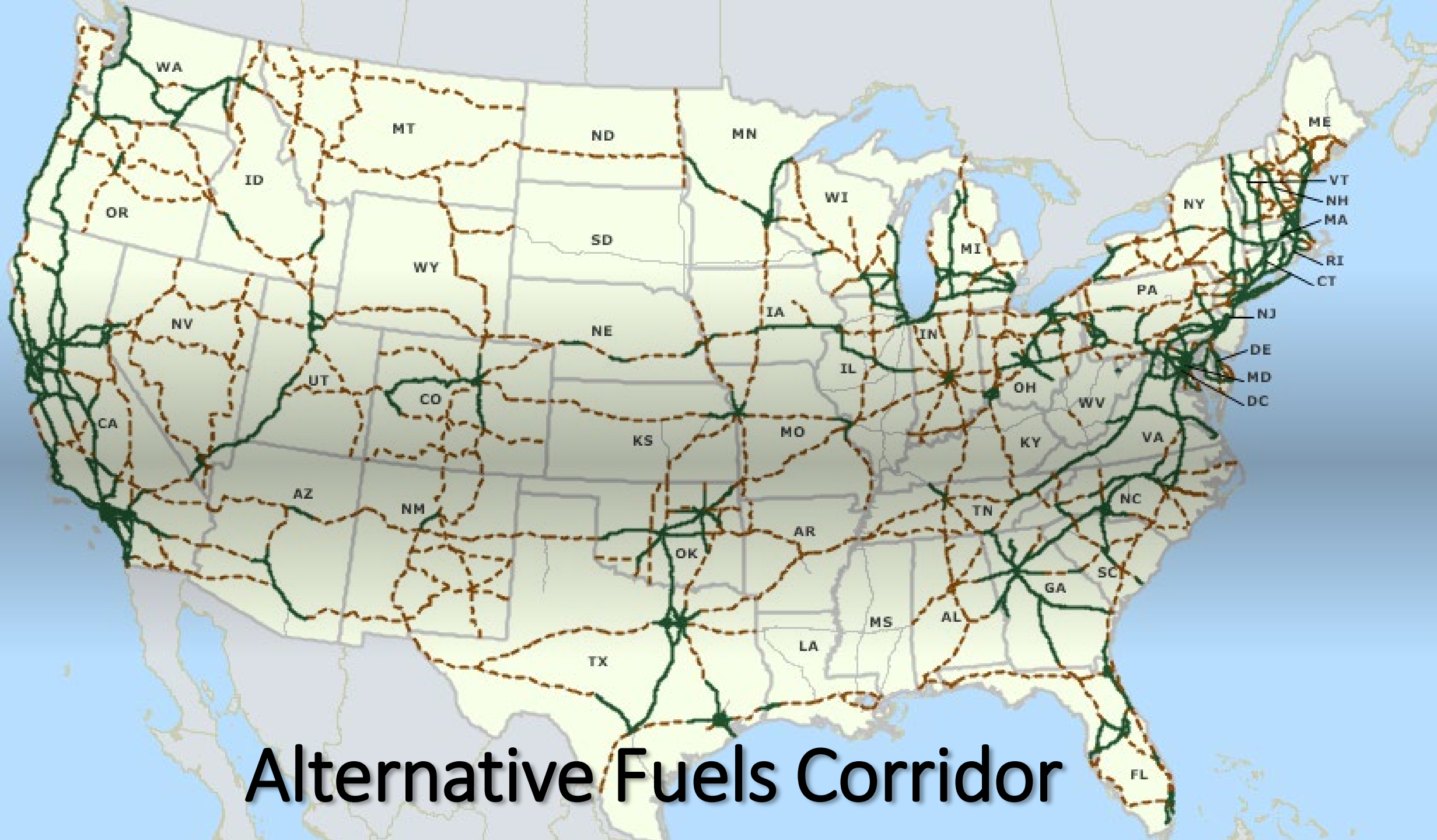
Newly created Joint Office of Energy and Transporation

Dedicated formula funding to States to deploy EV charging infrastructure on the Alternative Fuels Corridor – particularly the Interstate system

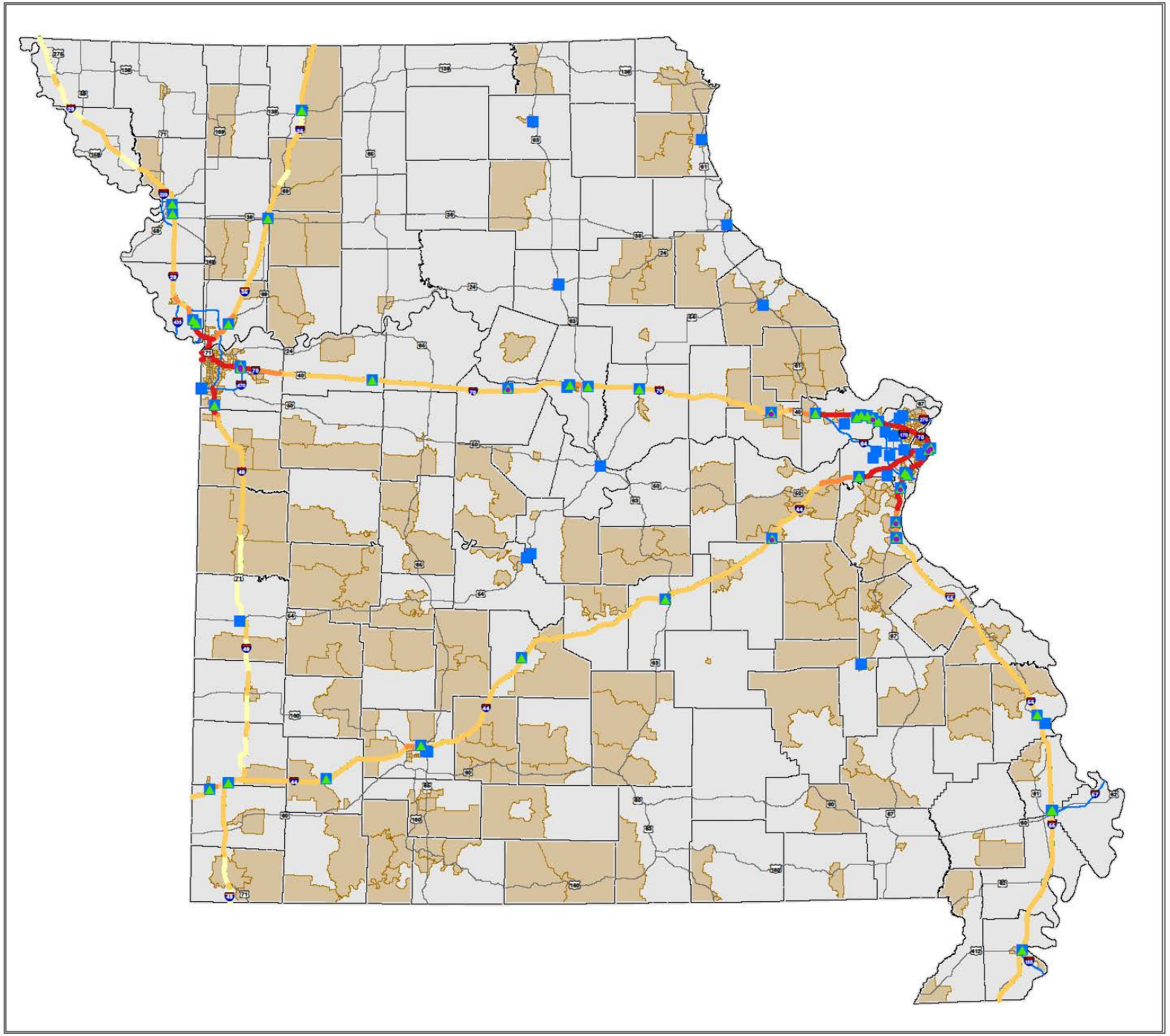
For Fiscal years 2022-2026, Missouri will receive $98.9M to fund EV charging infrastructure

NEVI will cover 80% of eligible project costs

Federal Fiscal Year	Forecasted NEVI Funds	Local Match Funds	Total Funds
FY 2022	$ 14,647,722	$ 2,929,544	$ 17,577,266
FY 2023	$ 21,078,366	$ 4,215,673	$ 25,294,039
FY 2024	$ 21,078,366	$ 4,215,673	$ 25,294,039
FY 2025	$ 21,078,366	$ 4,215,673	$ 25,294,039
FY 2026	$ 21,078,366	$ 4,215,673	$ 25,294,039
TOTAL	$ 98,961,186	$ 19,792,237	$ 118,753,423



Alternative Fuels Corridor



15-Missouri EV DC Fast Charge Locations within 1 mile of MDAFC in Justice 40

53-Missouri EV DC Fast Charge Locations within 1 mile of MDAFC

90-Missouri EV DC Fast Charge Location

Missouri Designated Alternate Fuel Corridor Total AADT

- Up to 15,000
- 15,000 to 45,000
- 45,000 to 70,000
- Over 70,000
- Interstate Routes
- US Routes
- DOT Justice 40

Missouri Department of Transportation
Transportation Planning
1-888-ASK-MODOT
WWW.MODOT.ORG
May 3, 2022

Program Requirements

500,000 DC fast chargers installed across the US AFC network

Charging stations shall be:

- Every 50 miles within 1 mile of AFC

Stations shall be minimum:

- DC Fast Chargers
- Provide at least 4 Combined Charging System (CCS) ports capable of simultaneously charging 4 EVs
- Station power capability should be no less than 600kW
  - Supporting at least 150kW per port simultaneously across four ports
- Design and construction should allow for 350kW > future upgrades

Must meet Justice40 guidance

- Explore the map - Climate & Economic Justice Screening Tool (geoplatform.gov)

State EV Plan Requirements

USDOT guidance addresses:

- Federal share and match requirements
- Funding requirements
- Project eligibility
- Deployment / Siting Considerations

State EV Plan Requirements

USDOT Guidance addresses

- Federal share and match requirements

80% is the maximum Federal share

Private funds can be used as match

State EV Plan Requirements

USDOT Guidance addresses

- Federal share and match requirements
- Funding Requirements

- **Along Alternative Fuel Corridors**
- **Maximum 50 mile spacing**
- **Maximum 1 mile from corridor**
- **Min 4-150 kW DC Fast Charging ports**
- **Locations open to general public**
- **Contracting with private entities is allowed**

State EV Plan Requirements

USDOT Guidance addresses

- Federal share and match requirements
- Funding Requirements
- Project eligibility

- **Acquisition and installation**
- **Upgrades, on-site power storage**
- **Operating and maintenance (up to 5 years)**
- **Development phase activities**
- **Signage and traffic control**
- **Several other related and support items**

State EV Plan Requirements

USDOT Guidance addresses

- Federal share and match requirements
- Funding Requirements
- Project eligibility
- Deployment / Siting Considerations

- **Distance between chargers (50 mi, 1 mi)**
- **Connections to electric grid**
- **Proximity of existing businesses/services**
- **Needs in rural and disadvantaged areas**
- **Fostering private investment**
- **Meeting market demands**

State EV Plan Requirements

Missouri has asked the Joint Office for clarification on several topics..

Example Question:

If the utility serving a proposed station location has to make upgrades to the site and distribution circuit or substation to accommodate the installation, is that an eligible expense? What limitations are there on those expenses?

Plan Elements

1. Communications

- Agency Coordination
- Stakeholder Meetings / Public Outreach
- Website Development and Surveys

2. EV and EV Charging Infrastructure Analysis

- Existing and Future EV Market
- EV Charging Infrastructure (current stations)
- EV Charging Demand / Needs
- General locations for new charging infrastructure

3. Policy and Implementation

- Vision and Goals
- Deployment Implementation
- Contracting Methods
- Civil Rights / Equity Considerations
- Cybersecurity
- Program Evaluation

Next Steps

Continued coordination with Utility Providers

Incorporate guidance from the EV Task Force

Continued discussion and coordination with neighbor states

Plan is Due to the Joint Office August 1, 2022

FHWA will approve State plans by September 30, 2022

Questions and Discussion

Electric Vehicle Task Force

APPENDIX 4

MISSOURI DEPARTMENT OF REVENUE

MISSOURI

Electric Vehicle Infrastructure Deployment Plan

Missouri Department of Transportation

Revised September 2022

MoDOT

MISSOURI DEPARTMENT OF NATURAL RESOURCES

HDR

Contents

Figures

1.0 Introduction

Missouri has developed a Statewide Electric Vehicle Infrastructure Deployment Plan in accordance with the National Electric Vehicle Infrastructure (NEVI) Formula Program Guidance. The plan details the state's process to engage stakeholders, complete technical analysis, and establish policy and planning recommendations for electric vehicles (EV). The Missouri NEVI Deployment Plan (NDP) will establish a framework for EV charging. Part of this framework is supporting long-distance EV travel by state residents and visitors. The NDP is also intended to help bolster economic development, tourism, and workforce development in communities across Missouri. The NDP provides a framework to develop a network of EV charging stations along key travel corridors. This network will provide a backbone for future build-out of EV fast-charging stations along interstates and key highways in Missouri and will support the goal of the NEVI program to facilitate a national EV charging network.

The Missouri Department of Transportation (MoDOT) and the Missouri Department of Natural Resources (DNR) collaborated and worked to develop a year one NDP. This collaboration follows the model of the newly created federal Joint Office of Transportation and Energy and leverages strengths from both agencies to deliver this new EV program. Plan approval authority lies with the plan primary sponsor, MoDOT.

The State of Missouri legislature has created an EV Taskforce (see SB262.pdf (mo.gov)) that is intended to address a range of issues involving EV infrastructure within the state. This Taskforce will be meeting through the end of the 2022 calendar year, and their findings could lead to related legislation that affects the Missouri NDP program, timeline and process. Policy items the SB 262 EV Task Force are expected to address include the development of a funding stream to operate, maintain and build vehicle infrastructure in lieu of revenue lost from the reduction in motor fuel taxes associated with increased EV use, and reinforcement of the existing policy position MoDOT will not own or operate any NDP funded EV stations or incur any future costs associated with their upkeep or future upgrades.

Given the existence of this Taskforce, this NDP has the following timetable. It describes Missouri's proposed approach for NDP development and adoption and is subject to modification as additional information becomes available and based on the findings of the EV Taskforce.

- May – August 2022
  - MoDOT and DNR initiate collaborative effort to develop this NDP.
  - NDP website launched with public survey element.
  - NDP submitted to U.S. Department of Transportation (USDOT) no later than August 1, 2022.
- 2022-2023
  - Monitor and respond to EV Taskforce process and outcomes.

- Develop initial approach for Missouri's administration of NEVI program funding.
- Monitor NEVI program development and coordinate with other states to understand best practices and lessons learned.

- 2024
  - Draft Request for Proposals (RFP) for first round of NEVI funding and initiate review process.
  - Begin annual EV Deployment Plan review and update.
  - Evaluate whether to nominate additional corridors for Alternative Fuel Corridor (AFC) designation in AFC Round 7.
- 2024-2025
  - Release RFP for NEVI funding.
  - Score proposals and announce successful awards.
  - Initiate deployment of EV charging stations.

2.0 State Agency Coordination

As noted in the introduction above, the Missouri Department of Transportation and the Missouri Department of Natural Resources collaborated to develop the first year NDP. MoDOT and DNR conducted bi-weekly coordination meetings throughout the NDP development period in May through July 2022. Coordination included identifying DC Fast Charging stations funded by VW Settlement funds in the overall network analysis.

In addition to internal coordination within the State of Missouri, MoDOT coordinated with adjacent states through a series of meetings and electronic communication during plan development. These coordination efforts helped to align planning efforts along AFCs that traverse state borders and are expected to help achieve the objective of a seamless national network.

3.0 Public Engagement

Missouri is in the process of developing a meaningful and responsible public engagement process for EV deployment. Resources developed for the initial public engagement effort included:

- MoDOT Alternative Fuels National Electric Vehicle Infrastructure Formula Program webpage (https://www.modot.org/nevi)
- Missouri NEVI Survey (https://form.jotform.com/221446272664154)
- Missouri Utility Provider Survey

3.1 Communication Program Goals

As Missouri continues to develop and improve the initial NDP, further public engagement activities will inform those efforts, including focused outreach efforts to Justice40 communities. Goals for communication include:

- Broad-based engagement from communities and stakeholders as input to plan development
- Feedback on the NDP and community and traveler needs and desires for electric vehicle infrastructure
- Input on priorities for additional corridors where development of electric vehicle infrastructure may be warranted in the future

3.2 Meetings

Missouri held a stakeholder meeting with utility providers on May 27, 2022, with representatives from the following organizations attending:

- Associated Electric Cooperative Incorporated
- Missouri Public Utilities Alliance
- Callaway Electric Corporation
- Ameren Missouri
- Evergy
- Liberty Utilities

An overview of the NEVI program was provided, and participants were given the opportunity to ask questions and receive responses to increase awareness and understanding.

3.3 Feedback

In coordination with the utility provider meeting, a 26-question survey was distributed to utility providers within the state. Fifteen responses were received. Key questions and responses included:

- Willingness to provide local matching funds (more than half of respondents indicated a willingness to provide a 20% match)
- Types of grid upgrades necessary to support EV charging (responses included transformer upgrades, line extensions, feeder circuits)
- Additional information needed from MoDOT (EV charging station locations, any known traffic hazards, types and sizes of EV chargers)
- Utility provider ownership/operation of EV charging stations (57% of respondents indicated they do not plan to own or operate EV charging stations)

The Missouri NDP has considered the feedback provided to date and will continue to solicit additional feedback as it is updated.

3.4 Next Steps

As explained in Section 1.0, several critical factors, including the existence of a legislatively mandated EV Task Force currently underway, resulted in a relatively minimal amount of public engagement for this initial planning effort. However, Missouri recognizes that a framework for meaningful engagement is an important next step to gather input and build awareness and support for the NDP. To that end, it is anticipated that the following actions will be included as a part of NDP updates beginning with the next iteration:

- Clearly defining the goals of the public engagement strategy with members of DACs: As the project team builds on the work of the EV Taskforce and further defines the next steps for meaningful engagement, DAC members and others will be sought out to hear their ideas and suggestions not only on the plan itself, but also on the framework (including the goals and objectives) of the public engagement strategy. This form of early engagement can lead to better outcomes and a more inclusive process as community members have the opportunity to help shape the strategy and bring their own local knowledge to the table. For example, DAC members are likely to know which approaches, venues, times and methods are most likely to lead to maximum engagement of their community, and what communication methods (print, email, text, social media, etc.) are most likely to be effective in reaching the intended audience.

- Providing foundational information to DAC members that will equip them to actively provide feedback for NEVI decisions (e.g., outreach and education on EV charging basics, existing and planned public EV charger locations, total cost of ownership, and financial incentives): As the NDP team develops materials and an engagement strategy for further outreach, particular emphasis will be placed on clear and audience-appropriate communication content and formats designed to build a base level of knowledge about NEVI program elements

so that input is based on accurate and up-to-date information and so that communities can better understand how this national program relates to them as individuals and neighborhoods. Our team anticipates gleaning best practices from peer states and carefully assessing which outreach and engagement methods are proving to be most effective so that they can be customized for Missourians.

- Gathering and publicly summarizing information about the benefits of EV charging infrastructure that DAC members most prioritize, and any concerns they may have about EV charging infrastructure deployment: As has been recognized nationally through the NDP process, EV prices have and will continue to pose a substantial 'barrier to entry' for DAC members to purchase and own zero-emission vehicles. Numerous strategies are now being enacted to address this core issue. Nonetheless, the Missouri NDP will seek to proactively gather input about priorities and concerns by using a range of approaches to solicit early input that can in turn be used to inform program development. Issues such a siting of charging stations, priorities for phasing (perhaps related to Justice40 geographies or travel corridors where DAC members constitute an outsize share of travelers, etc.) can be gleaned from these conversations and be used to help shape the NDP.

- Communicating progress on Plan development and deployment activities, including those informed by public engagement: A substantial first step towards the objective of communicating progress on the NDP is in place with the website that has been established. It is anticipated that this website will serve as a primary reference point for future updates as the findings of the EV Taskforce are used to help shape and implement the Missouri NDP. The project team also expects to learn from DAC members through the early engagement referenced above about other communication methods that can be effective in transmitting the plan's deployment and related progress.

- Evaluating how DAC members are receiving benefits as Plans are being deployed: As noted above, given the near-term challenges related to EV pricing and accessibility by DAC members, the most appropriate means to assess benefits are not well understood. Missouri thus expects to learn from the experiences of other states that are further ahead in terms of deployment and benefit measurement so that best practices can be adopted, and lessons learned applied. Among the potential measures that may be used and vetted with stakeholders are the following:

  - Improve clean transportation access through the location of chargers;
  - Decrease the transportation energy cost burden by enabling reliable access to affordable charging;
  - Reduce environmental exposures to transportation emissions;
  - Increase parity in clean energy technology access and adoption;
  - Increase access to low-cost capital to increase equitable adoption of more costly, clean energy technologies like EVs and EV chargers;

- Increase the clean energy job pipeline, job training, and enterprise creation in disadvantaged communities;
- Increase energy resilience;
- Provide charging infrastructure for transit and shared-ride vehicles;
- Increase equitable access to the electric grid; and
- Minimize gentrification-induced displacement result from new EV charging infrastructure.

Other measures are likely to be identified over the course of initial deployment and assessment in the near term and the Missouri NDP will incorporate those best suited to the state.

4.0 Plan Vision and Goals

The Missouri NEVI Deployment Plan Vision and Goals were developed by reviewing the Joint Office of Energy and Transportation's National Electric Vehicle Infrastructure Formula Program objectives and criteria and aligning those with the Missouri Department of Transportation's 2018 Long Range Transportation Plan (LRTP) goals, objectives, and guiding principles for the next 25 years (https://www.modot.org/long-range-transportation-plan), and the agency's Strategic Vision as articulated in the FOCUS document (https://www.modot.org/focus).

The Missouri NDP goals below are drawn from and aligned with both of the documents referenced above to work in tandem with the state's top priorities while addressing the demand for electric vehicle charging infrastructure and forthcoming federal support under the NEVI Formula Program. The table below presents the proposed NDP goals and how they are aligned with the state's LRTP goals, objectives, and guiding principles.

4.1 Missouri's NDP Vision

A safe, reliable, accessible, sustainable, innovative Electric Vehicle charging system that supports transportation choice, for a healthy environment and economy

Table 1: Missouri NEVI Deployment Plan Goals

Missouri NDP Goals	
Goal 1:	An EV charging network that serves Missouri's communities and travelers.
Goal 2:	A corridor-based EV charging system that leverages existing transportation and utility infrastructure for regional and interstate travel.
Goal 3:	A comprehensive system that supports transportation choices for all of Missouri's residents and builds on existing state-level planning efforts related to EVs.
Goal 4:	A resilient, economically sustainable vehicle fueling system that can adapt to changes in market conditions and transportation technologies.

Potential goals that can be considered for additional state-wide electric vehicle support include:

- Develop an EV charging infrastructure that is continuous and compatible with neighboring states on a regional basis
- Create a transportation system that reasonably incorporates technology to integrate renewable and sustainable energy sources
- Efficiently leverage existing transportation and utility infrastructure

4.2 NEVI 5-Year Program Targets

Program targets are expanded upon in more detail in Section 14 Program Evaluation, and refined targets will be developed during the next iteration of the annual plan update outlined below. They are subject to change based on the Notice of Proposed Rule Making that was issued on June 9, 2022 and may also be modified during the program implementation process as new information becomes available.

4.2.1 Year 1-2 Focus Areas/Quantitative Goal

In the first year, Missouri will focus on establishing the program, assessing best practices and preparing for deployment. Priority locations may change, depending on private investments that may occur along interstate highways.

4.2.2 Year 3-5 Focus Areas

The initial funding will be used to fill gaps with new and upgraded stations along Missouri's AFC network, consisting of the interstate system. After large gaps along interstates are filled, the State anticipates prioritizing locations that fill gaps along additional corridors, informed by public input and technical data and with consideration given to changing conditions statewide due to private sector investments in charging stations or other factors. If there is funding remaining, the State will prioritize upgrading existing locations funded through other programs or private investments to be NEVI compliant. The State will also evaluate whether to nominate additional US Highways as AFCs.

4.3 Annual Plan Updates

In accordance with the NEVI guidance, this plan is expected to be updated annually (as needed) to reflect future year funding allocations, new guidance, and progress in implementing the plan. The annual updates will provide an opportunity to adjust the plan, including the goals and targets, based on new information, ongoing stakeholder and public input, and lessons learned. These annual updates will also provide a scheduled opportunity for information sharing with other states and the Joint Office.

5.0 Contracting and Delivery Methods

5.1 Contracting

The State of Missouri evaluated a range of options for contracting and delivery methods, including Design-Build-Operate-Maintain (DBOM), Traditional Design-Build-Finance-Operate-Maintain (DBFOM), Progressive P3, Construction Management at Risk (CMAR) with Separate O&M/Charge Management Services Contract, Build to Suit (BTS), and Grant Applications. At this time Missouri has not selected a contracting method to deliver the NEVI program but anticipates a competitive process for award. Further evaluation will need to be done once the NEVI final rules are published.

5.1.1 Electric Vehicle Supply Equipment Direct Current Fast Charging Buy America

Missouri will adhere to Buy America requirements issued for NEVI and understands that FHWA has continued to interpret and apply Buy America requirements based on a 100% domestic content and domestic assembly threshold for iron, steel, and protective coatings, save for a de minimis threshold of $2,500 or one-tenth of one percent of the total value of the contract, whichever is greater. While MoDOT hopes for a more flexible definition than what FHWA has implemented to date, or for reasonable allowance of waivers, the agency is prepared to adhere to requirements FHWA issues. It should be noted, however, that the stricter the requirements are, the greater the risk to prompt deployment due to limited equipment availability and/or supply chain concerns.

5.2 Delivery Methods

To minimize the risk and maximize the value of lessons learned from around the country, a careful process to finalize the delivery method and procure the right partners is important. NEVI guidance requirements will be incorporated into the requirements of the contracting mechanism identified in this process. These include elements addressing operations, maintenance, data sharing, reporting and the equitable deployment of electric vehicle infrastructure to ensure these investments benefit disadvantaged communities and create safeguards to prevent or mitigate potential harms.

6.0 Existing and Future Conditions Analysis

6.1 State Geography, Terrain, Climate and Land Use Patterns

6.1.1 Missouri's State Geography

Missouri is a landlocked, centrally located state within the United States connecting to a much broader national network of interstate, US, and state highways. Missouri borders eight states including Kansas, Nebraska, Iowa, Illinois, Kentucky, Tennessee, Arkansas, and Oklahoma.

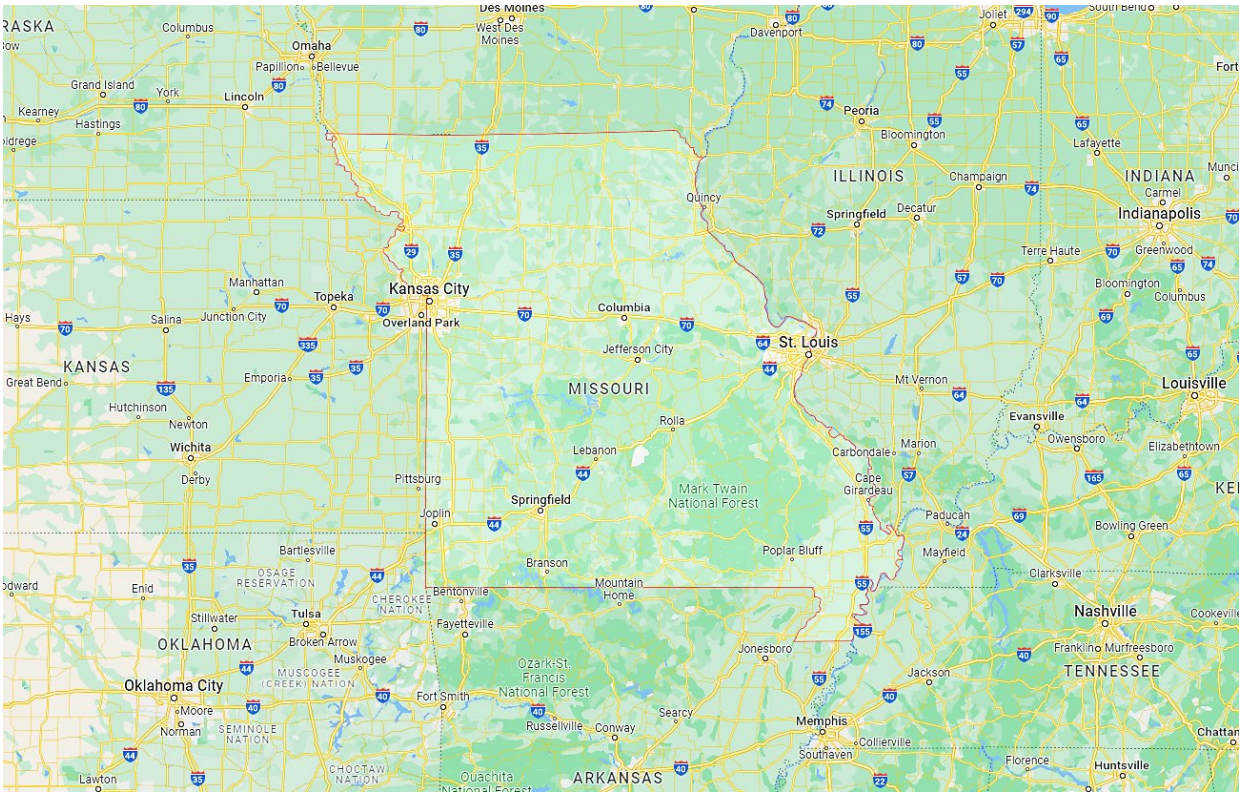


Figure 1: Geographic Location of Missouri

Within Missouri's boundaries, the state land area is 69,715 square miles which ranks 21st among US states[1]. Electric vehicle travel into, out of, within, and through Missouri will need to contend with its sprawling distances between communities, its primarily rural development pattern, and its topography of hills, mountains and plains. Missouri has a wide range of weather including seasonal high temperatures, significant snow, occasional flooding and tornadoes.

6.1.2 Missouri's Terrain Profile

Missouri's terrain is varied with land features ranging from rivers to mountains to plains. The state's terrain is primarily divided by its two major, navigable rivers, the Mississippi River and the Missouri River. The Mississippi River forms the state's eastern boundary, and the Missouri River

[1] U.S. Census Bureau

traverses between the east and west borders of the state connecting the St. Louis and Kansas City metropolitan areas. North of the Missouri River the land areas are part of the northern plains. In this northern plains, past land formations have left some rolling hills and larger river bluffs cut into the land. Southern Missouri is home to the Ozark mountains and other land formations like caves and sinkholes. The southeastern corner of the state is shaped by the Mississippi River plain and is the lowest, flattest, warmest, and wettest part of the state. In most cases, this terrain should be traversable by EVs without dramatically depleting energy to climb steep roadways.

6.1.3 Missouri's Climate Patterns

Missouri's climate is moderate with few extended periods of very cold or very hot weather. Missouri will seasonally rotate between hot summers and cold winters but typically avoids temperature extremes while exhibiting high humidity. Temperatures recorded within the state have historically ranged from –40 degrees F to 118 degrees F. EVs and their supporting energy generation and transmission will mostly benefit from the lack of extreme temperatures – though EVs may see more limited driving range in the peak of summer and winter to supply vehicle climate control.

Also, within the EV climate considerations, the provision of an electric vehicle charging network must address climate resiliency and extreme weather events. Missouri conducts statewide planning for natural emergencies including tornadoes, severe winter weather, flooding, earthquakes and extreme heat (among others). Unlike some natural emergencies, Missouri's primary risk of tornadoes is typically addressed through sheltering in place and may occur over a very short time span. The EV infrastructure network will not need to regularly accommodate peaked charging activity in advance of emergency evacuation. One potential exception may be flood vulnerable areas as flooding may cut off access to low-lying areas that could result in evacuation without sufficient warning, or the damage of flooding could cut-off long-term access across bodies of water. Flood vulnerability will be a consideration for Missouri in siting EV infrastructure and planning for future demand on the electrical grid.

6.1.4 Missouri's Land Use Patterns

Missouri's population was estimated in 2020 to be 6,160,281, the 19th ranked state population in the US. The population density of Missouri in 2020 was estimated at 89.5 persons per square mile, which ranked 28th of all US states. Missouri's population is largely driven by two major metropolitan areas, St. Louis and Kansas City. Those two metros combine to make up 55% of the population of Missouri. Missouri includes several other populous areas including the Springfield area with a population greater than 500,000 persons and the City of Columbia having a population exceeding 100,000 persons. The urban areas of Kansas City, St. Joseph, and Joplin connect via I-29 and I-49 and Kansas City connects to Columbia and St. Louis via I-70. The Interstate 44 corridor connects the urban area of Springfield to Joplin to the west and St. Louis to the northeast. The Interstate 55 corridor connects the Cape Girardeau urban area to St. Louis.

Outside of these notable urban areas, the Missouri land area is primarily rural in nature. The state population has been forecast to grow to roughly 6.4 million people by 2040. The state's population forecasts identify that increase of nearly 250,000 persons to be highly concentrated to metropolitan areas and fast-growing counties, specifically counties in the areas of Cape Girardeau, Columbia, Kansas City, Springfield, and St. Louis.

EV infrastructure at full NEVI build out will provide spacing of 50 miles or less between EV chargers along the interstate system, which will allow these urban centers and growth areas to adopt EVs and be able to travel freely to and from other Missouri metro areas and to a broader national system. Smaller municipalities and rural areas not served by the initial NEVI network in Missouri may be served as EV networks build out in the longer term.

6.2 State Travel Patterns, Public Transportation Needs, Freight, and Other Supply Chain Needs

In anticipation of the NEVI network deployment, the current status of infrastructure and traveler patterns have been assessed to determine potential use of EV chargers. Travel within Missouri, particularly on higher class facilities, has been assessed as well as the statewide networks for public transportation and freight supply chains. Missouri anticipates limited to modest impacts for most residents for some time. However, the NDP will serve to provide near-term EV charging opportunities on interstate routes that serve travelers moving through the state and between higher adopting metropolitan areas.

6.2.1 Roadway Network

Missouri's most frequent mode of travel is the light-duty or passenger vehicle. The state DOT maintains the seventh largest state highway system in the US at 33,856 miles. Missouri experiences nearly 130 million miles driven daily on its expansive state highway system. Included in that daily travel total is travel on both Missouri's interstate and major routes and much lower levels of travel on minor highways and low volume routes. Specifically, Missouri interstate and major routes comprise a distance of 5,517 miles, but account for as much as 76% of travel in the state. Minor highways and routes cover greater mileage, 17,450 miles, but carry only 22% of travel. In the lowest class, low volume routes cover 10,889 miles but carry only 2% of state travel. Thus, Missouri highways and routes present a large system to fully cover and a significant network of existing transportation assets before adding any additional EV charging assets.

Also of importance to Missouri's roadway network management strategy is consideration of the state's collection of bridges. Statewide there are 10,403 bridge structures. Within that full bridge class, there are some bridges that require separate classification and tracking. The first of these special bridges are the 207 major bridges in the state, structures that are of significant size and importance to major routes in Missouri. The second classification are bridges in poor condition. In 2018 there were 883 bridges in poor condition, which affects how MoDOT must allocate resources to increase the system's state of good repair. A third classification with significant

overlap to the second group are the state's 1,253 weight-restricted bridges. In considering state travel patterns for potential EV users, these poor condition and weight-restricted structures will need to be considered for preferred EV infrastructure corridor route selection and in the state's program-wide plans for balanced spending.

6.2.2 Public Transportation

Missouri's implementation of EV infrastructure will also need to take into consideration the growth in EV use in public transportation. The public transportation system in Missouri includes urban area systems, rural public transportation, and intercity bus travel. The urban areas systems are operated in seven urban areas: Columbia, Jefferson City, Joplin, Kansas City, Springfield, St. Joseph and St. Louis. Each of these providers operate in partnership with the Federal Transit Administration to operate services like local bus, express bus, circulators, paratransit, and some micromobility. A vast majority of these urban area services are not well adapted to use of DCFCs and will generally require charging at a transit depot off the NEVI system. Rural and intercity public transportation may differ from their urban counterpart in the future landscape of EVs. Rural public transportation often takes the form of much smaller vehicles. In Missouri, there is a common rural public transportation provider for demand responsive service to 87 counties of the state's 114 counties, though all counties have access to at least some rural public transportation service. In 2016 all rural transit providers combined to document 2.3 million rural transit rides. As many of the public transit vehicles may cover long trip distances, they will need to access fueling or charging infrastructure along their journey.

In Missouri, intercity buses are not a major form of travel, recording 80,000 bus riders in a single year (data from 2016). While users of the service may not be significant compared to other travel modes – intercity bus travel in a large footprint state like Missouri will require fueling or charging along the journey. In looking at both rural public transportation and intercity buses, these accessible and equitable forms of travel will need to be planned for fueling and charging opportunities as their fleets pilot and transition to alternative fuels over time.

6.2.3 Freight and Supply Chains

The Missouri NDP infrastructure also considers the impact of freight and supply chains on transportation infrastructure needs and to a lesser degree on the potential infrastructure locations of NEVI compliant chargers. At the time of this NEVI plan, Missouri is completing a 2022 update of its state freight and rail plan. The state draws significant economic benefit from freight movement as a producer of farm and food products and a consumer for manufacturing while also needing to plan for impacts of intrastate and through freight travel on transportation infrastructure. At a glance, Missouri freight movements include mobility of 985 million tons per year valued at $1.1 trillion (2018).

Of the 985 million tons, 41% of freight movement was by truck, which primarily occurs on interstates and major routes. Missouri's freight and rail plan assessed the movement types of

freight considering freight trip origin and trip destination. From that analysis, it was determined that of all freight trips in Missouri, 37% of goods tonnage moves entirely through Missouri. National models of freight movement project that by 2045 the share of through freight shipments will grow to 41% of tonnage touching state transportation facilities. Further, these long distances traveled by through freight travel leads to a heavy demand on the state's truck parking inventory. A recent analysis of public and private truck parking facilities in Missouri identified that of the state's 141 truck parking sites along Missouri interstate routes, 110 of those sites were utilized at greater than 80% capacity, with most of those sites at 100% capacity. It's clear that heavy trucks will need fueling and charging infrastructure as EV truck models grow in the market. The only caveat in regard to NEVI is that freight energy demands are anticipated to be larger than available DCFC networks planned for passenger vehicles. As such, initial state plans have focused on provision of charging infrastructure locations at the NEVI guidance level with a passenger vehicle focus and recognizing that future alternative fuel corridor enhancement will be needed in the long term for freight and supply chain needs.

All considered, freight and supply chains in Missouri are a large factor on transportation infrastructure use and could play an even bigger role in future alternative fuel corridor network development.

6.3 Current State of EV Industry and Markets

The prior sections reviewed travel patterns and conditions affecting travel in the state of Missouri. All of the facets reviewed have the potential to affect the Missouri share of a NEVI network. Yet, the current condition with EVs reflects a recently maturing market of vehicles offered, vehicle ownership, and new consideration for electric utilities to serve charging infrastructure. The following section highlights Missouri's EV ownership, the electric utility providers currently positioned to provider NEVI charger power, and the economic incentives and rebates available to the state and its public and private partners.

6.3.1 Electric Vehicles in Missouri

Electric Vehicle ownership and registration are trending up in Missouri. The US Department of Energy and the National Renewable Energy Laboratory report 6,740 all-electric vehicles were registered in Missouri as of June 2021. This represents 0.66% of all-electric vehicle registrations nationally and 0.34% of registered vehicles in Missouri. While this is currently a nominal percentage of the fleet, existing projections indicate an anticipated growth to 5.02% of the overall registered vehicle fleet being electric in Missouri by 2035.

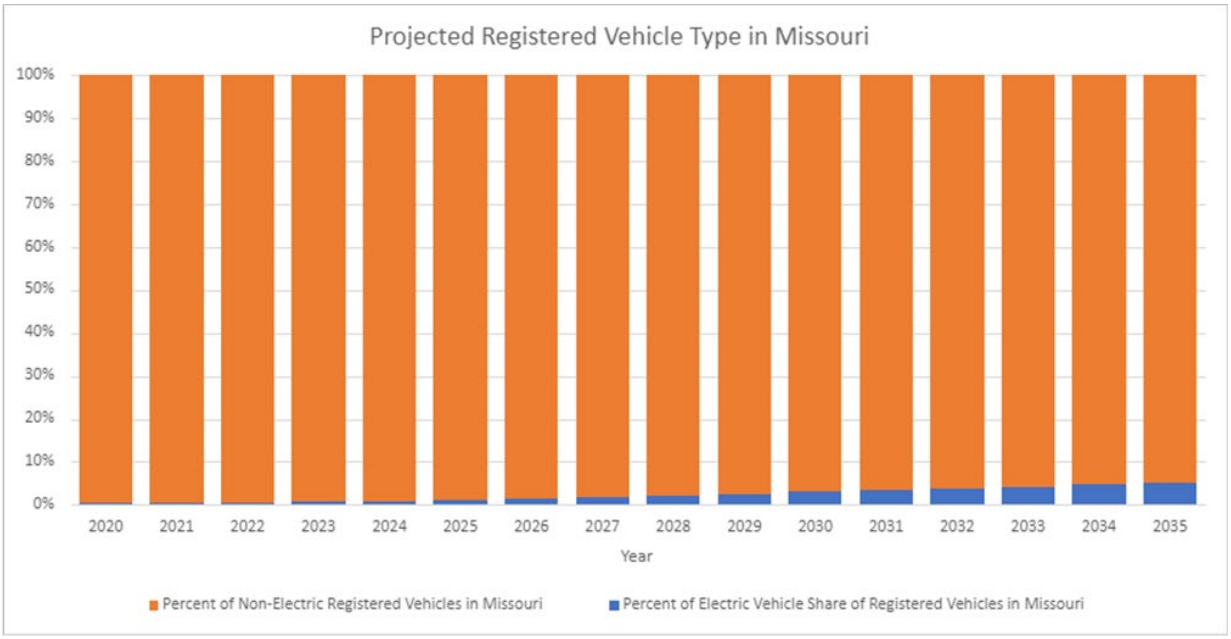


Figure 2: Projected Missouri Vehicle Registrations by Fuel Type

6.3.2 Electric Utility Service Areas in Missouri

Missouri is serviced by four regulated electric companies and several non-regulated distribution cooperatives or municipal systems. These electric service areas are shown in Figure 3: Missouri Electric Service Areas.

Options to ensure energy supply are adequate and readily available consist of expanding the grid to create more energy and creating storage for energy to be saved and used when demand peaks. While grid expansion may be on the horizon, capacity is currently considered adequate. However, opportunity exists to develop ways to store energy after it is created so it can be readily available during times of peak demand. In response Missouri utilities have invested in pilot projects for energy storage. Energy storage can be deployed throughout the entire electric system creating system reliability using the existing electric grids. Energy storage opportunities are under-utilized in Missouri, however, the technology is maturing rapidly. Additional integration of storage technologies can help Missouri in its grid modernization efforts as well as help provide more affordable, reliable energy to consumers.

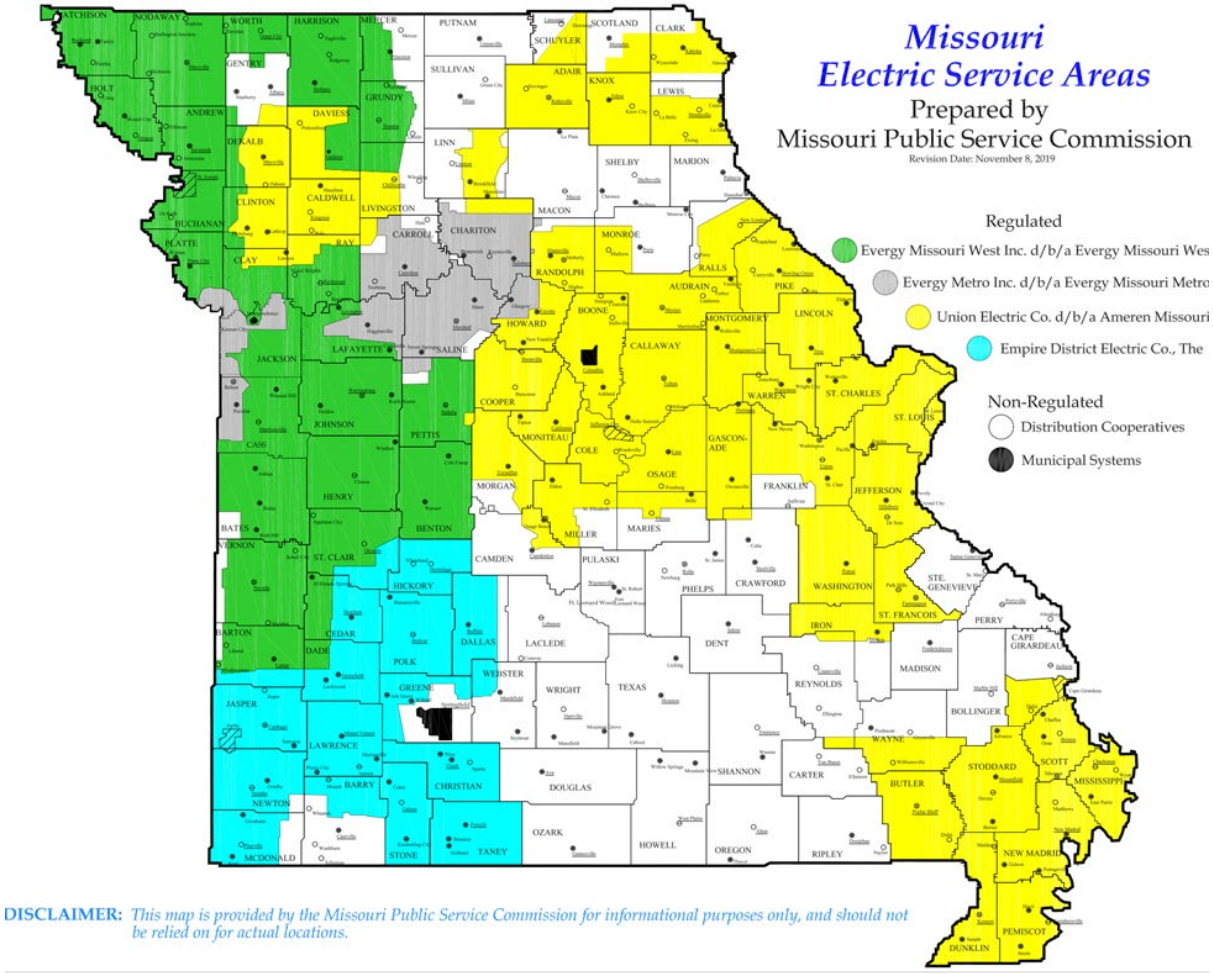


Figure 3: Missouri Electric Service Areas

6.3.3 Electric Vehicle Incentive and Rebate Programs in Missouri[2]

Below are examples of incentive and rebate programs available within Missouri. Additionally, local municipalities, such as the City Utilities of Springfield, provide EV charging rebates or other incentives to spur adoption of EV technologies.

- ***Alternative Fuel Vehicle (AFV) Decal -*** The state motor fuel tax does not apply to vehicles that are powered by an alternative fuel, including electricity, if the vehicles obtain an AFV decal. The AFV fee structure is by type of vehicle and Gross Vehicle Weight. The decal fee for plug-in hybrid electric vehicles model year 2018 and later is one-half of the annual decal fee applied to other AFV types.
- ***AFV Emissions Inspection Exemption***[3] **-** Vehicles powered exclusively by electricity, including low-speed vehicles, hydrogen, or fuels other than gasoline that are exempt

[2] Alternative Fuels Data Center: Electricity Laws and Incentives in Missouri (energy.gov)
[3] Missouri Revised Statutes 643.315

from motor vehicle emissions inspection under federal regulation, are exempt from state emissions inspection requirements.

- ***Ameren Missouri's Electric Vehicle (EV) Charging Station Incentives –*** The Charge Ahead program offers competitive incentives to non-residential customers for the installation of Level 2 EV charging stations or DCFC stations at qualifying workplaces, multi-unit dwellings, and public areas. Sites must be located in Ameren Missouri's service territory and require no electrical upgrades. Applicants may receive up to $500,000. Incentives are available on a first-come, first-served basis. Applications for incentives will be accepted until September 30, 2022, or until funding is exhausted, whichever is earlier through the Ameren Missouri Electric Vehicles Website.
- ***Evergy's Electric Vehicle (EV) Charging Station Rebate –*** Evergy offers a $500 rebate for the purchase and installation of a Level 2 EV charging station to qualified residential customers that purchase or lease an EV and enroll in a time-of-use rate through Evergy's EV Charging Rebate website.
- ***Utility/Private Incentives in Missouri –*** Some Missouri utilities joined the National Electric Highway Coalition (NEHC), committing to create a network of DCFC stations connecting major highway systems from coast to coast of the United States. NEHC utility members agree to ensure efficient and effective fast charging deployment plans that enable long distance EV travel, avoiding duplication among coalition utilities, and complement existing corridor DCFC sites. A list of participating utilities and states are available on the NEHC website.

6.4 AFC – Corridor Networks (Ready Corridors and Pending Corridors)

Missouri has designated Alternative Fuels Corridors (AFC) through the FHWA process that include the full mileage of all interstate routes within the state and does not include any additional routes from the US highway system or Missouri state highway system. The Missouri DOT and partners have not designated any new AFC routes or mileage during the AFC Round 6 designation period – which was open until May 13th, 2022. Specifically, the AFC in Missouri includes the full lengths of Interstate 29, Interstate 35, Interstate 44, Interstate 49, Interstate 55, and Interstate 70 as indicated by the dashed lines in Figure 4: Map of Missouri's Designated AFCs.

6.4.1 Corridor Pending Corridors

- Interstate 29 – Missouri / Iowa border to St. Joseph, Missouri
- Interstate 35 – Missouri / Iowa border to Kansas City metro area
- Interstate 44 – Missouri / Oklahoma border to St. Louis metro area
- Interstate 49 – Kansas City metro area to Missouri / Arkansas border

- Interstate 55 – Festus, Missouri to Missouri / Arkansas border
- Interstate 70 – Kansas City metro area to Wentzville, Missouri

6.4.2 Corridor Ready Corridors

- Interstate 29 – St. Joseph, Missouri to Kansas City metro area
- Interstate 35 – Within Kansas City metro area
- Interstate 55 – Within St. Louis metro area to Festus, Missouri
- Interstate 70 – Within the Kansas City metro area and between Wentzville, Missouri and the St. Louis metro area

Figure 4: Map of Missouri's Designated AFCs

6.5 Existing Locations of Charging Infrastructure Along AFCs

Missouri has 22 existing EV charging stations along the state's AFC network as of May 2022, with four additional stations under construction. These locations and their attributes are shown in the table below, with the figures in the "Route (AFC)" column denoting the interstate highway on which each station is located.

Prior to the finalization of the Volkswagen Environmental Settlement, Missouri's largest investor-owned utilities and several municipal utilities provided joint suggestions for how the Missouri Department of Natural Resources (DNR) could implement the Volkswagen Environmental Mitigation Trust (VW Trust) to fund EV infrastructure. This utility group identified more than 40 charging locations near highways, with the goal of creating a Minimum Practical Network of chargers that could allow an EV owner to travel to and from any part of the state. Around that same time, Electrify America began planning for three sites along I-70 and three sites along I-44. These sites were incorporated in the locations listed for the Minimum Practical Network, although Electrify America was not directly involved with that planning effort.

As of early May 2022, 26 of the Minimum Practical Network chargers are online and available to the public. Five more are expected to complete construction in the next few months. VW Trust applications for ten more locations will open in Summer 2022, with expected project completion in 2024.

Table 2: Existing EV Charging Infrastructure Along AFCs (as of May 2022)

State EV Charging Location Unique ID*	Route (AFC)	Location	Anticipated EV Network (if known)
Cameron	35	1514 Bob Griffin Rd, Cameron	ChargePoint
Bethany	35	504 S 39th St, Bethany	ChargePoint
Rolla	44	1735 N Bishop Avenue, Rolla	Blink
Eureka	44	245 E 5th St, Eureka	ChargePoint
Harrisonville	49	520 S Commercial St, Harrisonville	Francis Energy
Nevada	49	400 Johnson Drive, Nevada	Francis Energy
Sikeston/Miner	55	2832 E Malone Ave, Sikeston	ChargePoint
Perryville	55	2020 Jefferson St, Perryville	Francis Energy

State EV Charging Location Unique ID*	Route (AFC)	Location	Anticipated EV Network (if known)
Hayti	55	1200 E Washington St, Hayti	ChargePoint
Festus	55	1181 W Gannon Dr, Festus	ChargePoint
Warrenton	70	499 E Veterans Memorial Pkwy, Warrenton	ChargePoint
Kingdom City	70	County Rd 211, Kingdom City	ChargePoint
Columbia	70	1401 Creekwood Pkwy, Columbia	BTC Power
Joplin	44, 49	2100 S Prigmor Ave, Joplin	ChargePoint
Springfield	44	2963 E Division St, Springfield	ChargePoint
Cape Girardeau	55	25 S Kingshighway St, Cape Girardeau	ChargePoint
Mount Vernon - EA	44	500 W Mount Vernon Blvd, Mount Vernon	Electrify America
Lebanon - EA	44	669 West Elm St, Lebanon	Electrify America
Booneville - EA	70	2150 Main St, Booneville	Electrify America
Sullivan -EA	44	350 Park Ridge Road, Sullivan	Electrify America
St. Charles - EA	70	2897 Veterans Memorial Parkway, St. Charles	Electrify America
Independence - EA	70	17810 E 39th St, Independence	Electrify America

An overview of EV charging locations statewide for Missouri, including those on the state's AFC network, is shown in Figure 5 below.

Figure 5: Map of Missouri's Existing Public Charger Locations Along Designated AFCs

6.6 Known Risks and Challenges

Within the State of Missouri, risks and challenges exist related to the deployment of EV charging stations and to EV adoption. These are summarized below:

6.6.1 Barriers to EV Adoption

- ***Lack of Charging Infrastructure –*** The NDP will go far to address this for long-range travel, but the investments may still result in gaps for community charging needs in some communities within the state.
- ***Range Anxiety for Long Trips –*** The NDP is seeking to address this directly by positioning EV charging stations along major travel corridors.
- ***Long Recharge Times –*** 150 kW minimum power dictated by the NDP will alleviate this to a degree, and there may be upgraded and thus faster charging in future facilities, but for the near term the recharge time for an EV will still be 3-4 times as long as what it takes to refill a vehicle with gasoline.

6.6.2 Barriers to EV Infrastructure Deployment

- ***Limited Utility Infrastructure –*** Grid capacity must be able to support chargers or be upgraded.
    - This is a bigger concern for supplying the day-to-day charging needs of EVs.
    - The load from a DCFC network along the highway will not be as significant or present as much of a challenge for the utilities but extending 3-phase power to rural locations may impact installation budgets and schedules.
    - The locations of some DCFC may be difficult to develop (see Rural/Underserved Infrastructure Gaps).
- ***Utility Demand Charges –*** Rate structures are not friendly for high power / low utilization loads like a DCFC where significant use occurs during peak load times.
    - While EV adoption is currently low, utilization will also be low, and costs for electricity will be relatively high.
    - Increased utilization helps to alleviate demand charge impacts, but it is difficult to get to high utilization if costs are high.
- ***Rural/Underserved Infrastructure Gaps -*** Supporting long distance travel means supporting travel through rural areas where the need may exist for charging but the market size is relatively low.
    - These areas may have a small number of registered EVs but higher volumes of pass-through EV traffic.
    - These areas may not have easy access to the 3-phase power required by DCFC.
- ***Supply Chain Issues -*** With the influx of funding to support charging station installation combined with widespread supply chain issues globally, the availability of chargers and related materials may be constrained in the near term. The ongoing equipment, labor, precious metals, and microchip shortages have the potential to lengthen production timelines and increase costs.

7.0 EV Charging Infrastructure Deployment

The State of Missouri expects to partner with local or tribal governments, private entities, or utilities to develop the EV Charging Network. Priority locations for NEVI-funded projects are identified in Section 8.2. Exact locations of charging stations (e.g., specific businesses or parking lots) have not been identified by the State; applicants for funding will be required to identify the specific location in each community where they propose to install charging equipment. The State may be flexible on the precise location if an applicant proposes an alternative that meets the NDP goals and complies with federal guidelines.

8.0 Site Suitability, Prioritization, and Selection

8.1 Methodology

Building on the prior work related to VW Environmental Settlement funding, Missouri evaluated the 22 existing sites, identifying stations that will require an upgrade to meet NEVI standards, stations that already meet NEVI standards, and stations that are further than one mile from the Alternative Fuel Corridor. The project team also identified charging stations along the AFCs that are separated by more than 50 miles. Along these segments, the team identified possible new locations that would meet the 50-mile requirement and bring the network into compliance with NEVI guidelines.

The possible new locations fall into two categories:

- Locations where charging infrastructure exists but is not likely to be upgradable, or where chargers were planned for inclusion in future VW Trust funding rounds (Kansas City, St. Joseph, and Concordia).
- Locations where a town with gas stations is near the highway and which reduce the distance between chargers to less than 50 miles (Craig, Lamar, St. Robert, and Butler).

In general, the 30 planned sites place charging infrastructure near enough to Missouri's borders that connecting Missouri's network to neighboring states' networks should be practical. Coordination with adjacent states has been initiated and is expected to continue to ensure that continuity of the AFC corridors is maintained across state lines.

8.1.1 Preference for Existing Infrastructure

In selecting sites for NEVI funding, the preference should be to fill gaps across the AFC network while leveraging existing investments in charging infrastructure within the state. The oldest of these locations became operational just over one year ago, therefore when and where appropriate, NEVI funds should be deployed to upgrade the older stations first so as to avoid the inefficient use of taxpayer funds.

The Minimum Practical Network requirements are considerably less stringent than the NEVI requirements. While some existing sites meet the charging rate requirements of NEVI, other remaining sites would require upgrades through which some nearly new charging equipment would be removed and replaced with equipment capable of safely handling a 150kW charging rate. This presents a challenge for station owners who still likely have not seen a return on the equipment that would be replaced. Still, these existing stations will likely incur fewer project costs related to power transmission infrastructure compared to locations that do not currently have any charging infrastructure.

8.1.2 Network Node Selection Methodology

Selection of charging network nodes along AFC's includes two phases. The first phase determines the location where new nodes should be in order to meet the 50-mile requirement along AFC's. The second phase, to occur at a later point in program development, will be selection of the specific sites within locations identified. Once a general location has been identified, and applications have been opened to the public, a coordinated specific site selection process will determine where a site will be located.

8.1.3 Selection of New Locations

For the seven locations that do not have charging infrastructure already available for upgrade, it will be necessary to ensure that a suitable location can be found within 50 miles of an existing charging location. Of primary importance for this determination are the following factors:

Distance from Three-Phase Power: Three-phase power is required for a DCFC site. Power would ideally come from a substation, or it may be tapped from a distribution line. This metric has a significant impact on site suitability since it could be very expensive to bring a large amount of power over a long distance to a new site.

Maximum Voltage of Nearest Power: This metric addresses the voltage rating of the nearest power source. For a substation, this is the highest incoming voltage present. For a distribution line, this is the line voltage. Higher voltages can supply larger loads and are better suited for providing the power level needed for chargers.

Number of Substations within Five Miles: Sites that are close to multiple substations are more likely to have reliable power than sites that are only near a single substation. It is also possible to provide redundant power feeds to improve reliability when multiple substations are nearby. The number of nearby substations is used as approximate proxy for the reliability of power, although other metrics may be more applicable if the data are available.

Amenities: Even with improvements in charging technology, the amount of time that will be required for EVs to recharge at DCFC sites along the highway will likely be around 30 minutes for the near future. Charging sites should be co-located with amenities that drivers can use while waiting for their vehicles to charge. These amenities could include convenience stores,

restaurants, and parks. The score for this metric is based on an aggregation of information about the area within one mile of the interchange where a charging site could be located.

Distance to Furthest Upgradable Location: One of the main requirements for the state's AFCs to be considered fully built-out is that chargers be located no further than 50 miles apart. For this reason, potential new charger locations will be evaluated by the furthest distance to another charger on the AFC(s) served. To prevent clustering of charging locations, this metric can be negative if a potential new location is too close to another existing or planned location.

Justice40: Prioritizing the installation of vehicle chargers depends not only on the suitability of the site, but equity for disadvantaged communities. The NEVI guidance encourages states to utilize the EV Charging Justice40 Mapping Tool during the development of plans. Justice40 may be better suited as a metric in deciding between sites within a chosen location, since distance requirements along corridors are already prescribed.

8.1.4 Selection of Sites within a Location

While the NDP does not require detailed information on selected sites, consideration should be given to metrics for selecting specific sites within chosen charging locations. In areas where an existing station owner is unwilling or unable to upgrade their equipment, it may be prudent to use the same general location. Missouri anticipates using site selection criteria to award grants to funding applicants.

Site selection criteria are expected to include:

- ***Requested Funding*** – comparison of applicants' funding requests for chargers in the same location.
- ***Payment Options Available*** – require at least two acceptable payment methods at each charging site (one of which must be pay-by-voice phone call), with additional points for more options (none of which can be subscription-based).
- ***Ease of Navigation*** – more points would be awarded for sites that are visible from the highway or easy to access.
- ***Driver Amenities*** – more points would be awarded for sites that have facilities to accommodate drivers while they wait, such as restrooms, dining, and entertainment.
- ***Experience and Timeline*** – applicants will be graded based on evaluation of their experience with EV charging infrastructure and services.

8.1.5 Scoring

As Missouri develops the specific approach for the deployment program, scoring criteria will be confirmed, with the expectation that factors such as interchanges, daily long-distance trips, cross street average daily traffic, system miles covered, power availability and reliability, amenities, Justice40, site resiliency and environmental risk (flooding, etc.) will be used to determine the most viable sites.

8.2 Initial Phase Deployments/Upgrades

The table below provides a list of the locations identified for DCFC installations or existing charger upgrades in the initial deployment phase.

Table 3: Proposed New and Upgraded Charging Station Locations in Initial Deployment Phase

State EV Charging Location Unique ID	Route (AFC)	Location*	Anticipated EV Network	Utility Territories	Anticipated Station Ownership	FY23-FY26 Funding Amount (Prelim. Estimate)
Craig	29	Craig	TBD	TBD	TBD	$700,000
Kansas City 1	29	Kansas City	TBD	TBD	TBD	$700,000
St. Robert	44	St. Robert	TBD	TBD	TBD	$700,000
Lamar	49	Lamar	TBD	TBD	TBD	$700,000
Butler	49	Butler	TBD	TBD	TBD	$700,000
Concordia	70	Concordia	TBD	TBD	TBD	$700,000
St. Joseph	29	St. Joseph	TBD	TBD	TBD	$700,000
Kansas City 2	35	Kansas City	TBD	TBD	TBD	$700,000

- **NOTE: These locations are approximate and subject to refinement based on continuing development of the NDP and deployment planning and implementation.**

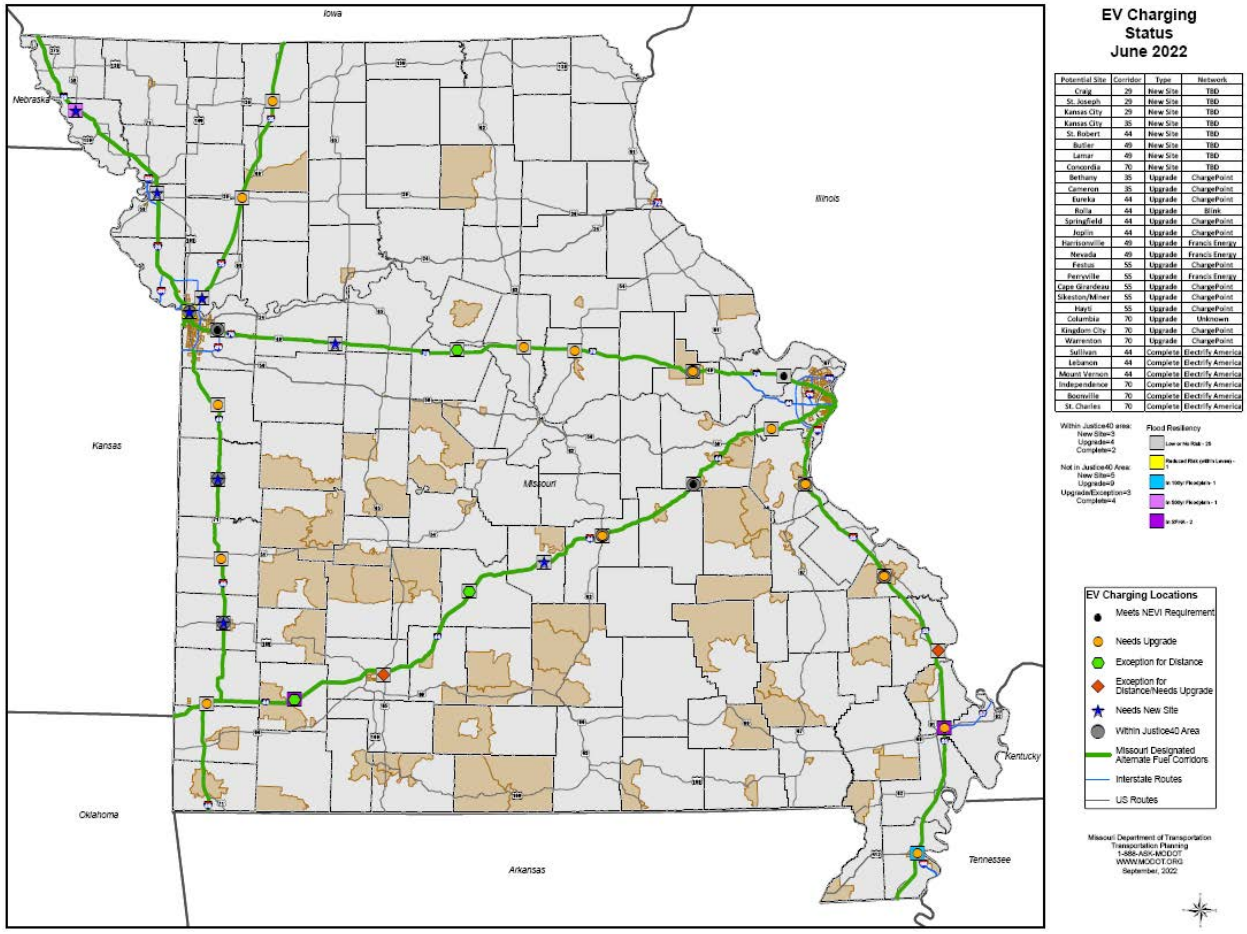


Figure 6: Proposed EVSE Deployments and Upgrades (Indicated by a Blue Star)

8.2.1 Corridor Pending Designations Upgraded to Corridor Ready Designations

Each of the "Corridor Pending" corridors listed below are expected to be upgraded to "Corridor Ready" with the deployments planned through the NDP.

- Interstate 29 – Missouri / Iowa border to St. Joseph, Missouri
- Interstate 35 – Missouri / Iowa border to Kansas City metro area
- Interstate 44 – Missouri / Oklahoma border to St. Louis metro area
- Interstate 49 – Kansas City metro area to Missouri / Arkansas border
- Interstate 55 – Festus, Missouri to Missouri / Arkansas border
- Interstate 70 – Kansas City metro area to Wentzville, Missouri

8.2.2 Increasing Capacity and Redundancy Along Existing AFCs

Missouri applied NEVI guidance for station spacing, power ratings and number of units to the Alternative Fuel Corridors. Consideration was given to the estimated range of an 80% charge from a 30-minute charge session for low and mid-range electric vehicles. On the low end, a 150-mile range electric vehicle would have an estimated 120-mile range after completing an 80% charge. A 250-mile mid-range electric vehicle would have an estimated 200-mile range after completing an 80% charge. Resulting range from a recommended 80% charge would provide EV drivers ample options to traverse the state when the network is fully built out.

A map indicating the anticipated AFC network density with completion of the proposed deployments is shown below. As is clear, there will be considerable access to EVSE for travelers in Missouri, including within and adjacent to Justice40 areas. Missouri will consider the expected coverage gaps (where there is no light blue on the map) in future rounds of AFC designations.

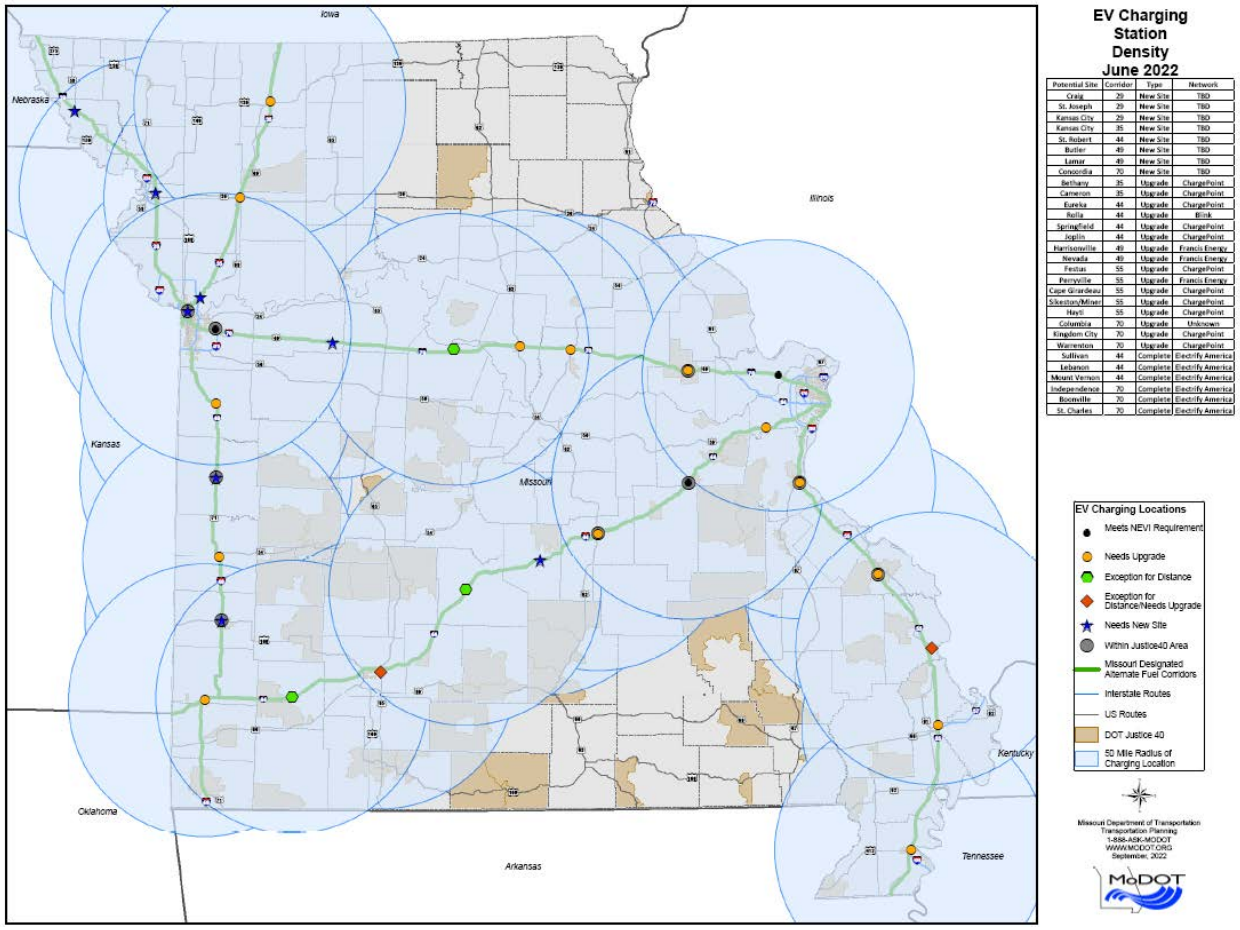


Figure 7: AFC Corridor EV Charger Density

8.2.4 Electric Vehicle Freight Considerations

Missouri will address freight in more detail following the release of FHWA guidance in the fall of 2022. Some considerations include:

- Freight vehicles include nationwide companies and independent owner-operators – so NEVI deployments need to account for the needs of the smallest / most vulnerable freight haulers.
- Statewide trip distances:
  - I-70 Kansas City Missouri River to Mississippi River in St. Louis – 250 miles
  - I-29 Downtown KC to Iowa border – 129 miles
  - I-35 Missouri / Kansas border to Iowa border – 115 miles
  - I-44 Oklahoma border to I-70 in St. Louis – 293 miles

8.2.5 Public Transportation Considerations

Transit agencies in the metropolitan areas of Missouri have already begun to deploy electric buses through grants received through the FTA Low or No Emission Vehicle Program and other federal funding programs and plan to increase the number of electric buses in the future. Kansas City Area Transportation Authority acquired two fully electric transit buses in 2021 and has committed to purchase additional zero-emission vehicles in the future. Metro St. Louis has 24 electric buses and recently received an FTA grant to support enhanced charging infrastructure for their fleet. It is expected that these agencies will use their own charging systems for the foreseeable future. Smaller and rural transit systems across the state may elect to take advantage of the public charging stations funded through the NDP as they incorporate electric vehicles into their fleet.

8.3 FY23-FY26 Deployments

For Electric Alternative Fuel Corridors, Missouri examined existing charging locations using the Alternative Fuel Data Center and applied FHWA Round 6 requirements to identify stations that met requirements. Missouri DNR planned locations were examined and filtered by these requirements as well. Resulting coverage gaps greater than 50 miles were examined for suitable electrical supply and candidate locations were placed near communities or incorporated cities.

8.4 NEVI Formula Funding

8.4.1 Sources

Missouri is forecasted to receive approximately $98.9 million in NEVI formula funds over the five-year period from Federal Fiscal Year (FY) 2022 to FY 2026 as indicated in Table 4. The minimum 20% non-federal match required to secure that funding is $19.8 million, for a minimum total five-year program amount of $118.7 million. If a larger non-federal match can be secured that amount could increase.

Table 4: NEVI Formula Funds and Matching Funds (Millions)

Federal Fiscal Year	Forecasted NEVI Funds	Local Match Funds	Total Funds
FY 2022	$ 14,647,722	$ 2,929,544	$ 17,577,266
FY 2023	$ 21,078,366	$ 4,215,673	$ 25,294,039
FY 2024	$ 21,078,366	$ 4,215,673	$ 25,294,039
FY 2025	$ 21,078,366	$ 4,215,673	$ 25,294,039
FY 2026	$ 21,078,366	$ 4,215,673	$ 25,294,039
TOTAL	$ 98,961,186	$ 19,792,237	$ 118,753,423

The FY 2022 federal amount is approximately $14.6 million. The minimum 20% non-federal match for FY 2022 is $2.9 million, resulting in a total of $17.5 million for the year. It is assumed that the remaining annual amounts will be divided evenly over the following four years. This results in approximately $21.1 million in federal funds and $4.2 million in matching funds or $25.3 million in total for FY 2023 through FY 2026. This plan is expected to be updated on an annual basis (as needed) to reflect the state funding plans for each fiscal year.

8.4.2 NEVI Formula Funding Uses

The main use of the formula funds will be to deploy needed EV charging infrastructure on the Alternative Fuel Corridors (AFC) network described further in Chapter 6. Cost estimates for charging infrastructure site development have been developed based on best practices and industry trends for unit costs and installation types.

8.5 State, Regional, and Local Policy

Entities that contract with the State and charging equipment providers will need to demonstrate they are coordinating with property owners and municipalities to ensure they follow local permitting requirements, zoning laws, and land-use policies before charging sites are selected.

9.0 Implementation

Strategies for guiding the implementation of the program will rely on the contracting process as described in Section 5 (Contracting) and as further developed based on best practices and guidance from the Missouri EV Task Force.

9.1 Strategies for EV Infrastructure Operations and Maintenance

Vendors receiving awards will follow agreed-upon requirements for operation and maintenance. Monitoring and service level agreements for station performance will be specified in the contract and it is expected that MoDOT will monitor station up time through vendor reported usage data and general user satisfaction on publicly accessible third-party charging web sites. Operation and maintenance costs are anticipated to be approximately 5% of installation cost and will be evaluated per location over time. Enforcement of idle fees and time limits will be the responsibility of the vendor/station operator.

9.2 Strategies for Service Provider and Station Owner Identification

It is expected that MoDOT will use existing solicitation methods to advertise, select, and award contracts to electric vehicle charging equipment service providers/property owners. Based on prior experience and communications with other states, charging equipment companies and other potential vendors generally have the expertise and ability to locate suitable locations for charging stations within the areas identified in this NDP. MoDOT will monitor progress with regular meetings between the vendor(s) and project team consistent with contract language and structure.

9.3 Strategies for Data Collection and Sharing

Contracts with vendors will include requirements to provide anonymized usage statistics for analysis. A methodology to coordinate data statewide and to provide to the Joint Office will be developed. Consideration will be given to using tools such as ArcGIS Online dashboards to provide partners and the public access to relevant information. Data sharing will conform to requirements that will be outlined in further guidance from the Joint Office once it becomes available.

9.4 Strategies for Addressing Resiliency Against Technology, Utilities, and Extreme Weather

Three primary areas where Missouri will address resiliency are described below. Additionally, the State will examine best practices from other states to learn and adapt the approach and deployment methodology in an effort to develop the EV network for comprehensive resiliency.

- **Technology Resiliency –** With charging and battery technology evolving, the charging provider should have the ability to upgrade chargers to meet new standards and evolving battery technology. Delivering suitable power to the site is a key focus of this effort, along with modular infrastructure that can be easily upgraded will be a key outcome in the process.
- **Energy/Grid Resiliency -** Missouri will continually explore options for energy resilience along with utility partners and charging providers. One challenge to implementing the charging system is the numerous utility providers located along the corridor network, which is also an opportunity to ensure energy resilience for the charging network.
- **Extreme Weather Resiliency –** Extreme cold, excessive heat, snow, flash flooding, and tornadoes are all extreme weather events that may be experienced in Missouri. Because MoDOT has minimal experience with EV infrastructure, it is anticipated resiliency during these extreme weather events will be addressed primarily by the private charging provider, with potential requirements to address resiliency as a component of the contracting process.

Missouri will define minimum standards related to snow removal, including best practices to ensure snow removal does not block or restrict access to charging infrastructure once additional guidance is released from the Joint Office.

9.5 Strategies for Promotion of Strong Labor, Safety, Training, and Installation Standards

Missouri expects vendors selected under this program to emphasize safety in all aspects of station development, installation, and maintenance. Various programs are available to ensure local contractors are knowledgeable and trained on the subject and the selected vendor is expected to take advantage of those resources. Training and certification criteria will be elements of the scoring matrix for vendor evaluation in the solicitation process. Additionally, Missouri will assess the feasibility of engaging Justice40 communities in workforce training for the installation and ongoing operations and maintenance support that will be needed to operate and maintain the AFC network, while remaining cognizant of potential geographic and travel challenges related to certain station locations.

9.6 Draft Charger Types

9.6.1 NEVI Standard

- Applied to all AFC routes
- Conformance with NEVI standards required to be certified as fully built-out
- Charger power standards:
    - Minimum Standard – 150 kW x (4) (600 kW total)
    - Preferred Standard A – 175 kW x (4) (700 kW total) with power sharing (350 kW per port)

- Preferred Standard B – 350 kW x (2) and 150 kW x (2) (1 MW total)
- Located a maximum of 50 miles from another NEVI-compliant charging station
- Located no more than one mile from the corridor
- Site configuration
  - Preferred - Pull-through charging site orientation (see Figure 8: Pull-Through Charging Site Orientation)
  - Minimum Standard – Head-in charging site orientation, parallel orientation (see Figure 9: Head-In Charging Site Orientation with Parallel Chargers) preferred over perpendicular (see Figure 10: Head-In Charging Site Orientation with Perpendicular Chargers)
  - Compliant with all applicable ADA and NEVI standards

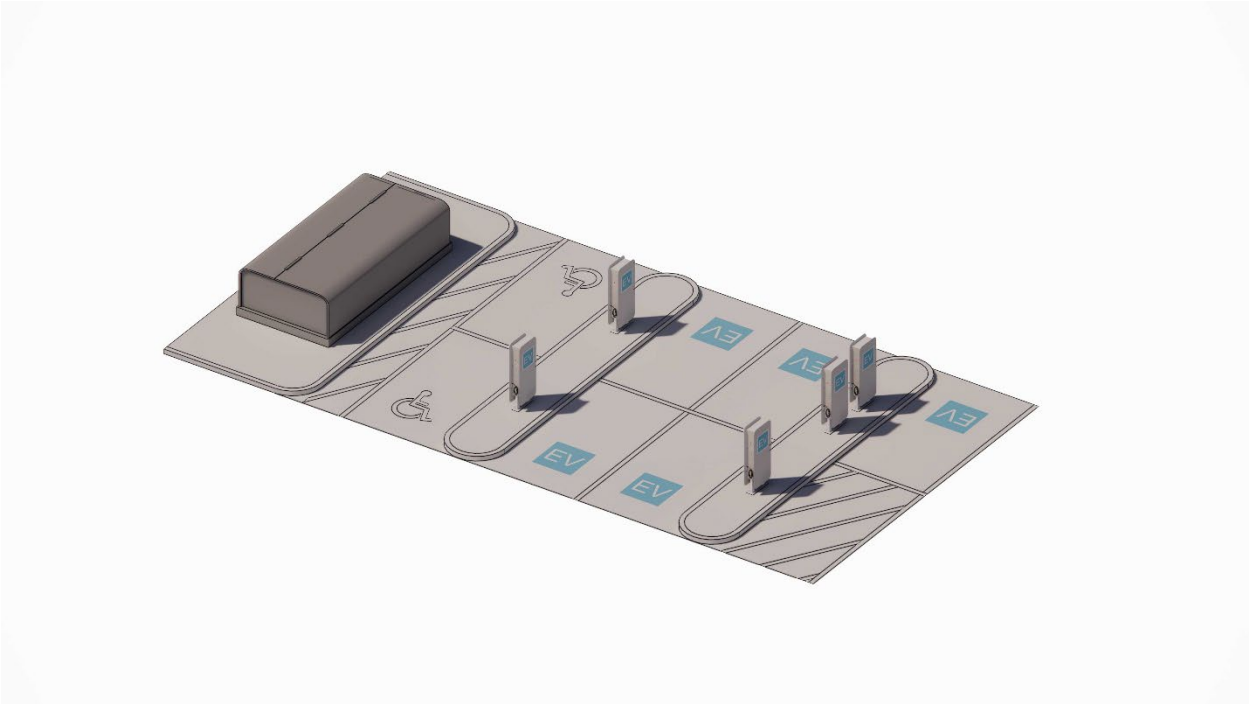


Figure 8: Pull-Through Charging Site Orientation Concept

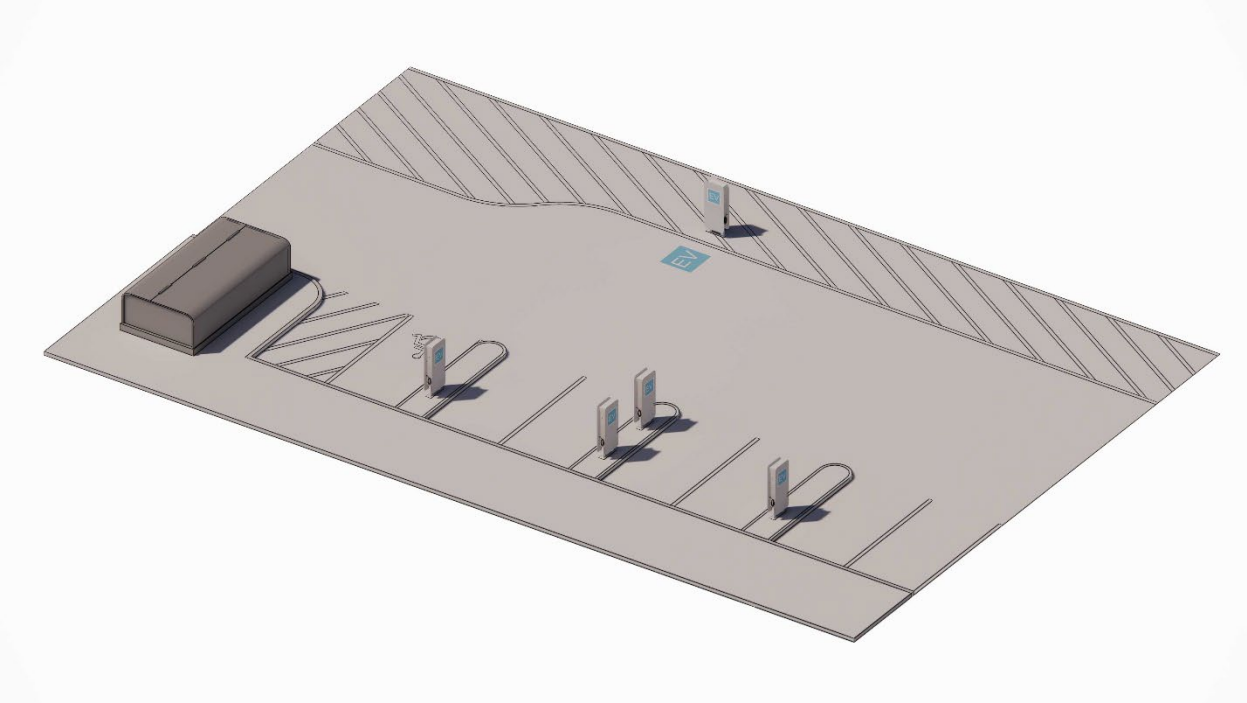


Figure 9: Head-In Charging Site Orientation with Parallel Chargers Concept

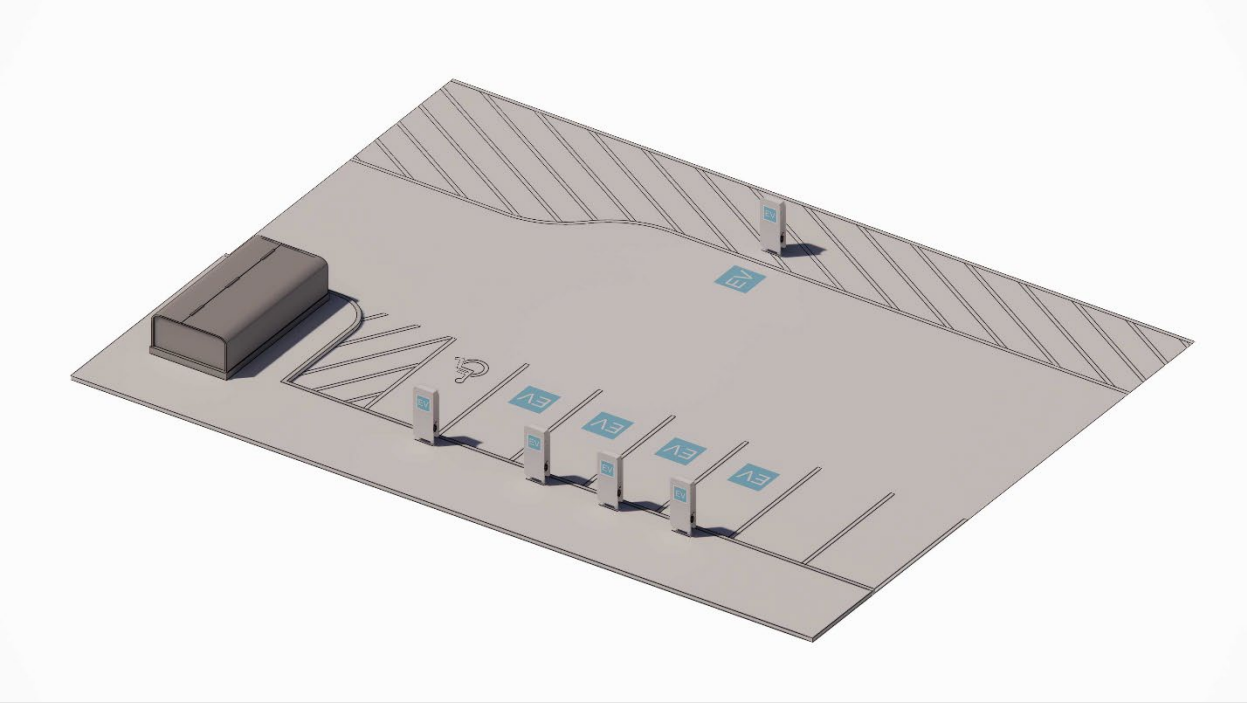


Figure 10: Head-In Charging Site Orientation with Perpendicular Chargers Concept

9.6.2 Charging Location Amenities and Features

MoDOT recognizes not all charging locations will have a full suite of amenities, and these locations will be supporting travelers having a 10-minute to 30-minute layover for long distance trips. As site selection is initiated, MoDOT has identified the amenities that should be part of the considerations for site suitability. They are categorized into tiers; each corresponding to the level of preference or need, with each tier inclusive of the amenities in the lower tiers.

- ***Minimum Amenities and Features:*** Bathroom, vending machine, benches, trash can, lighting, 24 hour access, security cameras
- ***Preferred Amenities and Features:*** Restaurant, convenience store, shelter/canopy
- ***Ideal Amenities and Features:*** Outdoor space/park/playground, pet relief area, multiple restaurants, back-up power connection

10.0 Civil Rights

Missouri DOT is a proven administrator of Federal-aid funds and as such, assures compliance with State and Federal civil rights laws as a regular business practice. The NDP will be implemented utilizing the adopted practices that have provided Civil Rights compliance and have been successfully implemented by other federal funding programs for decades. By utilizing this proven practice, Title VI of the Civil Rights Act, Americans with Disabilities Act, Section 504 of the Rehabilitation Act, and all accompanying USDOT regulations and ancillary programs will be included in the NEVI program from the onset.

The MoDOT Civil Rights Program dictates that no person shall be excluded from participation in, or is denied the benefits of, or is subjected to discrimination under any program or activity receiving Federal financial assistance from MoDOT on the grounds of race, color, age, sex, disability or national origin. The MoDOT Civil Rights Program:

- Prohibits entities from denying an individual any service, financial aid, or other benefit because of race, color, national origin, or disability.
- Prohibits entities from providing a different service or benefit or providing these in a different manner from those provided to others under the program.
- Prohibits segregation or separate treatment in any manner related to receiving program services or benefits.
- Prohibits entities from requiring different standards or conditions as prerequisites for serving individuals.
- Prohibits discriminatory activity in a facility built in whole or part with Federal funds.
- Prohibits locating facilities in any way that would limit or impede access to a Federally funded service or benefit.
- Encourages the participation of minorities as members of planning or advisory bodies for programs receiving Federal funds.
- Requires information and services to be provided in languages other than English when significant numbers of beneficiaries are of limited English-speaking ability.
- Requires entities to notify the respective population about applicable programs.
- Requires assurance of nondiscrimination in purchasing of services and hiring practices.

MoDOT is committed to ensuring that projects, programs, and services are performed without discrimination, under Title VI and ADA. To accomplish this, MoDOT functional units are responsible for ensuring nondiscrimination within their activities and programs. Requirements include:

- Incorporate Title VI/ADA Nondiscrimination requirements into appropriate manuals, directives, and regulations.
- Incorporate Title VI/ADA Nondiscrimination requirements into the designing and planning phases of project development.

- Develop procedures to advise beneficiaries of all nondiscrimination laws.
- Maintain documentation of beneficiary's nondiscrimination activities.
- Confirm that manpower and budget appropriations are adequate to accomplish nondiscrimination commitments.
- Confirm that federally funded contracts with consulting firms contain Title VI/Nondiscrimination assurances and the consultants comply with the assurances.
- Require Disadvantaged Business Enterprise (DBE) participation in contracts.
- Provide a complaint process that allows for investigations of alleged violations.
- Create a uniform data collection standard for evaluation of and outreach to EJ communities.
- Notify the public of compliance with Title VI and ADA.

11.0 Equity Considerations

Missouri is committed to emphasizing equity considerations when planning investments in electric vehicle charging infrastructure. Missouri recognizes that while the use of EVs is gradually increasing in the state, EV ownership is not currently an option for all Missourians due to availability and affordability issues, and it may not be the right fit for some of the wide-ranging mobility needs in our state. As the demand and the charging network grow over time, it's expected that passenger vehicle model options will increase and prices for EVs will decrease. Transit services in metropolitan and on-demand rural service are also expected to transition to cleaner options, including EV. Planning for these investments in infrastructure today to benefit the people of Missouri equitably is a priority.

The Justice40 Initiative, established in January 2021 by Presidential Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad, states a goal that at least 40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities (DACs). The Interim Implementation Guidance for the Justice40 Initiative (released July 2021) and the National Electric Vehicle Infrastructure Formula Program Guidance (released in February 2022), identifies clean transportation, to include the NEVI program, as a Justice40 covered program.

11.1 Identification of and Outreach to Disadvantaged Communities within the State

As part of USDOT and USDOE partnership in implementing the Justice40 Initiative, an interim definition for disadvantaged communities was developed to assist states to identify disadvantaged communities. "Communities" are defined as a group of individuals living in close geographic proximity to one another. "Disadvantaged" is defined through data investigation of these communities by a combination of variables including – low-income (and/or high persistent poverty), racial minority composition, linguistic isolation, high transportation cost burden, high energy cost burden, and disproportionate environmental stressors.

The State of Missouri has utilized the Electric Vehicle Charging Justice40 Map tool to analyze the existing and future EV network, with an emphasis on:

- Identifying disadvantaged communities adjacent to the existing EV corridors and chargers
- Identifying disadvantaged communities adjacent to future corridors and charging infrastructure
- Including maps and tables of disadvantaged communities overlayed with existing and future EV infrastructure statewide and in these communities.

The State of Missouri will develop procedures to encourage and monitor participation of all citizens in the planning process. This includes meaningful engagement in projects and

programs with low-income and minority individuals, those with limited English proficiency, and other underserved groups.

11.2 Identifying, Quantifying, and Measuring Benefits to Disadvantaged Communities

Missouri sees value in performance-based planning and is experienced in measuring performance and reporting in accordance with USDOT requirements. Missouri recognizes the emerging nature of the NEVI program and looks forward to working with USDOT to measure the benefits of this program as it evolves. Currently benefits beyond geographic location can only be discussed qualitatively as tools do not yet exist to measure other expected benefits. It is the State's expectation that this program will evolve and mature to have a national standard for benefit metrics and measurement set by USDOT. Until that time comes, Missouri is evaluating existing programs and data tools to internally enhance, target, and measure the benefits of the NEVI program to disadvantaged communities.

Initially, Missouri will track the location of EV chargers and the percentage of those located in USDOT designated disadvantaged communities using the Electric Vehicle Charging Justice40 Map tool. Missouri will also explore opportunities to enhance and measure DBE utilization on NEVI projects. Existing partnerships with MPOs and locals will also be explored for continuing to fine tune potential measurements and improvement for gauging statewide air quality improvements and disadvantaged communities.

11.3 Benefits to Disadvantaged Communities

Missouri anticipates challenges in identifying the totality of direct, indirect, and cumulative benefits of this plan to disadvantaged communities. While it is possible to account for charging infrastructure location in relationship to disadvantaged communities, MoDOT expects the benefits of this investment to go beyond the geographic location of the chargers. EV charger presence in disadvantaged communities when the community has low, or no EV ownership provides little benefit beyond enhancing the business economy in these areas while EV owners are charging. Through existing programs and outreach, job creation for EVs can be enhanced through the use and training of DBEs, which aids local disadvantaged communities. Additionally, as transit fleets transition to alternative fuels, emission reduction is expected to provide cleaner air both within the immediate proximity of bus maintenance facilities and throughout the service area.

12.0 Labor and Workforce Considerations

12.1 Labor and Workforce Overview

The NEVI program will generate substantial opportunities for equitable and accessible job creation in the electrical and construction trades as a nationwide network of electric vehicle chargers are planned, designed, installed, and commissioned. The NEVI program will also increase opportunities for power generation and power distribution utilities to strengthen their workforce to provide electric vehicle transportation that is convenient, reliable, affordable, and equitable. Project planning, stakeholder engagement, construction and its support services, and long-term maintenance will all provide job opportunities. Missouri is prepared to meet this opportunity through its strong utility stakeholders and robust workforce practices.

12.2 Construction Workforce

As of March 2022, the State of Missouri had a construction workforce of 140,300, which is 4.8% of the State's non-farmer labor force.[4] Local research on the construction workforce notes an average annual wage of $57,000.[5] In comparison, the Missouri Economic Research and Information Center (MERIC) notes that statewide per capita income was a $51,697 in 2020. One primary finding is the heavy concentration of construction jobs in the two major metropolitan areas of the state as compared to the estimate for construction jobs in Missouri as a whole. The state's large footprint of small and medium size urbanized areas and rural areas will generate some construction activity distant from the primary centers of construction workers. The Justice40 mapping performed as a part of this plan, as indicated in Figure 11 below where the Justice 40 areas area shown in light purple shading, highlights that proactive engagement of local construction laborers will be needed most acutely along I-44 in areas surrounding Springfield, I-49 near Joplin, and I-55 near Cape Girardeau.

Geographic Area	Construction Jobs (thousands) March 2022
Kansas City (MO-KS)	55.6
St. Louis (MO-IL	71.9
Springfield	9.7

[4] Missouri Economy at a Glance (bls.gov)
[5] https://dnr.mo.gov/document-search/missouri-comprehensive-state-energy-plan

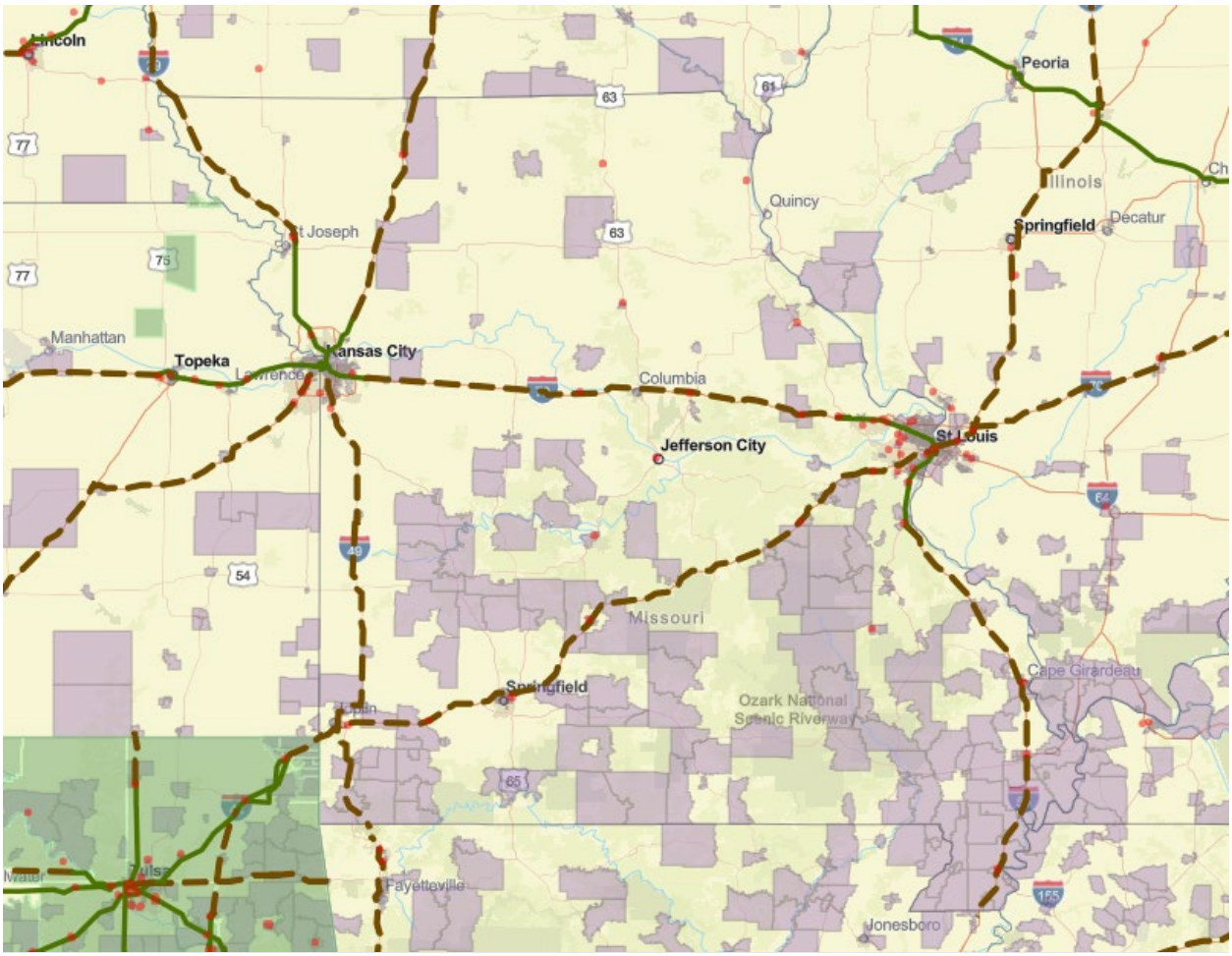


Figure 11 : Climate and Economic Justice Screening Tool (Justice40) Map of Missouri

12.3 Electrical Trades

The use of well-trained electrical staff will be critical to success of building out the NEVI network in Missouri. The State of Missouri Division of Professional Registration maintains a registry of electrical contractors containing 720 registered contractors – though not exclusively serving the commercial or construction clientele.[6] The state is also well prepared with 56 Missouri-based electrical contractors that have become certified in the Electric Vehicle Infrastructure Training Program with the program supported by local utilities such as Evergy and Ameren Missouri.

12.4 Labor and Workforce Strategies

The State of Missouri has strong existing strategies that will enable NEVI investment to create jobs and benefits that are inclusive, local, and create a diverse and sustainable electric vehicle

[6] https://pr.mo.gov/listings-elec.asp

workforce. In deploying NEVI, the State of Missouri will be able to leverage the following strengths in developing the electric vehicle workforce.

- ***Leverage Statewide Workforce Initiatives:*** Missouri could leverage statewide workforce initiatives generated at multiple levels of state governance. The Missouri Economic Research and Information Center has created campaigns for career pathways in the construction and energy sectors and this has translated to successful use of apprenticeships[7]. Individual counseling and other supportive services for workforce development are available from the Missouri Department of Higher Education and Workforce Development. *The State of Missouri will leverage agency partnerships and services to source the workers needed for the state to support NEVI deployment.*

Missouri is a National Leader in Apprenticeships

#3 – Completed apprenticeships

#4 – New apprentices

#6 – Active apprentices

Source: apprenticeship_missouri (mo.gov)

- ***Inclusivity of Contractors:*** The Missouri DOT has a strong Disadvantaged Business Enterprise (DBE) program[8] and practices for On the Job Training.[9] Missouri DOT has invested in availability studies of DBE contractors – noting an overall DBE number of more than 1,300 firms, with 920 firms with home offices in the State of Missouri. Historically, the Missouri DOT has assessed DBE availability as between 13% and 18% available in the periods between 2004 and 2018. Use of programs like the DBE program made a substantial portion of allocated and potential discretionary funds available to benefit the local community. The State of Missouri will apply their tested practices to establish appropriate DBE goals and trainee / apprentice goals for NEVI deployment projects.
- ***Training and Higher Education:*** Strategies to grow the EV workforce include investment in community college education. Community colleges are also frequent partners in providing offerings for the Electric Vehicle Infrastructure Training Program. Missouri's approved electrician community college programs provide geographic diversity throughout the state and opportunities for training to those transitioning to the industry. Degree and certificate programs are available at Crowder College (Southwest), Mineral Area College (East Central), State Technical College of Missouri (Central), and Three Rivers College (Southeast). The State of Missouri will work with agency partners to confirm the availability of technical training and higher education in sufficient quantity and diversity to support the NEVI impact to local workforce.

[7] apprenticeship_missouri (mo.gov)
[8] DBE Program | Missouri Department of Transportation (modot.org)
[9] On The Job Training/Contract Compliance | Missouri Department of Transportation (modot.org)

13.0 Cybersecurity

The State of Missouri and the Missouri DOT are committed to public service, including cyber security, cyber resiliency, and privacy protections for all services and systems in the communities in which they serve. The potential sources and types of cybersecurity threats for EVSEs are evolving and regularly scheduled risk assessments are prudent and necessary to provide Defense-in-Depth protection. Successful exploitation of even a single DCFC can cause relay chatter, or other various power quality issues and phase instability, that can have cascading effects upstream.

Primary Goals of this EVSE cybersecurity guidance include:

- Securing EVSE infrastructure deployed as part of the NDP. Secure is defined as:
  - Protected against physical or electronic intrusion by unauthorized persons or entities.
  - Hardened against damage or loss of service due to weather, environment, transient surge voltages, traffic incidents, etc.
  - Protected against insider threats whether malicious or inadvertent.
  - Segmented (separated) to protect against unintended damage, unauthorized access, loss of data, service availability, privacy breach etc. from unprotected connections among stakeholder partner and user systems.
- Validating that all revenue and financial systems are compliant with the Payment Card Industry (PCI) requirements.
- Developing security operations that are compliant with, and certification maintained for, Security Operations Center – Level 2 (SOC2) audit requirements.
- Building in physical and electronic resiliency systemwide.
- Implementing Security by Design for each project.

13.1 EV Industry Cybersecurity Best Practices

13.1.1 General

A common set of recommended best practices are summarized below for the EV deployers. Details of these are available from: https://doi.org/10.2172/1706221

- **Risk Management**
  - Establish full lifecycle risk reviews and prioritize improvements based on risk to EVSE operations.
  - Maintain updated architecture diagrams to identify critical assets, internet connections, open ports, and supported protocols.
  - Establish a process for active security patch management.
- **Configuration and Change Management**
  - Create a formal process for uploading code.
  - Properly secure keys, credentials, and other secret items.

- **Identity and Access Management**
  - Require individual credentials for system login and don't reuse credentials.
  - Limit the use of system/maintenance accounts.
- **Threat and Vulnerability Management**
  - Use a Common Vulnerability Scoring System (CVSS) to evaluate potential vulnerabilities and prioritize response.
  - Establish and regularly update a comprehensive threat profile.
- **Communications**
  - Encrypt all information internal and external to the EVSE.
  - Apply network segmentation and security systems including Intrusion Detection System (IDS), Intrusion Prevention System (IPS) and firewalls.
- **Event and Incident Response, Continuity of Operations**
  - Implement Information Security Continuous Monitoring (ISCM) per National Institute of Standards and Technology Special Publication (NIST SP) 800-137.
  - Establish protocols and procedures for immediate response to logs or alerts from ISCM, Security Information and Event Management (SIEM) and IDS/IPS systems.
  - Create a Security Operations Center (SOC) and maintain SOC2 certification.
  - Establish business continuity, incident response and disaster recovery plans. Conduct regularly scheduled table-top exercises, drills, and reviews to test procedures, train staff and update per technology changes.
- **Supply Chain Management**
  - Use secure shipping channels that include verification of the state of EVSE when it departs facility.
  - Specify tamper resistant seals, alarms, and other protective measures to prevent and report attempts of unauthorized access to equipment or enclosures.
- **Workforce Management**
  - Ensure critical roles have redundancy in personnel and cross function capabilities.
  - Evaluate competence of staff with periodic social engineering (phishing), audits, etc.
- **Cybersecurity Program Management**
  - Mature a cybersecurity program strategy with clear priorities and governance model.
  - Include a "safe" environment for anonymous or protected means to report violations or vulnerability concerns.

13.1.2 Foundational Principles

Achieving the best feasible protective posture is facilitated by employing two foundational principles: Security by Design and Defense-in-Depth.

- ***Security by Design*** is the controlled use of established processes to build security functions, safeguards and procedures into software and systems design from project initiation, ensuring security is considered and tested throughout the entire design/engineering phase.
- ***Defense in Depth*** is the practice of constructing cybersecurity defense via layers of protection that overlap and enhance adjacent layers. Where one layer is defeated, another is automatically implemented to step into the gap and continue defensive efforts.

14.0 Program Evaluation

MoDOT will develop a program evaluation plan to provide the Joint Office of Energy and Transportation with data documenting the impacts of the federal dollars invested in EV charging infrastructure. It will also provide the Joint Office and MoDOT with metrics regarding Missouri's progress towards its goals and the performance of the EV charging network. Working in conjunction with its public and private partners, MoDOT will collect data and report progress on its EV goals according to the schedule required by the Joint Office. MoDOT will use this information to inform network development and the installation of additional chargers based on the use and performance of existing chargers in the network.

A summary of MoDOT's program evaluation approach by NDP goal is shown in Table 5: Program Evaluation Criteria. Each goal is tied to one or more indicator supported by metrics that measure progress towards each goal. To determine whether Missouri is on track to meet its vision for EV adoption and EV infrastructure deployment, MoDOT will set targets for each metric. Through periodic evaluation of Missouri's charging network, MoDOT can determine the most effective ways to strengthen or reorient its investment and overall program.

Table 5: Program Evaluation Criteria

State NDP Goals	Indicators	Potential Metrics
An EV charging network that serves Missouri's communities and travelers.	Access & Reliability	Percent of population within 50 miles of a station Percent of population within 15 miles of a station Charger availability/uptime
A corridor-based EV charging system that leverages existing transportation and utility infrastructure for regional and interstate travel.	Network Completion	System miles covered by EV charging stations Number of stations meeting NEVI guidance minimum standards
A safe comprehensive system that supports transportation choices for all of Missouri's residents and builds on existing state-level planning efforts related to EVs.	Utilization	Registered light-duty vehicles that are BEVs (# and %) Number of charging events Percent of time with a vehicle connected aggregated by time of day, payment type, land use, location

A resilient, economically sustainable vehicle fueling system that can adapt to changes in market conditions and transportation technologies.	Revenue Generation	Total state tax and fee revenue collected Average charging cost per kWh

15.0 Discretionary Exemptions

15.1 Summary of Requests

Missouri is seeking exemptions for a total of five locations on the state's AFC corridors based on currently available information. Additional details are provided in the table, map and explanatory paragraphs below.

Exception #	Type	Distance of Deviation	Included in Round 6 AFC Nomination	Reason for Exception Request
1- Springfield	☐ 50 miles apart ● 1 mile from exit	__ miles 1.1 miles	☐ Yes ● No	☐ Grid Capacity ☐ Geography ☐ Equity ● Extraordinary Cost
2- Cape Girardeau	☐ 50 miles apart ● 1 mile from exit	__ miles 1.0 miles	☐ Yes ● No	☐ Grid Capacity ☐ Geography ☐ Equity ● Extraordinary Cost
3- Mount Vernon	☐ 50 miles apart ● 1 mile from exit	__ miles 0.4 miles	☐ Yes ● No	☐ Grid Capacity ☐ Geography ☐ Equity ● Extraordinary Cost
4- Lebanon	☐ 50 miles apart ● 1 mile from exit	__ miles 0.2 miles	☐ Yes ● No	☐ Grid Capacity ☐ Geography ☐ Equity ● Extraordinary Cost
5- Booneville	☐ 50 miles apart ● 1 mile from exit	__ miles 0.1 miles	☐ Yes ● No	☐ Grid Capacity ☐ Geography ☐ Equity ● Extraordinary Cost

15.2 Justification for Exceptions

The Springfield site (labeled as #1) is located at 2963 E. Division Street in Springfield, Missouri. The site lies 2.1 miles from the I-44 AFC corridor and is currently equipped with a CHADEMO, J1772COMBO charger with two charging ports. Based on current and projected EV adoption rates and use, this charging site is expected to meet the needs of the traveling public through the life of the NEVI program and therefore does not warrant replacement or upgrading at this time. If the site usage climbs and demand exceeds capacity, it will be reconsidered at a future date for upgrade or replacement.

The Cape Girardeau site (labeled as #2) is located at 25 S. Kings Highway Street, Cape Girardeau, Missouri. The site lies 2 miles from the I-55 AFC corridor and is currently equipped with a CHADEMO J1772COMBO charger with two charging ports. Based on current and projected EV

adoption rates and use, this charging site is expected to meet the needs of the traveling public through the life of the NEVI program and therefore does not warrant replacement or upgrading at this time. If the site usage climbs and demand exceeds capacity, it will be reconsidered at a future date for upgrade or replacement.

The Mount Vernon site (labeled as #3) is located at 500 W. Mount Vernon Boulevard in Mount Vernon, Missouri. The site lies 1.4 miles from the I-44 AFC corridor and is currently equipped with a CHADEMO J1772COMBO charger with four charging ports. Based on current and projected EV adoption rates and use, this charging site is expected to meet the needs of the traveling public through the life of the NEVI program and therefore does not warrant replacement or upgrading at this time. If the site usage climbs and demand exceeds capacity, it will be reconsidered at a future date for upgrade or replacement.

The Lebanon site (labeled as #4) is located at 669 West Elm Street, Lebanon, Missouri. The site lies 1.2 miles from the I-44 AFC corridor and is currently equipped with a CHADEMO J1772COMBO charger with four charging ports. Based on current and projected EV adoption rates and use, this charging site is expected to meet the needs of the traveling public through the life of the NEVI program and therefore does not warrant replacement or upgrading at this time. If the site usage climbs and demand exceeds capacity, it will be reconsidered at a future date for upgrade or replacement.

The Boonville site (labeled as #5) is located at 2150 Main Street in Boonville, Missouri. The site lies 1.1 miles from the I-70 AFC corridor and is currently equipped with a CHADEMO J1772COMBO charger with four charging ports. Based on current and projected EV adoption rates and use, this charging site is expected to meet the needs of the traveling public through the life of the NEVI program and therefore does not warrant replacement or upgrading at this time. If the site usage climbs and demand exceeds capacity, it will be reconsidered at a future date for upgrade or replacement.

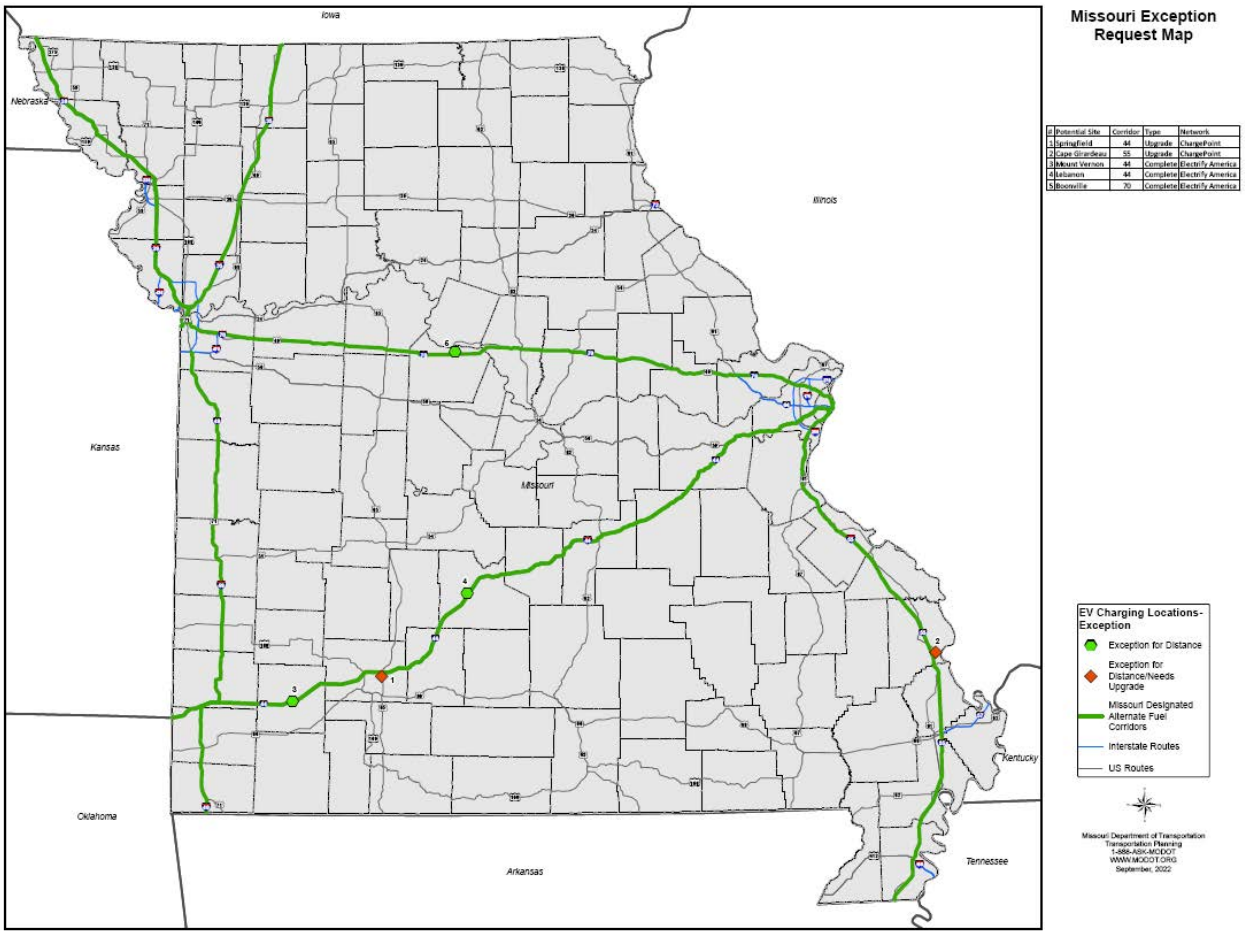


Figure 12: Map of Exception Request Locations

Electric Vehicle Task Force

APPENDIX 5

MISSOURI DEPARTMENT OF REVENUE

Table of Contents

Section 3.40. Electric Vehicle Fueling Systems

Section 3.40. Electric Vehicle-Fueling Systems was added as a "tentative code" in 2015. In July 2022, the status of the code was changed from "tentative" to "permanent" effective January 1, 2023.
(Amended 2022)

A. Application

A.1. General. – This code applies to devices, accessories, and systems used for the measurement of electricity dispensed in vehicle fuel applications wherein a quantity determination or statement of measure is used wholly or partially as a basis for sale or upon which a charge for service is based.

A.2. Exceptions. – This code does not apply to:

(a) The use of any measure or measuring device owned, maintained, and used by a public utility or municipality only in connection with measuring electricity subject to the authority having jurisdiction such as the Public Utilities Commission.

(b) Electric Vehicle Supply Equipment (EVSEs) used solely for dispensing electrical energy in connection with operations in which the amount dispensed does not affect customer charges or compensation.

(c) The wholesale delivery of electricity.

A.3. Additional Code Requirements. – In addition to the requirements of this code, Electric Fueling Systems shall meet the requirements of Section 1.10. General Code.

A.3.1. Electric Vehicle Supply Equipment (EVSE) with Integral Time-Measuring Devices. – An EVSE that is used for both the sale of electricity as vehicle fuel and used to measure time during which services (e.g., vehicle parking) are received. These devices shall also meet the requirements of Section 5.55. Timing Devices.

A.4. Type Evaluation. – The National Type Evaluation Program (NTEP) will accept for type evaluation only those EVSEs that comply with all requirements of this code and have received safety certification by a nationally recognized testing laboratory (NRTL).

S. Specifications

S.1. Primary Indicating and Recording Elements.

S.1.1. Electric Vehicle Supply Equipment (EVSE). – An EVSE used to charge electric vehicles shall be of the computing type and shall indicate the electrical energy, the unit price, and the total price of each transaction.

(a) EVSEs capable of applying multiple unit prices over the course of a single transaction shall also be capable of indicating the start and stop time, the total quantity of energy delivered, the unit price, and the total price for the quantity of energy delivered during each discrete phase corresponding to one of the multiple unit prices.

(b) EVSEs capable of applying additional fees for time-based and other services shall also be capable of indicating the total time measured; the unit price(s) for the additional time-based service(s); the total computed price(s) for the time measured; and the total transaction price, including the total price for the energy and all additional fees.

S.1.2. EVSE Indicating Elements. – An EVSE used to charge electric vehicles shall include an indicating element that accumulates continuously and displays, for a minimum of 15 seconds at the activation by the user

and at the start and end of the transaction, the correct measurement results relative to quantity and total price. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device. All indications and representations of electricity sold shall be clearly identified and separate from other time-based fees indicated by an EVSE that is used for both the sale of electricity as vehicle fuel and the sale of other separate time-based services (e.g., vehicle parking).

S.1.2.1. Multiple EVSEs Associated with a Single Indicating Element. – A system with a single indicating element for two or more EVSEs shall be provided with means to display information from the individual EVSE(s) selected or displayed, and shall be provided with an automatic means to indicate clearly and definitely which EVSE is associated with the displayed information.

S.1.3. EVSE Units.

S.1.3.1. EVSE Units of Measurement. – EVSE units used to charge electric vehicles shall be indicated and recorded in kilowatt-hours (kWh) and decimal subdivisions thereof.
(Amended 2022)

S.1.3.2. EVSE Value of Smallest Unit. – The value of the smallest unit of indicated delivery by an EVSE, and recorded delivery if the EVSE is equipped to record:

(a) for AC systems shall not exceed 0.0001 kWh;

(b) for DC systems shall not exceed 0.001 kWh; and

(c) the value of the kWh shall be expressed only as a decimal submultiple of 1 that satisfy (a) and (b).
(Amended 2022)

S.1.3.3. Values Defined. – Indicated values shall be adequately defined by a sufficient number of figures, words, symbols, or combinations thereof. An indication of "zero" shall be a zero digit for all displayed digits to the right of the decimal mark and at least one to the left.

S.2. EVSE Operating Requirements.

S.2.1. EVSE Return to Zero.

(a) The primary indicating and the primary recording elements of an EVSE used to charge electric vehicles, if the EVSE is equipped to record, shall be provided with a means for readily returning the indication to zero either automatically or manually.

(b) It shall not be possible to return primary indicating elements, or primary recording elements, beyond the correct zero position.

S.2.2. EVSE Indicator Zero Reset Mechanism. – The reset mechanism for the indicating element of an EVSE used to charge electric vehicles shall not be operable during a transaction. Once the zeroing operation has begun, it shall not be possible to indicate a value other than: the latest measurement; "all zeros;" blank the indication; or provide other indications that cannot be interpreted as a measurement during the zeroing operation.

S.2.3. EVSE Provision for Power Loss.

S.2.3.1. Transaction Information. – In the event of a power loss, the information needed to complete any transaction (i.e., delivery is complete and payment is settled) in progress at the time of the power loss (such as the quantity and unit price, or sales price) shall be determinable through one of the means listed below or the transaction shall be terminated without any charge for the electrical energy transfer to the vehicle:

(a) at the EVSE;

(b) at the console, if the console is accessible to the customer;

(c) via on site internet access; or

(d) through toll-free phone access.

For EVSEs in parking areas where vehicles are commonly left for extended periods, the information needed to complete any transaction in progress at the time of the power loss shall be determinable through one of the above means for at least eight hours.

S.2.3.2. Transaction Termination. – In the event of a power loss, either:

(a) the transaction shall terminate at the time of the power loss; or

(b) the EVSE may continue charging without additional authorization if the EVSE is able to determine it is connected to the same vehicle before and after the supply power outage.

In either case, there must be a clear indication on the receipt provided to the customer of the interruption, including the date and time of the interruption along with other information required under S.2.6. EVSE Recorded Representations.

S.2.3.3. User Information. – The EVSE memory, or equipment on the network supporting the EVSE, shall retain information on the quantity of fuel dispensed and the sales price totals during power loss.

S.2.4. EVSE Indication of Unit Price and Equipment Capacity and Type of Voltage.

S.2.4.1. Unit Price. – An EVSE shall be able to indicate on each face the unit price at which the EVSE is set to compute or to dispense at any point in time during a transaction.

S.2.4.2. Equipment Capacity and Type of Voltage. – An EVSE shall be able to conspicuously indicate on each face the maximum rate of energy transfer (i.e., maximum power) and the type of current associated with each unit price offered (e.g., 7 kW AC, 25 kW DC, etc.).

S.2.4.3. Selection of Unit Price. – When electrical energy is offered for sale at more than one unit price through an EVSE, the selection of the unit price shall be made prior to delivery through a deliberate action of the purchaser to select the unit price for the fuel delivery. Except when the conditions for variable price structure have been approved by the customer prior to the sale, a system shall not permit a change to the unit price during delivery of electrical energy.

Note: When electrical energy is offered at more than one unit price, selection of the unit price may be through the deliberate action of the purchaser: 1) using controls on the EVSE; 2) through the purchaser's use of personal or vehicle-mounted electronic equipment communicating with the system; or 3) verbal instructions by the customer.

S.2.4.4. Agreement Between Indications. – All quantity, unit price, and total price indications within a measuring system shall agree for each transaction.

S.2.5. EVSE Money-Value Computations. – An EVSE shall compute the total sales price at any single-purchase unit price for which the electrical energy being measured is offered for sale at any delivery possible within either the measurement range of the EVSE or the range of the computing elements, whichever is less.

S.2.5.1. Money-Value Divisions Digital. – An EVSE with digital indications shall comply with the requirements of paragraph G-S.5.5. Money-Values, Mathematical Agreement, and the total price computation shall be based on quantities not exceeding 0.5 MJ or 0.1 kWh.

S.2.5.2. Auxiliary Elements. – If a system is equipped with auxiliary indications, all indicated money value and quantity divisions of the auxiliary element shall be identical to those of the primary element.

S.2.6. EVSE Recorded Representations. – A receipt, either printed or electronic, providing the following information shall be available at the completion of all transactions:

(a) the total quantity of the energy delivered with unit of measure;

(b) the total computed price of the energy sale;

(c) the unit price of the energy, and for systems capable of applying multiple unit prices for energy during a single transaction, the following additional information is required:

(1) the start and stop time of each phase during which one of the multiple unit prices was applied;

(2) the unit price applied during each phase;

(3) the total quantity of energy delivered during each phase;

(4) the total purchase price for the quantity of energy delivered during each phase;

(d) the maximum rate of energy transfer (i.e., maximum power) and type of current (e.g., 7 kW AC, 25 kW DC, etc.);

(e) any additional separate charges included in the transaction (e.g., charges for parking time) including:

(1) the time and date when the service begins and the time and date when the service ends; or the total time interval purchased, and the time and date that the service either begins or ends;

(2) the unit price applied for the time-based service;

(3) the total purchase price for the quantity of time measured during the complete transaction;

(f) the final total price of the complete transaction including all items;

(g) the unique EVSE identification number;

(h) the business name; and

(i) the business location.

S.2.7. Indication of Delivery. – The EVSE shall automatically show on its face the initial zero condition and the quantity delivered (up to the capacity of the indicating elements).

All DC EVSE are exempt from this requirement until January 1, 2028.
(Amended 2022)

S.2.8. Automatic Timeout – Pay-At-EVSE. *– Once an EVSE has been authorized, it must deauthorize within two minutes if not activated. Reauthorization of the EVSE must be performed before any electrical energy is delivered and/or timing charges assessed. If the time limit to deauthorize the EVSE is programmable, it shall not accept an entry greater than two minutes.*
[Nonretroactive as of January 1, 2020]
(Added 2019)

S.3. Design of Measuring Elements and Measuring Systems.

S.3.1. Metrological Components. – An EVSE measuring system shall be designed and constructed so that metrological components are adequately protected from environmental conditions likely to be detrimental to accuracy. The system shall be designed to prevent undetected access to adjustment mechanisms and terminal blocks by providing for application of a physical security seal or an audit trail.

S.3.2. Terminals. – The terminals of the EVSE system shall be arranged so that the possibility of short circuits while removing or replacing the cover, making connections, or adjusting the system, is minimized.

S.3.3. Provision for Sealing. – For devices and systems in which the configuration or calibration parameters can be changed by use of a removable digital storage device, security shall be provided for those parameters as specified in G-S.8.2. Devices and Systems Adjusted Using Removable Digital Storage Devices. For parameters adjusted using other means, the following applies.

Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that no adjustment can be made of:

(a) each individual measurement element;

(b) any adjustable element for controlling voltage or current when such control tends to affect the accuracy of deliveries;

(c) any adjustment mechanism that corrects or compensates for energy loss between the system and vehicle connection; and

(d) any metrological parameter that detrimentally affects the metrological integrity of the EVSE or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal. Audit trails shall use the format set forth in Table S.3.3. Categories of Device and Methods of Sealing.
(Amended 2019)

Table S.3.3.
Categories of Device and Methods of Sealing

Categories of Device	Method of Sealing
Category 1: No remote configuration capability.	Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.
Category 2: Remote configuration capability, but access is controlled by physical hardware. The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.	The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring EVSE or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual EVSEs at a location. If the counters are located in the system controller rather than at the individual EVSE, means must be provided to generate a copy of the information through an on-site device; this information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection.
Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password). The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.	An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. The event logger information may be provided electronically in lieu of or in addition to a hard copy at the time of inspection, provided the event logger information is retained in the system for future reference. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the EVSE, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)

(Amended 2021)

S.3.4. Data Storage and Retrieval.

(a) EVSE data accumulated and indicated shall be unalterable and accessible.

(b) Values indicated or stored in memory shall not be affected by electrical, mechanical, or temperature variations, radio-frequency interference, power failure, or any other environmental influences to the extent that accuracy is impaired.

(c) Memory and/or display shall be recallable for a minimum of three years. A replaceable battery shall not be used for this purpose.

S.3.5. Temperature Range for System Components. – EVSEs shall be accurate and correct over the temperature range of – 40 °C to + 85 °C (− 40 °F to + 185 °F). If the system or any measuring system components are not capable of meeting these requirements, the temperature range over which the system is capable shall be stated on the NTEP CC, marked on the EVSE, and installations shall be limited to the narrower temperature limits.

S.4. Connections.

S.4.1. Diversion of Measured Electricity. – No means shall be provided by which any measured electricity can be diverted from the measuring device.

S.4.1.1. Unauthorized Disconnection. – Means shall be provided to automatically terminate the transaction in the event that there is an unauthorized break in the connection with the vehicle.

S.4.2. Directional Control. – If a reversal of energy flow could result in errors that exceed the tolerance for the minimum measured quantity, effective means, automatic in operation to prevent or account for the reversal of flow shall be properly installed in the system. (See N.3. Minimum Test Draft [Size])

S.5. Markings. – The following identification and marking requirements are in addition to the requirements of Section 1.10. General Code, paragraph G-S.1. Identification.

S.5.1. Location of Marking Information; EVSE. – The marking information required in General Code, paragraph G-S.1. Identification shall appear as follows:

(a) within 60 cm (24 in) to 150 cm (60 in) from ground level; and

(b) on a portion of the EVSE that cannot be readily removed or interchanged (e.g., not on a service access panel).

S.5.2. EVSE Identification and Marking Requirements. – In addition to all the marking requirements of Section 1.10. General Code, paragraph G-S.1. Identification, each EVSE shall have the following information conspicuously, legibly, and indelibly marked:

(a) voltage rating;

(b) maximum current deliverable;

(c) type of current (AC or DC or, if capable of both, both shall be listed);

(d) minimum measured quantity (MMQ); and

(e) temperature limits, if narrower than and within – 40 °C to + 85 °C (− 40 °F to + 185 °F).

(Amended 2021)

S.5.3. Abbreviations and Symbols. – The following abbreviations or symbols may appear on an EVSE system.

(a) VAC = volts alternating current;

(b) VDC = volts direct current;

(c) MDA = maximum deliverable amperes;

(d) J = joule.

S.6. Printer. – When a system is equipped with means for printing the measured quantity, the printed information must agree with the indications on the EVSE for the transaction and the printed values shall be clearly defined.

S.6.1. Printed Receipt. – Any delivered, printed quantity shall include an EVSE identification number that uniquely identifies the EVSE from all other EVSEs within the seller's facility, the time and date, and the name of the seller. This information may be printed by the EVSE system or pre-printed on the ticket.

S.7. Totalizers for EVSE Systems. – EVSE systems shall be designed with a nonresettable totalizer for the quantity delivered through each separate measuring device. Totalizer information shall be adequately protected and unalterable. Totalizer information shall be provided by the system and readily available on site or via on site internet access.

S.8. Minimum Measured Quantity (MMQ). – The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(a) Measuring systems shall have a minimum measured quantity not exceeding 2.5 MJ or 0.5 kWh.

N. Notes

N.1. No Load Test. – A no load test may be conducted on an EVSE measuring system by applying rated voltage to the system under test and no load applied.

N.2. Starting Load Test. – A system starting load test may be conducted by applying rated voltage and 0.5-ampere load.

N.3. Minimum Test Draft (Size). – Full and light load tests shall require test of the EVSE System for a delivery of the minimum measured quantity as declared by the manufacturer.

N.4. EVSE System Test Loads. – EVSE measuring system testing shall be accomplished by connecting the test load and test standard at the point where the fixed cord is connected to the vehicle. Losses in the cord between the EVSE under test and the test standard should be automatically corrected for in the EVSE quantity indication for direct comparison to the test standard and also while the EVSE is in normal operation. For EVSEs that require a customer-supplied cord, system testing shall be accomplished by connecting the test load and test standard at the point where the customer's cord is connected to the EVSE.

N.5. Test of an EVSE System.

N.5.1. Performance Verification in the Field. – Testing in the field is intended to validate the transactional accuracy of the EVSE system. The following testing is deemed sufficient for a field validation.

N.5.2. Accuracy Testing. – The testing methodology compares the total energy delivered in a transaction and the total cost charged as displayed/reported by the EVSE with that measured by the measurement standard.

(a) For AC systems:

(1) Accuracy test of the EVSE system at a load of not less than 85 % of the maximum deliverable amperes (expressed as MDA) as determined from the pilot signal for a total energy delivered of at least twice the minimum measured quantity (MMQ). If the MDA would result in maximum deliverable power of greater than 7.2 kW, then the test may be performed at 7.2 kW.

(2) Accuracy test of the EVSE system at a load of not greater than 10 % of the maximum deliverable amperes (expressed as MDA) as determined from the pilot signal for a total energy delivered of at least the minimum measured quantity (MMQ).

(b) For DC systems (see note):

(1) Accuracy test of the EVSE system at a load of not less than 85 % of the maximum deliverable amperes current (expressed as MDA) as determined from the digital communication message from the DC EVSE to the test standard for a total energy delivered of at least twice the minimum measured quantity (MMQ).

(2) Accuracy test of the EVSE system at a load of not more than 10 % of the maximum deliverable amperes (expressed as MDA) as determined from the digital communication message from the DC EVSE to the test standard for a total energy delivered of at least the minimum measured quantity (MMQ).

All DC EVSE are exempt from this requirement until January 1, 2028.
(Amended 2022)

Note: For DC systems it is anticipated that an electric vehicle may be used as the test load. Under that circumstance, testing at the load presented by the vehicle shall be sufficient.

N.6. Repeatability Tests. – Tests for repeatability shall include a minimum of three consecutive tests at the same load, similar time period, etc., and be conducted under conditions where variations in factors are reduced to minimize the effect on the results obtained.

T. Tolerances

T.1. Tolerances, General.

(a) The tolerances apply equally to errors of underregistration and errors of overregistration.

(b) The tolerances apply to all deliveries measured at any load within the rated measuring range of the EVSE.

(c) Where instrument transformers or other components are used, the provisions of this section shall apply to all system components.

T.2. Load Test Tolerances.

T.2.1. EVSE Load Test Tolerances. – The tolerances for EVSE load tests are:

(a) Acceptance Tolerance: 1.0 %; and

(b) Maintenance Tolerance: 2.0 %.

All DC EVSE are exempt from this requirement until January 1, 2028.
(Amended 2022)

T.3. Repeatability. – When multiple load tests are conducted at the same load condition, the range of the load test results shall not exceed 25 % of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance.

T.4. Tolerance Application in Type Evaluation Examinations for EVSEs. – For type evaluation examinations, the acceptance tolerance values shall apply under the following conditions:

(a) at any temperature, voltage, load, and power factor within the operating range of the EVSE, and

(b) regardless of the influence factors in effect at the time of the conduct of the examination, and

(c) for all quantities greater than the minimum measured quantity.

T.5. No Load Test. – An EVSE measuring system shall not register when no load is applied.

T.6. Starting Load. – An EVSE measuring system shall register a starting load test at a 0.5 ampere (A) load.

UR. User Requirements

UR.1. Selection Requirements.

UR.1.1. Computing-Type Device; Retail EVSE. – An EVSE used to charge electric vehicles shall be of the computing type and shall indicate the electrical energy, the unit price, and the total price of each delivery.

UR.1.2. Connection Cord-Length. – An adequate means for cord management shall be in use when the cord exceeds 25 ft in length.

UR.2. Installation Requirements.

UR.2.1. Maximum Deliverable Current. – The marked maximum deliverable current shall not exceed the total capacity in amperes of the EVSE or the thermal overload protectors of the installation site.

UR.2.2. Manufacturer's Instructions. – An EVSE shall be installed in accordance with the manufacturer's instructions, and the installation shall be sufficiently secure and rigid to maintain this condition.

UR.2.3. Load Range. – An EVSE shall be installed so that the current and voltage will not exceed the rated maximum values over which the EVSE is designed to operate continuously within the specified accuracy. Means to limit current and/or voltage shall be incorporated in the installation if necessary.

UR.2.4. Regulation Conflicts and Permit Compliance. – If any provision of Section UR.2. Installation Requirements is less stringent than that required of a similar installation by the serving utility, the installation shall be in accordance with those requirements of the serving utility.

The installer of any EVSE shall obtain all necessary permits.

UR.2.5. Responsibility, Unattended EVSE. – An unattended EVSE shall have clearly and conspicuously displayed thereon, or immediately adjacent thereto, adequate information detailing the name, address, and phone number of the local responsible party for the device.

UR.3. Use of EVSE.

UR.3.1. Unit Price for Retail EVSE Devices. – The unit price at which the EVSE is set to compute shall be conspicuously displayed or posted on the face of the retail EVSE used in direct sale.

UR.3.2. Return of Indicating and Recording Elements to Zero. – The primary indicating elements (visual) and the primary recording elements shall be returned to zero immediately before each transaction.

UR.3.3. EVSE Recorded Representations. – A receipt, either printed or electronic, providing the following information shall be available at the completion of all transactions:

(a) the total quantity of the energy delivered with unit of measure;

(b) the total computed price of the energy sale;

(c) the unit price of the energy; and for systems capable of applying multiple unit prices for energy during a single transaction, the following additional information is required:

(1) the start and stop time of each phase during which one of the multiple unit prices was applied;

(2) the unit price applied during each phase;

(3) the total quantity of energy delivered during each phase;

(4) the total purchase price for the quantity of energy delivered during each phase;

(d) the maximum rate of energy transfer (i.e., maximum power) and type of current (e.g., 7 kW AC, 25 kW DC, etc.);

(e) any additional separate charges included in the transaction (e.g., charges for parking time) including:

(1) the time and date when the service begins and the time and date when the service ends; or the total time interval purchased, and the time and date that the service either begins or ends;

(2) the unit price applied for the time-based service;

(3) the total purchase price for the quantity of time measured during the complete transaction;

(f) the final total price of the complete transaction including all items;

(g) the unique EVSE identification number;

(h) the business name; and

(i) the business location.

UR.3.4. EVSE in Operation. – The EVSE shall be permanently, plainly, and visibly identified so that it is clear which EVSE and connector is in operation.

UR.3.5. Steps After Charging. – After delivery to a customer from a retail EVSE:

(a) the EVSE shall be shut-off at the end of a charge, through an automatic interlock that prevents subsequent charging until the indicating elements and recording elements, if the EVSE is equipped and activated to record, have been returned to their zero positions; and

(b) the vehicle connector shall not be returned to its starting position unless the zero set-back interlock is engaged or becomes engaged by the act of disconnecting from the vehicle or the act of returning the connector to the starting position.

THIS PAGE INTENTIONALLY LEFT BLANK

Automobile Manufacturers Association (ACEA), "European Oil Sequences," or other Vehicle or Engine Manufacturer standards as approved in Section 2.33.1.3.1. Vehicle or Engine Manufacturer Standard. (Amended 2014)

2.33.1.3.1. Vehicle or Engine Manufacturer Standard. – The label on any vehicle engine (motor) oil container, receptacle, dispenser, or storage tank and the invoice or receipt from service on an engine that includes the installation of vehicle engine (motor) oil dispensed from a receptacle, dispenser, or storage tank shall identify the specific vehicle or engine manufacturer standard, or standards, met in letters not less than 3.18 mm (1/8 in) in height. If the vehicle (motor) oil only meets a vehicle or engine manufacturer standard, the label must clearly identify that the oil is only intended for use where specifically recommended by the vehicle or engine manufacturer.

(Added 2014)

2.33.1.3.2. Inactive or Obsolete Service Categories. – Whenever any vehicle engine (motor) oil in a container, receptable, dispenser, storage tank, or in bulk does not meet an active API service category as defined by the latest version of SAE J183, "Engine Oil Performance and Engine Service Classification (Other than "Energy Conserving")," API Publication 1509, "Engine Oil Licensing and Certification System," European Automobile Manufacturers Association (ACEA), "European Oil Sequences," or other Vehicle or Engine Manufacturer Standards as approved in Section 2.33.1.3.1., Vehicle Or Engine Manufacturer Standard the front or forward facing-label of such vehicle engine (motor) oil container, receptacle, dispenser, or storage tank and the invoice or receipt from service on an engine that includes the installation of bulk vehicle engine (motor) oil dispensed from a receptacle, dispenser, or storage tank shall bear the plainly visible, cautionary statement set forth in the latest version of SAE J183, Appendix A. Whenever any vehicle engine (motor) oil is declared obsolete by a vehicle or engine manufacturer, the front or forward-facing label of such vehicle engine (motor) oil container, receptacle, dispenser, or storage tank and the invoice or receipt from service on an engine that includes the installation of bulk vehicle engine (motor) oil dispensed from a receptacle, dispenser, or storage tank shall bear the plainly visible, cautionary statement required by the vehicle or engine manufacturer.

(Amended 2014 and 2021)

2.33.1.4. Tank Trucks or Rail Cars. – Tank trucks, rail cars, and other types of delivery trucks that are used to deliver bulk vehicle engine (motor) oil are not required to display the SAE viscosity grade and service category or categories on such tank trucks, rail cars, and other types of delivery trucks. In lieu of such display requirements, the documentation defined in Section 2.33.1.5. Documentation shall be readily available for inspection.

(Amended 2013, 2014, and 2021)

2.33.1.5. Documentation. – When the engine (motor) oil is sold in bulk, an invoice, bill of lading, shipping paper, or other documentation must accompany each delivery. This document must identify the quantity of bulk engine (motor) oil delivered as defined in Sections 2.33.1.1. Viscosity, grade as defined by SAE J300, "Engine Oil Viscosity Classification," 2.33.1.2. Brand; 2.33.1.3. Engine Service Category; the name and address of the seller and buyer; and the date and time of the sale. For inactive or obsolete service categories, the documentation shall also bear the plainly visible cautionary statement as required in Section 2.33.1.3.2. Inactive or Obsolete Service Categories. Documentation must be retained at the retail establishment for a period of not less than one year.

(Added 2013) (Amended 2014 and 2021)

(Added 2012) (Amended 2013 and 2014 and 2021)

2.34. Retail Sales of Electricity Sold as a Vehicle Fuel.

2.34.1. Definitions.

2.34.1.1. Electricity Sold as Vehicle Fuel. – Electrical energy transferred to and/or stored onboard an electric vehicle primarily for the purpose of propulsion.

2.34.1.2. Electric Vehicle Supply Equipment (EVSE). – The conductors, including the ungrounded, grounded, and equipment grounding conductors; the electric vehicle connectors; attachment plugs; and all other fittings, devices, power outlets, or apparatuses installed specifically for the purpose of measuring, delivering, and computing the price of electrical energy delivered to the electric vehicle.

2.34.1.3. Fixed Service. – Service that continuously provides the nominal power that is possible with the equipment as it is installed.

2.34.1.4. Variable Service. – Service that may be controlled resulting in periods of reduced, and/or interrupted transfer of electrical energy.

2.34.1.5. Nominal Power. – Refers to the "intended" or "named" or "stated" as opposed to "actual" rate of transfer of electrical energy (i.e., power).

2.34.2. Method of Sale. – All electrical energy kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be in units in terms of the megajoule (MJ) or kilowatt-hour (kWh). In addition to the fee assessed for the quantity of electrical energy sold, fees may be assessed for other services; such fees may be based on time measurement and/or a fixed fee.

2.34.3. Retail Electric Vehicle Supply Equipment (EVSE) Labeling.

(a) A computing EVSE shall display the unit price in whole cents (e.g., $0.12) or tenths of one cent (e.g., $0.119) on the basis of price per megajoule (MJ) or kilowatt-hour (kWh). In cases where the electrical energy is unlimited or free of charge, this fact shall be clearly indicated in place of the unit price.

(b) For fixed service applications, the following information shall be conspicuously displayed or posted on the face of the device:

(1) the level of EV service expressed as the nominal power transfer (i.e., nominal rate of electrical energy transfer), and

(2) the type of electrical energy transfer (e.g., AC, DC, wireless).

(c) For variable service applications, the following information shall be conspicuously displayed or posted on the face of the device:

(1) the type of delivery (i.e., variable);

(2) the minimum and maximum power transfer that can occur during a transaction, including whether service can be reduced to zero;

(3) the condition under which variations in electrical energy transfer will occur; and

(4) the type of electrical energy transfer (e.g., AC, DC, wireless).

(d) Where fees will be assessed for other services in direct connection with the fueling of the vehicle, such as fees based on time measurement and/or a fixed fee, the additional fees shall be displayed.

(e) The EVSE shall be labeled in accordance with 16 CFR 309 – FTC Labeling Requirements for Alternative Fuels and Alternative Fueled Vehicles.

(f) The EVSE shall be listed and labeled in accordance with the National Electric Code® (NEC) NFPA 70, Article 625 Electric Vehicle Charging Systems (**www.nfpa.org**).

2.34.4. Street Sign Prices and Other Advertisements. – Where electrical energy unit price information is presented on street signs or in advertising other than on EVSE:

(a) The electrical energy unit price shall be in terms of price per megajoule (MJ) or kilowatt-hour (kWh) in whole cents (e.g., $0.12) or tenths of one cent (e.g., $0.119). In cases where the electrical energy is unlimited or free of charge, this fact shall be clearly indicated in place of the unit price.

(b) In cases where more than one electrical energy unit price may apply over the duration of a single transaction to sales to the general public, the terms and conditions that will determine each unit price and when each unit price will apply shall be clearly displayed.

(c) For fixed service applications, the following information shall be conspicuously displayed or posted:

(1) the level of EV service expressed as the nominal power transfer (i.e., nominal rate of electrical energy transfer), and

(2) the type of electrical energy transfer (e.g., AC, DC, wireless).

(d) For variable service applications, the following information shall be conspicuously displayed or posted:

(1) the type of delivery (i.e., variable);

(2) the minimum and maximum power transfer that can occur during a transaction, including whether service can be reduced to zero;

(3) the conditions under which variations in electrical energy transfer will occur; and

(4) the type of electrical energy transfer (e.g., AC, DC, wireless).

Where fees will be assessed for other services in direct connection with the fueling of the vehicle, such as fees based on time measurement and/or a fixed fee, the additional fees shall be included on all street signs or other advertising.

(Added 2013)

2.35. Diesel Exhaust Fluid (DEF).

2.35.1. Definition.

2.35.1.1. Diesel Exhaust Fluid (DEF). – A preparation of aqueous urea [(NH2)2CO], containing 32.5 % by mass of technically-pure urea in high-purity water with quality characteristics defined by the latest version of ISO 22241, “Diesel engines - NOx reduction agent AUS 32.”

2.35.2. Labeling of Diesel Exhaust Fluid (DEF). – DEF shall be labeled.

2.35.2.1. Retail Dispenser Labeling. – A label shall be clearly and conspicuously placed on the front panel of the Diesel Exhaust Fluid dispenser stating “for operation of selective catalytic reduction (SCR) converters in motor vehicles with diesel engines.”

2.35.2.2. Documentation for Retailers of Bulk Product. – A DEF supplier shall provide, at the time of delivery of the bulk shipment of DEF, identification of the fluid’s origin including the name of the fluid manufacturer, the brand name, trade name, or trademark, and a statement identifying the fluid as DEF conforming to specifications given in the latest version of ISO 22241, “Diesel engines - NOx reduction agent AUS 32.” This information shall be provided by the supplier on an invoice, bill of lading, shipping paper, or other document.

Electric Vehicle Task Force

APPENDIX 6

MISSOURI DEPARTMENT OF REVENUE

Missouri Electric Vehicle Task Force

INVESTOR-OWNED UTILITY TASK FORCE QUESTIONS

Investor-owned Utility Task Force Questions

Q: Removal or mitigation of barriers to electric vehicle charging, including strategies, such as time-of-use rates, to reduce operating costs for current and future electric vehicle owners without shifting costs to electric ratepayers who do not own or operate electric vehicles;

A: The primary barriers related to electric vehicle (EV) charging for drivers are the following:

- **Lack of sufficient number of DC fast chargers along highway corridors that enable safe and convenient long-distance EV travel.**
- **Lack of sufficient number of DC fast chargers in communities that enable renters to conveniently charge an EV.**
- **Lack of sufficient number of Level 2 chargers in communities and at destination locations, such as hotels, stores, workplaces, etc., that would create a robust EV charging ecosystem.**

Investor-owned Utility Task Force Questions

Q: Strategies for managing the impact of electric vehicles on, and services provided for electric vehicles by, the electricity transmission and distribution system;

A: Most utilities view EVs as a very flexible resource that offer opportunities to increase the utilization of existing infrastructure and the potential for integrating customer-owned batteries for the benefit of grid reliability.

- **That said, there will be impact, and limitations can occur at any given level or multiple levels of the grid which already happens today with other non-EV related loads.**
- **Utilities are aware of these potential constraints and are studying them to adequately plan for them and proactively mitigate them through integrated planning.**
- **It is critical that utilities remain front and center in the facilitation of EV infrastructure development and delivery.**
- **One of the tools that utilities have to help take advantage of the flexibility of EV loads is customer programs that reward EV-owning customers for charging their vehicles at times of low demand (TOU).**

Investor-owned Utility Task Force Questions

Q: Electric system benefits and costs of electric vehicle charging, electric utility planning for electric vehicle charging, and rate design for electric vehicle charging;

A: There are many benefits to EVs proliferating in our communities. EVs are a flexible resource in that they can usually charge at home or workplaces. Both of these locations are well-suited for utility-promoted charge management that can help to optimize charging to match grid conditions. Better utilization of the existing grid will increase revenues with low additional investment, thereby causing downward rate pressure for all electric customers.

Electric utility planning occurs decades in advance due the complexity of interrelated factors and electric transportation is a key and growing element of consideration when developing utility integrated resource plans.

Rate design is an important function of utilities in developing, through a rigorous regulatory process, equitable rates for all electric utility customers

Investor-owned Utility Task Force Questions

Q: The appropriate role of electric utilities with regard to the deployment and operation of electric vehicle charging systems;

A: States and utilities have taken a variety of approaches to the utility role in EV charging deployment.

While Missouri has no policy that prevents regulated utilities to own and operate EV charging stations, there is now legal precedent that EV charging can be considered part of utility infrastructure (Missouri Court of Appeals Western District WD80911, August 7, 2018).

Utilities that invest in EV charging stations can accelerate the deployment of charging and help to solve the "chicken and egg" problem of EV charging vs. the vehicles and also ensure a geographically diverse, equitable, and timely deployment of charging.

Investor-owned Utility Task Force Questions

Q: How and on what terms, including quantity, pricing, and time of day, charging stations owned or operated by entities other than electric utilities will obtain electricity to provide to electric vehicles;

A: For Missouri's regulated utilities, the business customer that owns the charging stations can set the fees they want to charge to EV drivers and collect those fees.

Those transactions are completely separate from the fees and rates the utility customer will pay to their utility.

Utilities have set rates based on several factors and those are the rates that charging station owners will pay on their monthly electric bills.

Investor-owned Utility Task Force Questions

Q: Options to address how electric vehicle users pay toward the cost of maintaining the state's transportation infrastructure, including methods to assess the impact of electric vehicles on that infrastructure and how to calculate a charge based on that impact, the potential assessment of a charge to electric vehicles as a rate per kilowatt hour delivered to an electric vehicle, varying such per-kilowatt-hour charge by size and type of electric vehicle, and phasing in such per-kilowatt-hour charge;

A: Utilities agree that the state's transportation infrastructure users should contribute to the payments for maintaining such infrastructure.

Currently, Missouri Department of Revenue requires an Alternative Fuel Vehicle sticker fee for EVs that will escalate in cost as petroleum taxes also increase over the next several years. The current payment for an EV sticker is more than the equivalent gasoline vehicle when considering the efficiency of EVs.

Trying to assess fees at the EV charging stations based on the vehicle size and type is problematic. Also, because up to 95% of EV charging will happen at home or work, it is not possible to collect enough taxes through retail stations.

Staying with an Alternative Fuel Vehicle sticker fee for EVs may be the best long-term approach due to electric meter limitations at home and workplace.

Investor-owned Utility Task Force Questions

Q: Strategies to encourage electric vehicle usage without shifting costs to electric ratepayers who do not own or charge electric vehicles; and

A: If an EV drives 10,000 electric miles per year, it will consume at least 250 kWh/yr. which translates into ~$250 per year in additional utility revenue, in rough numbers. The estimated MO 19,000 vehicles @ $250 is a very conservative $4.75M of additional revenues each year with very little utility investment needed.

This revenue causes a "downward pressure" impact to all utility customers. It is a fact that EV drivers are providing a significant benefit to other non EV-owning customers, not a cost.

This fact signals that utilities should be making some investments to encourage EV adoption by their customers

The pending IIJA funding is a great opportunity for Missouri to establish strong EV corridor and community charging that will reduce a significant barrier to adoption.

Missouri Electric Vehicle Task Force
Investor-owned Utility Summary Answers to Task Force Questions
September 9, 2022
Drafted by Ameren Missouri in consultation with Evergy and Liberty Utilities

2. The task force shall analyze the following in the context of transportation funding, and make recommendations as to any actions the state should take to fund transportation infrastructure in anticipation of more widespread adoption of electric vehicles:

(1) Removal or mitigation of barriers to electric vehicle charging, including strategies, such as time-of-use rates, to reduce operating costs for current and future electric vehicle owners without shifting costs to electric ratepayers who do not own or operate electric vehicles;

The primary barriers related to electric vehicle (EV) charging for drivers are the following:

- **Lack of sufficient number of DC fast chargers along highway corridors that enable safe and convenient long-distance EV travel.**
- **Lack of sufficient number of DC fast chargers in communities that enable renters to conveniently charge an EV.**
- **Lack of sufficient number of Level 2 chargers in communities and at destination locations, such as hotels, stores, workplaces, etc., that would create a robust EV charging ecosystem.**

For businesses considering development of EV charging and intending to provide a profitable service, the challenge is the capital cost of the charging equipment and the ongoing operating costs given the high power levels needed to provide a satisfying user experience for the driver (faster charging requires higher power levels with associated electric demand charges; the result is relatively high electric bills).

Charging cost for EV drivers varies based on the charging power level, location, and/or length of charging session with owners of the charging stations having the opportunity to set the rates to drivers. To-date, the cost to drivers for charging their vehicles has not been a significant barrier. However, for owners of DC fast chargers, or those businesses and entrepreneurs contemplating development of such, the operating costs of powering and maintaining the equipment on top of the capital investment may prove unprofitable, particularly in these early years with relatively few EVs on the roadways.

Utility rates are generally established based on the cost to serve customers. Assuming an existing rate for energy (kWh) or demand (kW) is appropriately based on cost to serve, any downward change in a rate to "reduce operating costs for current and future EV owners" would necessarily cause an upward shift in costs to other "ratepayers who do not own or operate EVs." Time of Use rates (TOU) are particularly helpful in shifting usage to off-peak time periods when utility infrastructure is underutilized. The application of TOU to EV charging is not a simple matter. In cases of high power DC fast charging along highway corridors, a long-distance driver likely does not have the schedule flexibility to time their EV charging session. And for the vast majority of Level 2 charging away from home, the ability to avoid peak periods for this slower rate of charging would be difficult. Applying TOU rates to DC fast chargers that primarily serve the local community may be easier in that local EV drivers may have more routine schedule flexibility on when to charge their vehicles. For example, for an EV driver that does not have home charging, having a regular routine of charging their EV at the local convenience store or grocery store and at a time associated with a lower cost to charge may be

effective. Still, each EV charger business owner will have the challenge of communicating the differences in TOU rates to customers and will still have responsibility to pay the electric demand charges that result from those EV drivers that still decide to charge their EVs at an on peak time of day.
Another option EV charging station owners may have to mitigate EV charging operating costs is to install EV charging equipment that can be programmed to reduce power levels and thereby avoid demand charges. In this way, the chargers would automatically charge at a slower rate and maintain a lower peak kW demand, resulting in a relatively lower electric bill.

(2) Strategies for managing the impact of electric vehicles on, and services provided for electric vehicles by, the electricity transmission and distribution system;

There has been much conjecture that the transition to EVs is going to cause undue stress on the electric grid and cause unacceptable reliability issues. To the contrary, most utilities view EVs as a very flexible resource that offer opportunities to increase the utilization of existing infrastructure and the potential for integrating customer-owned batteries for the benefit of grid reliability. That said, there will be impact, and limitations can occur at any given level or multiple levels of the grid (local line transformer, feeder conductor capacity, substation capacity etc.), which already happens today with other non-EV related loads. Utilities are aware of these potential constraints and are studying them to adequately plan for them and proactively mitigate them through integrated planning.

Given the electric utility's role in operating and maintaining a reliable electric grid, it is critical that utilities remain front and center in the facilitation of EV infrastructure development and delivery. This is to ensure geographic consistency, equity, and electrical supply reliability. While the competitive market (unregulated) forces are often seen as the appropriate means of proliferating EV infrastructure, meaningful involvement in developing Missouri's EV charging ecosystem is essential.

Utility planning timelines are decades long, and today's integrated resource planning incorporates various levels of EV adoption into modelling scenarios. Utilities in Missouri are looking closely at EV registration data as well as having many internal conversations about how EV loads will come onto the grid in terms of power levels, locations, and pace. One of the tools that utilities have to help take advantage of the flexibility of EV loads is customer programs that reward EV-owning customers for charging their vehicles at times of low demand (TOU). Some of these programs are being piloted or offered in Missouri today and we expect further development and evolution over time.

(3) Electric system benefits and costs of electric vehicle charging, electric utility planning for electric vehicle charging, and rate design for electric vehicle charging;

There are many benefits to EVs proliferating in our communities. As mentioned above, EVs are a flexible resource in that they can usually charge at home or workplaces. In fact, we expect that the vast majority of charging, up to 95%, will happen at home or the workplace, if workplace charging is an option. Both of these locations are well-suited for utility-promoted charge management that can help to optimize charging to match grid conditions. Better utilization of the existing grid will increase revenues with low additional investment, thereby causing downward rate pressure for all electric customers.

As stated above, electric utility planning occurs decades in advance due the complexity of interrelated factors (including design, supply chain, technology innovation, and more) and electric transportation is a key and growing element of consideration when developing utility integrated resource plans.

Rate design is an important function of utilities in developing, through a rigorous regulatory process, equitable rates for all electric utility customers. Rate design can be utilized to promote certain desirable behaviors, such as charging EVs at times of low grid demand or avoiding EV charging at times of high grid demand. Yet there are limits to using rate design to cause behavioral change given the potential for undesirable shifting of costs to others.

(4) The appropriate role of electric utilities with regard to the deployment and operation of electric vehicle charging systems;

The question of appropriateness of the electric utility role is an interesting one. States and utilities have taken a variety of approaches to the utility role in EV charging deployment. While Missouri has no policy that prevents regulated utilities to own and operate EV charging stations, there is now legal precedent that EV charging can be considered part of utility infrastructure (Missouri Court of Appeals Western District WD80911, August 7, 2018). The question in Missouri lies more with the Missouri Public Service Commission that has been reluctant to allow investor-owned utilities to own and operate charging stations as part of their business models. Utilities that invest in EV charging stations can accelerate the deployment of charging and help to solve the "chicken and egg" problem of EV charging vs. the vehicles and also ensure a geographically diverse, equitable, and timely deployment of charging.

(5) How and on what terms, including quantity, pricing, and time of day, charging stations owned or operated by entities other than electric utilities will obtain electricity to provide to electric vehicles;

Any new or existing utility customer that decides to install EV charging on their site will need electric supply from their utility. For Missouri's regulated utilities, the business customer that owns the charging stations can set the fees they want to charge to EV drivers and collect those fees. Those transactions are completely separate from the fees and rates the utility customer will pay to their utility. Utilities have set rates based on several factors and those are the rates that charging station owners will pay on their monthly electric bills.

(10) Options to address how electric vehicle users pay toward the cost of maintaining the state's transportation infrastructure, including methods to assess the impact of electric vehicles on that infrastructure and how to calculate a charge based on that impact, the potential assessment of a charge to electric vehicles as a rate per kilowatt hour delivered to an electric vehicle, varying such per-kilowatt-hour charge by size and type of electric vehicle, and phasing in such per-kilowatt-hour charge;

Utilities agree that the state's transportation infrastructure users should contribute to the payments for maintaining such infrastructure. Currently, Missouri Department of Revenue requires an Alternative Fuel Vehicle sticker fee for EVs that will escalate in cost as petroleum taxes also increase over the next several years. The current payment for an EV sticker is more than the equivalent gasoline vehicle when considering the efficiency of EVs. There are other states that have studied this

issue and Missouri's regulated utilities do not take a specific position on how best to collect fees. However, trying to assess fees at the EV charging stations based on the vehicle size and type is problematic. Also, because up to 95% of EV charging will happen at home or work, it is not possible to collect enough taxes through retail stations. Collecting road taxes from home or workplace is technically problematic due to how electric metering works. For this reason, staying with an Alternative Fuel Vehicle sticker fee for EVs may be the best long-term approach.

(12) Strategies to encourage electric vehicle usage without shifting costs to electric ratepayers who do not own or charge electric vehicles; and

Missouri has an estimated 19,000 electric vehicles operating within the state. (This number includes full battery electric and plug-in hybrid vehicles). If an EV drives a conservative 10,000 electric miles per year, it will consume at least 250 kWh per year, which translates into about $250 per year in additional utility revenue, in rough numbers. 19,000 vehicles @ $250 is a very conservative $4.75M of additional revenues <u>each year</u> with very little utility investment needed. This revenue causes a "downward pressure" impact to <u>all</u> utility customers. It is a fact that EV drivers are providing a significant benefit to other non EV-owning customers, not a cost. This fact signals that utilities should be making some investments to encourage EV adoption by their customers and this is happening through educational awareness building, technical assistance, incentive programs, and corridor charging investments combined with federal funding. The pending IIJA funding is a great opportunity for Missouri to establish strong EV corridor and community charging that will reduce a significant barrier to adoption.

Electric Vehicle Task Force

APPENDIX 7

MISSOURI DEPARTMENT OF REVENUE

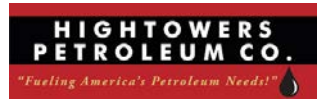
Fuels Institute

Reality of EV Transitions

John Eichberger
Executive Director, Fuels Institute
jeichberger@fuelsinstitute.org
703-518-7971

Fuels Institute Board of Advisors

Fuels Institute




Electric vehicles will play a very
important role, but...

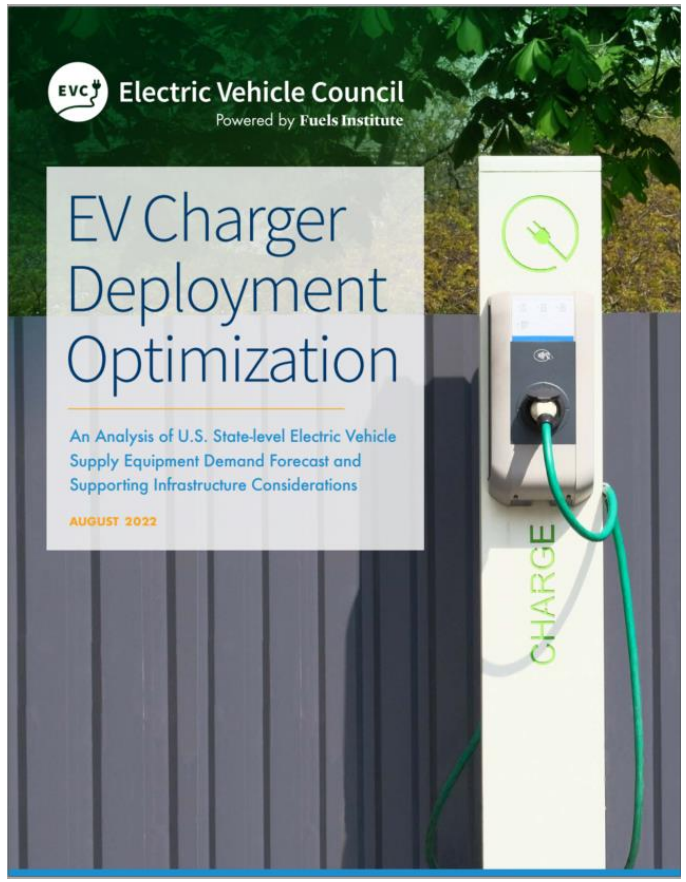
Perception and Reality Differ

Americans believe that 20% of vehicles in operation are electric and that 24% of vehicles sold in 2021 were electric.

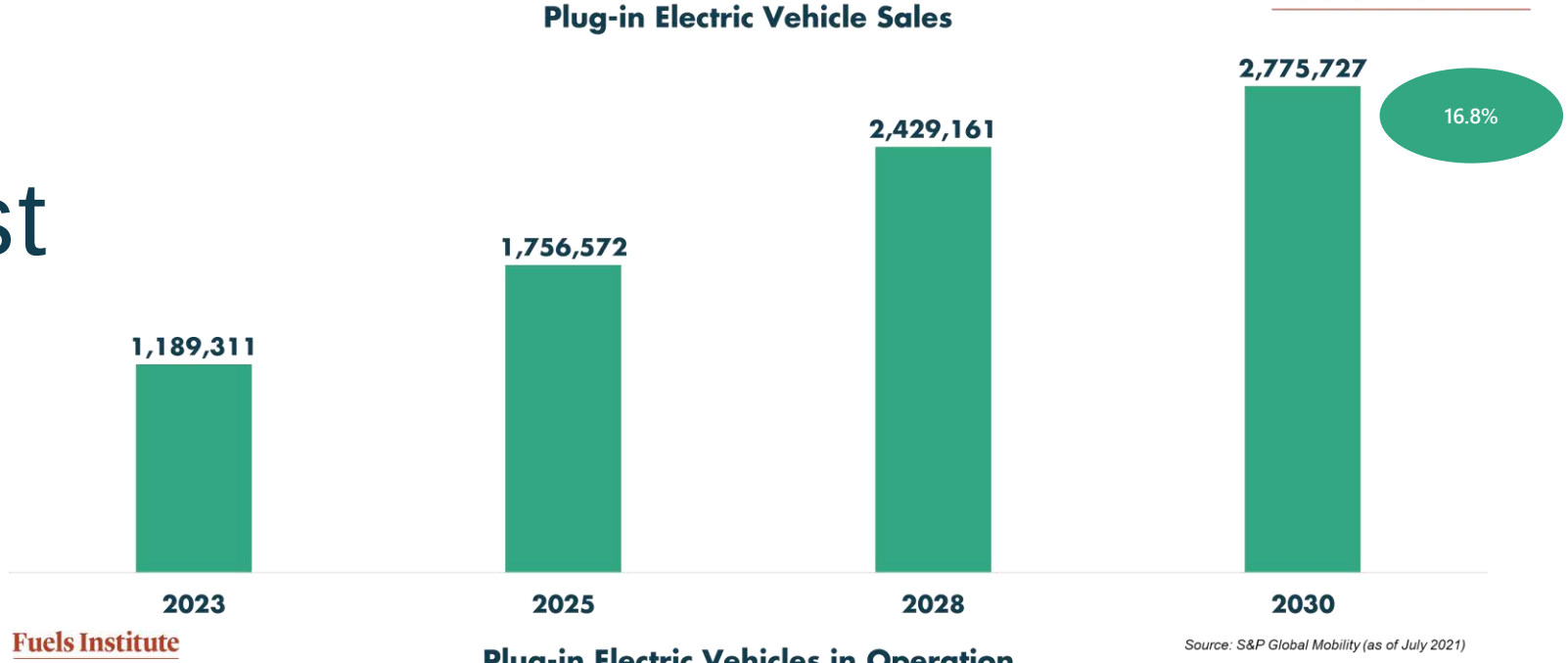
There is a distinct difference between perception & reality, projections & practical expectations.

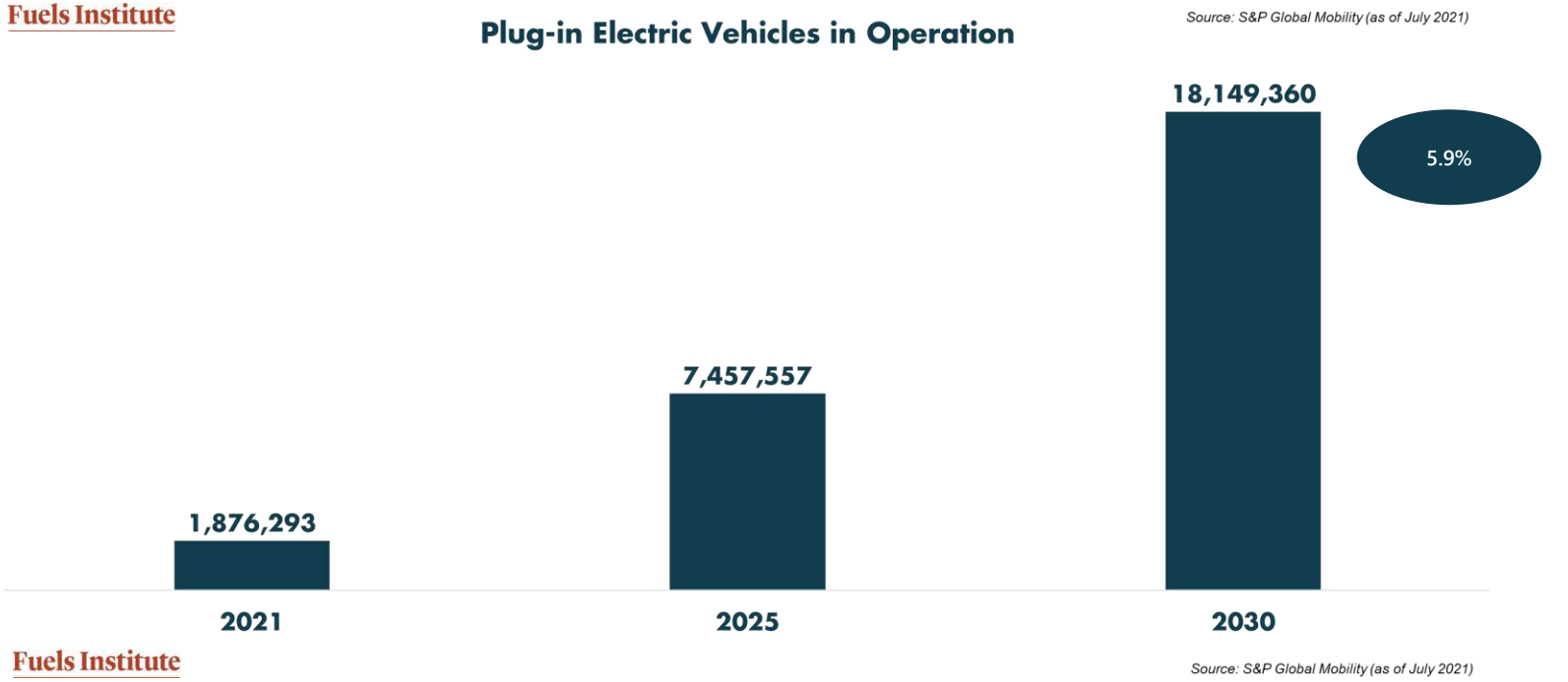
S&P Global Mobility Forecast

Contrast this with recent forecasts of 50% of sales by 2030



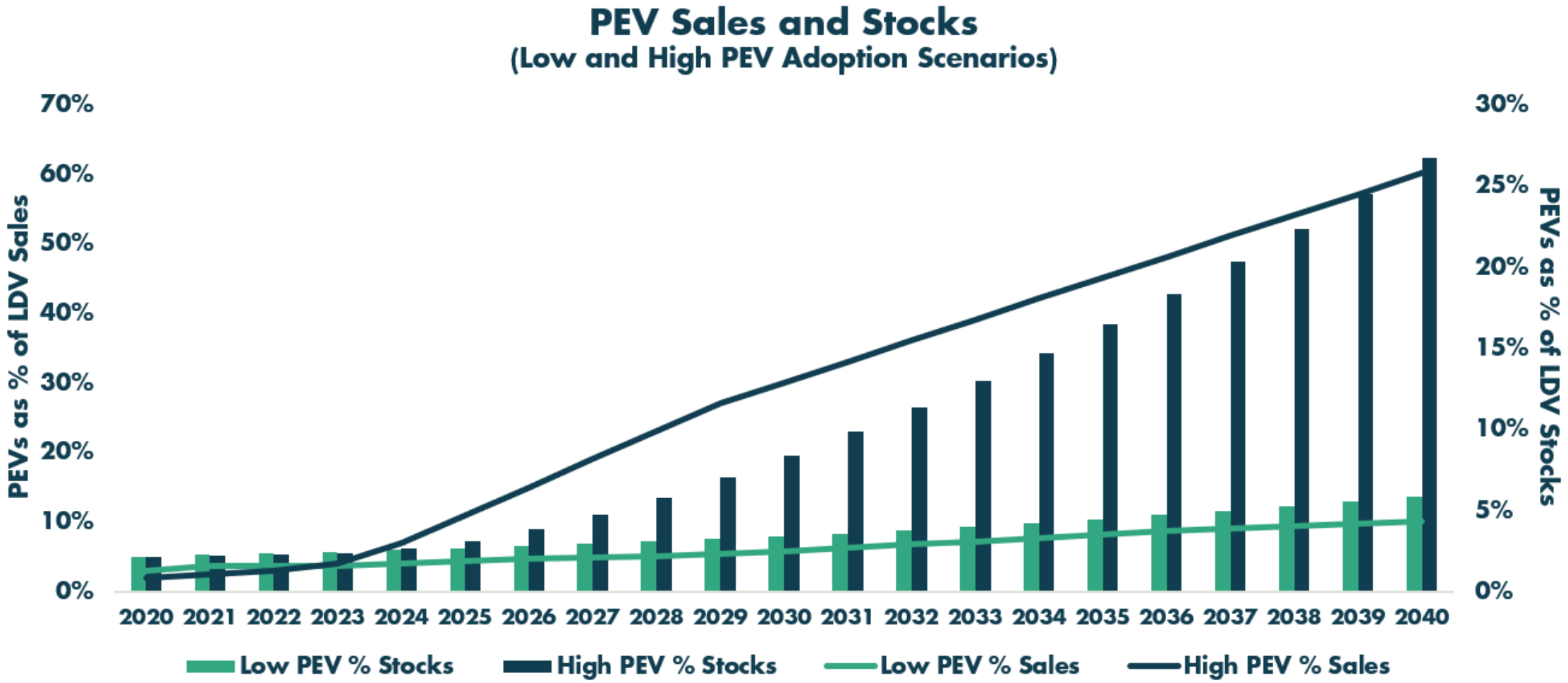
Fuels Institute





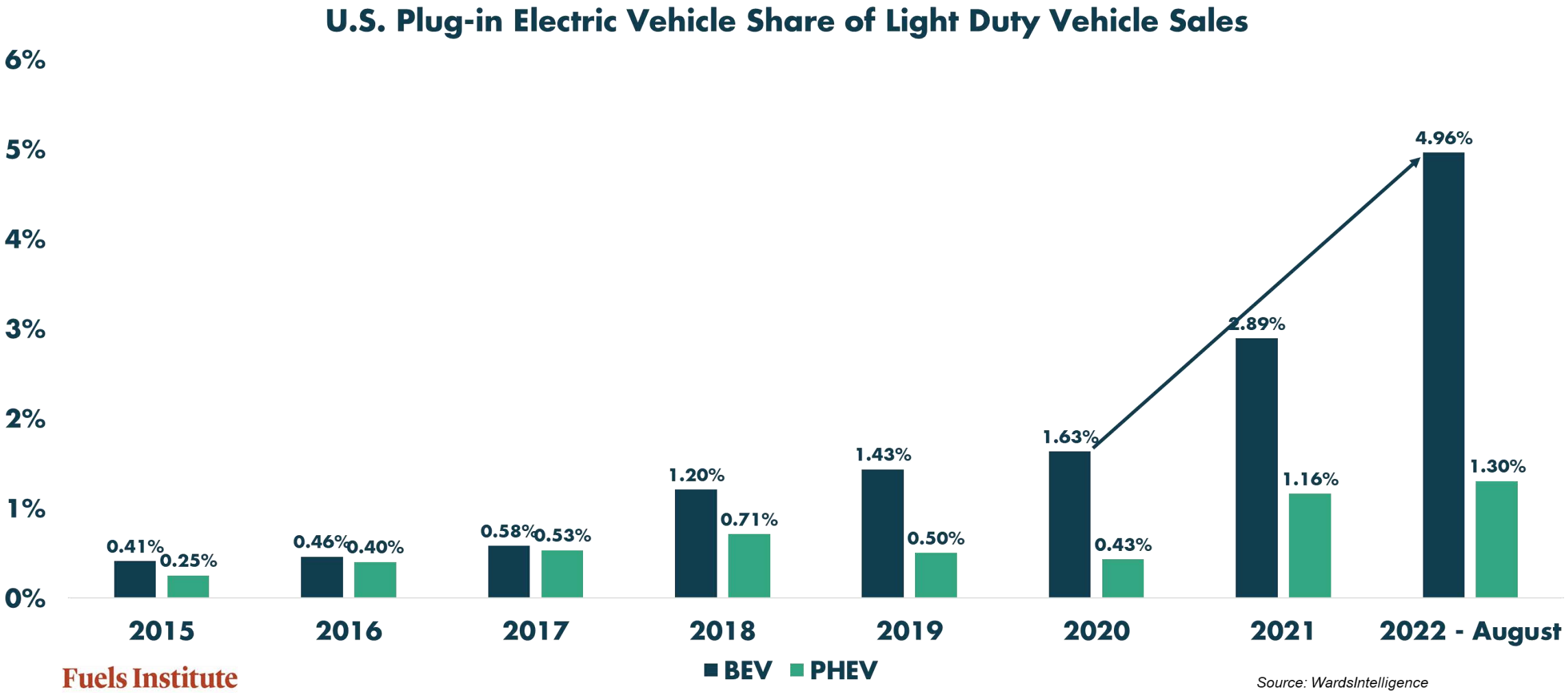
Turnover is slow, even w/ rapid sales growth

If PEVs reach 60% sales in 2040, they may only represent 27% of LDVs on the road



BEVs hit 5% of sales through September 2022

A big question remains: **Can and for how long might this momentum continue considering price increases and supply shortages?**



Fuels Institute

Source: WardsIntelligence

EV prices are going in the wrong direction

Up — they're going up

By Andrew J. Hawkins | @andyjayhawk | Aug 24, 2022, 11:07am EDT | 19 comments

Fuels Institute

IRS clarifies new EV tax credit rules, lists 2022-23 vehicles that may be eligible

Upon signing of the Inflation Reduction Act, the IRS is clarifying what happens between now and the end of the year.

August 17, 2022 01:23 PM

MARCH 14

Tesla increases prices throughout whole lineup, its cheapest electric car now starts at $47,000

Fred Lambert - Mar. 14th 2022 9:27 pm PT @FredericLambert

Rivian discontinues its cheapest electric truck option

By Ramishah Maruf, CNN
Updated 4:55 PM EDT, Sat August 20, 2022

AUTOS

Ford hikes price of electric Mustang Mach-E by as much as $8,475 due to 'significant' battery cost increases

PUBLISHED FRI, AUG 26 2022•10:59 AM EDT | UPDATED FRI, AUG 26 2022•2:07 PM EDT

Michael Wayland
@MIKEWAYLAND

SHARE

AUTOS

Ford CEO doesn't expect electric vehicle battery costs to drop anytime soon

PUBLISHED WED, AUG 10 2022•1:44 PM EDT | UPDATED WED, AUG 10 2022•10:09 PM EDT

John Rosevear
@JOHN__ROSEVEAR

Michael Wayland
@MIKEWAYLAND

SHARE

Battery Pack Costs Rise for Battery Electric Vehicles

15 August 2022 | Monika Punshi

TRANSPORTATION

Used EV prices rising five times faster than gas-powered cars

BY SUSAN CARPENTER | NATIONWIDE
PUBLISHED 12:15 PM PT AUG. 30, 2022

Ford Raises Prices of F-150 Lightning Electric Truck, Citing Rising Material Costs

Demand for electric vehicles has been far stronger than the supply of battery materials like lithium, nickel and cobalt.

REPORT

Used electric car prices jump 54%, far outpacing gas-powered models

Gas prices and new-vehicle shortages have driven buyers to preowned EVs

CHRIS TEAGUE
Aug 25th 2022 at 10:27AM

38 comments

AUGUST 12

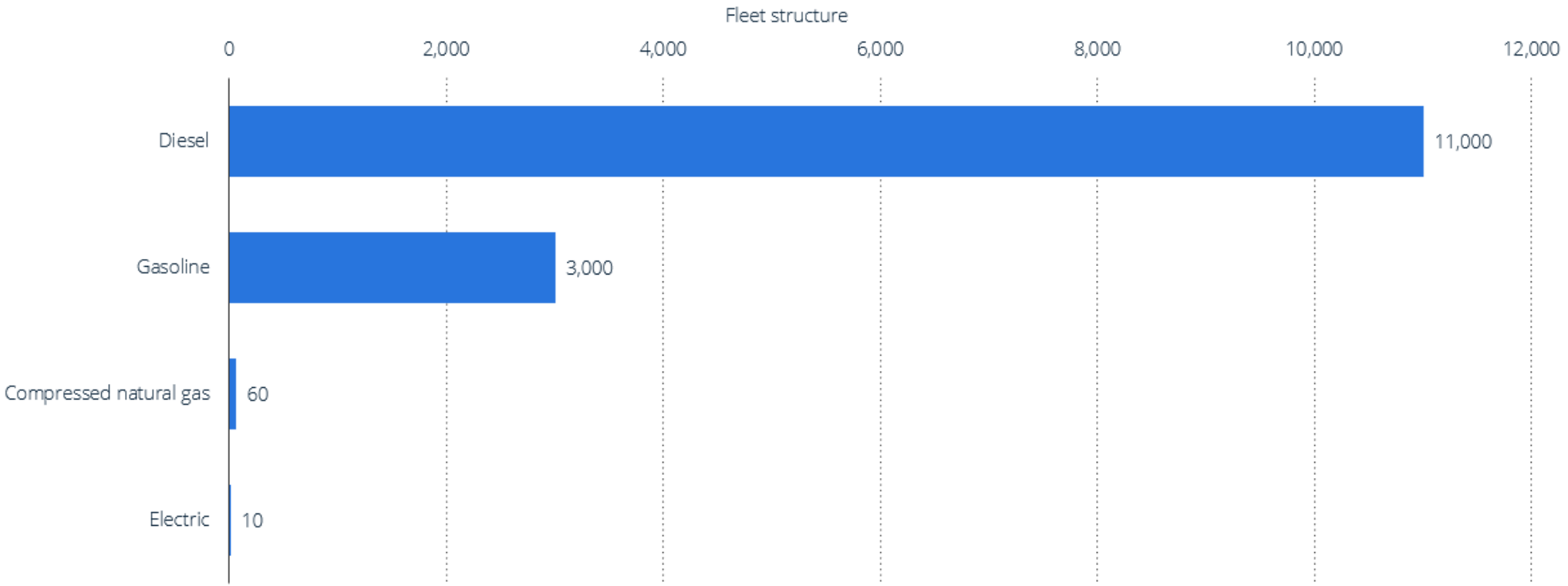
Tesla stops taking Model 3 Long Range orders as backlog extends to 2023

Fred Lambert - Aug. 12th 2022 2:38 pm PT @FredericLambert

MHDV Alternatives have small footprint

Commercial vehicle fleet in the United States in 2020, by fuel type (in 1,000s)

Commercial vehicle fleet by fuel type in the U.S. 2020



Note(s): United States; as of December 2020

Further information regarding this statistic can be found on page 8.

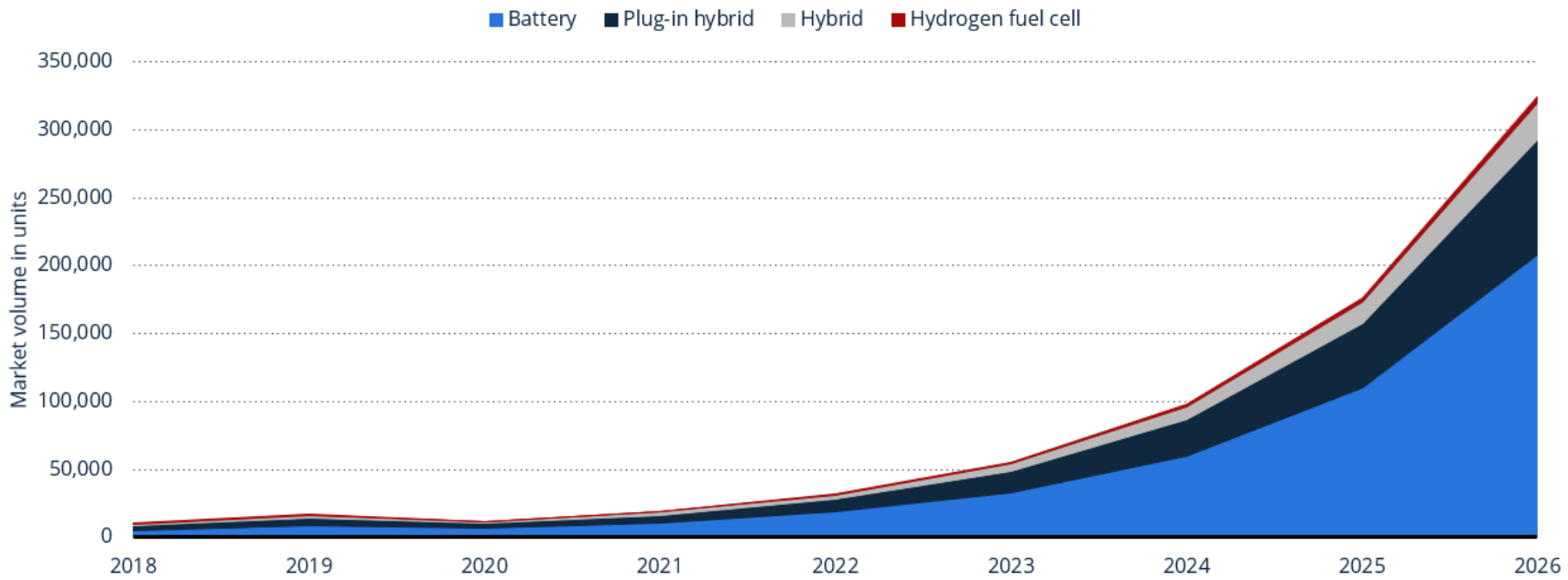
Source(s): IHS Markit; Diesel Technology Forum; ID 1269132

Global forecasts for MHDVs remain modest

Global annual sales of commercial vehicles was reported to be around 22 million units.
The forecast below projects total fleet inventory of ZEVs of about 325,000 units in 2026.

Projections for the electric truck market volume worldwide between 2018 and 2026, by charge type

Projected global electric truck market volume by type 2018-2026



29

Description: Projections estimate battery-electric trucks will make up approximately 64 percent of the total electric trucks fleet in 2026, at just under 208,000 units. This segment is the most rapidly growing, with a compound annual growth rate forecast at 78.58 percent between 2020 and 2026. By contrast, hydrogen fuel cell trucks are projected to represent some 4,390 vehicles in the fleet, up from 468 in 2019. Read more
Note(s): Worldwide; 2018 to 2019
Source(s): MRFR

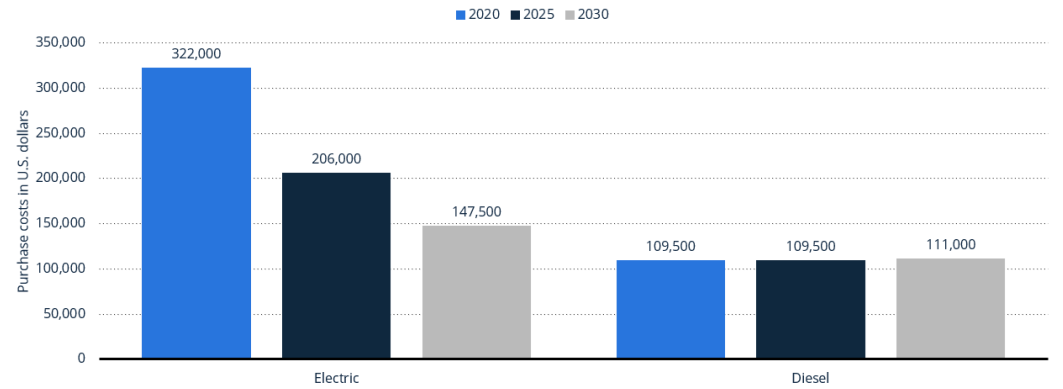
statista

Why is market share growth slow?

Price, infrastructure, ROI

Projected medium-duty truck purchase costs between 2020 and 2030, by fuel type (in U.S. dollars)

Projected diesel and electric medium-duty truck purchase costs 2020-2030

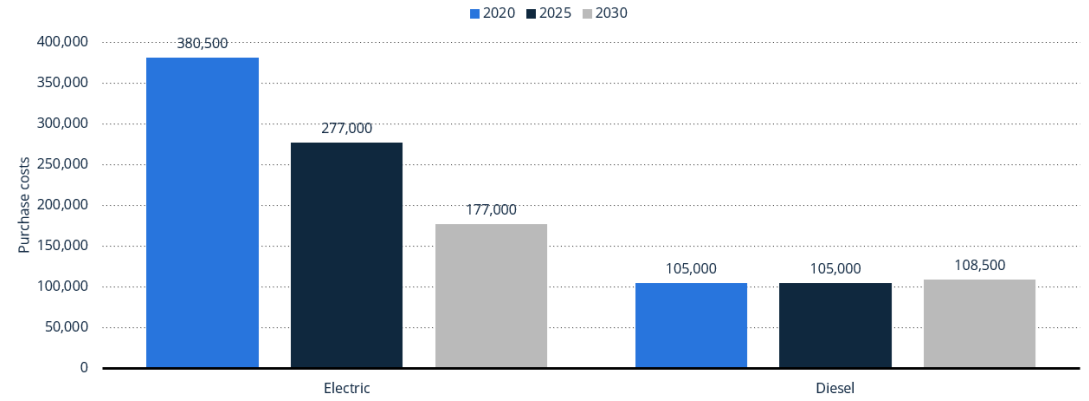


32 **Description:** Between 2020 and 2030, the purchase cost for electric medium-duty trucks is projected to drop by over half compared with 2020 to some 147,500 U.S. dollars. The trend for diesel vehicles is the opposite. While purchase costs are projected to remain stable throughout 2025, they are tipped to increase by some 1,500 U.S. dollars by 2030. Read more
Note(s): Worldwide; 2020
Source(s): Calstart; FIER Automotive; Global Commercial Vehicle Drive to Zero

statista

Projected heavy-duty truck purchase costs between 2020 and 2030, by fuel type (in U.S. dollars)

Projected diesel and electric heavy-duty truck purchase costs 2020-2030

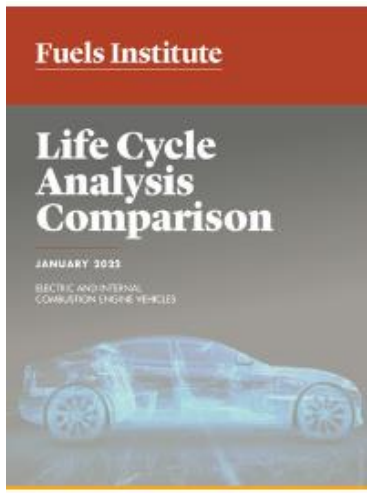


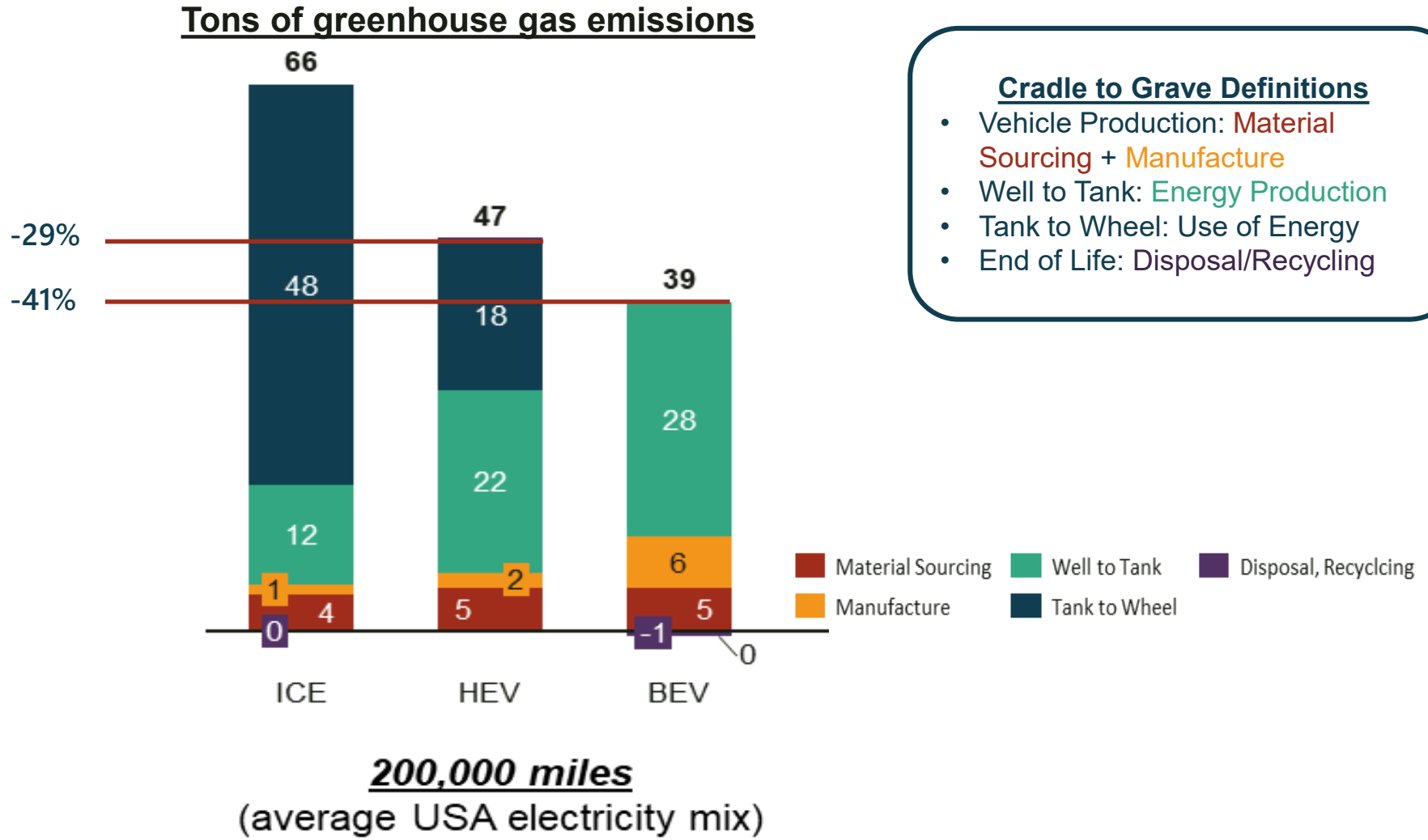
33 **Description:** Between 2020 and 2030, the purchase cost for electric heavy-duty trucks is projected to drop by over half, compared with 2020 to some 177,000 U.S. dollars. The trend for diesel vehicles is the opposite. While purchase costs are forecasted to remain stable until 2025, they will increase by some 3,500 U.S. dollars by 2030. Read more
Note(s): Worldwide; 2020
Source(s): Calstart; FIER Automotive; Global Commercial Vehicle Drive to Zero

statista

High Level Summary – LCA Comparison

Over a 200,000 mile lifetime and based upon a national average electricity mix, BEVs emit less carbon than ICEVs and HEVs.





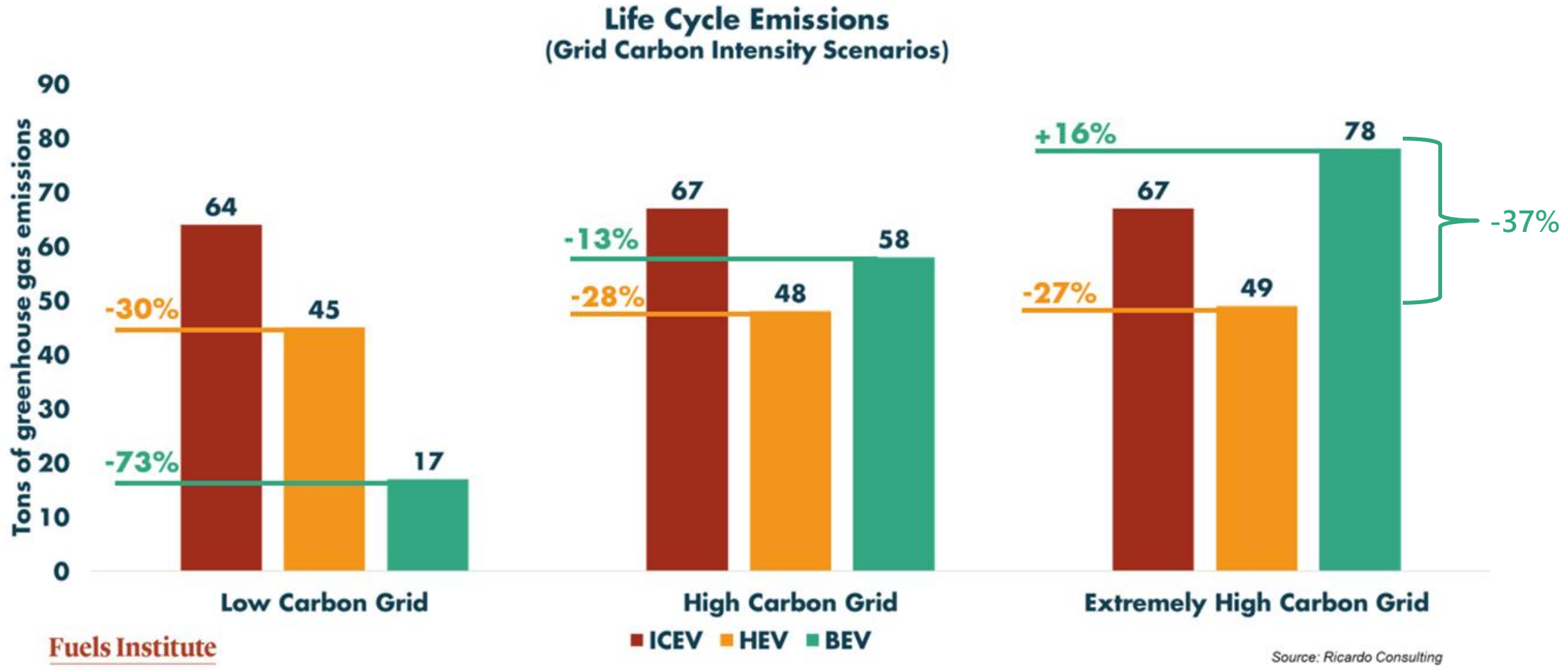
Cradle to Grave Definitions

- Vehicle Production: Material Sourcing + Manufacture
- Well to Tank: Energy Production
- Tank to Wheel: Use of Energy
- End of Life: Disposal/Recycling

Where we deploy EVs matters

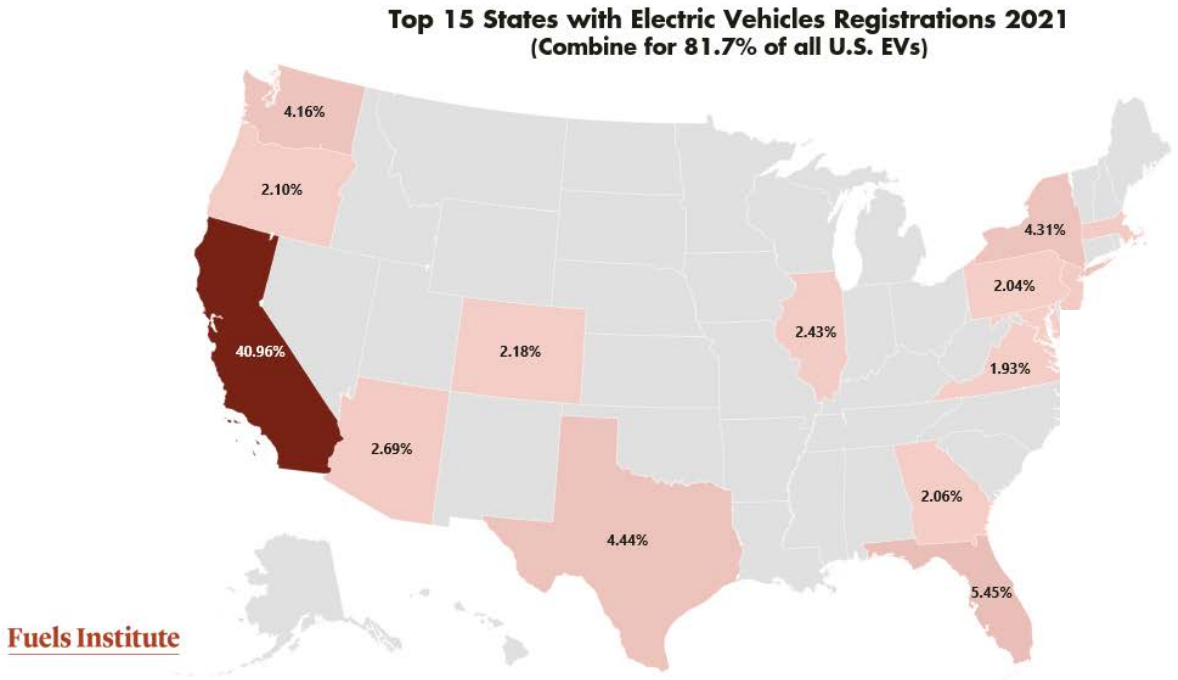
Not all markets are created equal – deployment of decarbonization strategies should take into consideration regional, market and duty-cycle variations to maximize carbon reduction as quickly and affordably as possible.

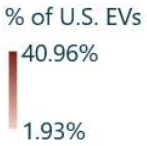
72% of a BEV's lifetime carbon emissions (on average) come from the generation of electricity.

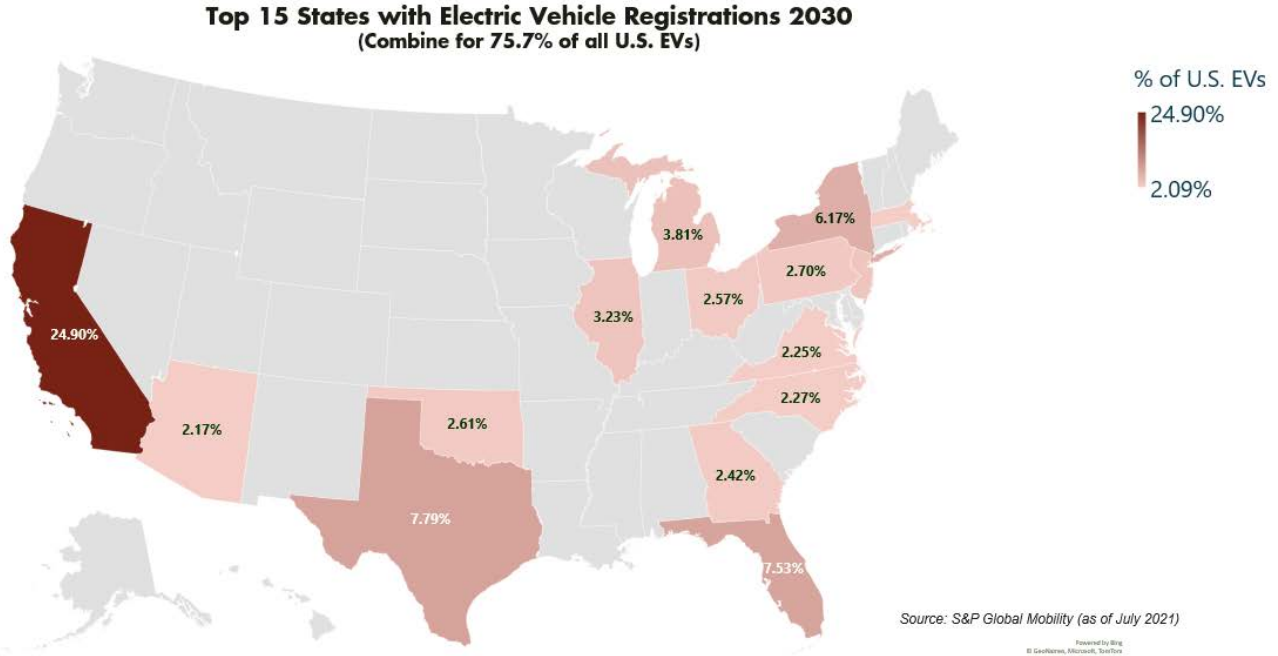


EV Geographic Distribution is Uneven

California's dominance expected to ease through 2030, although not all ZEV partner states support ICE Ban



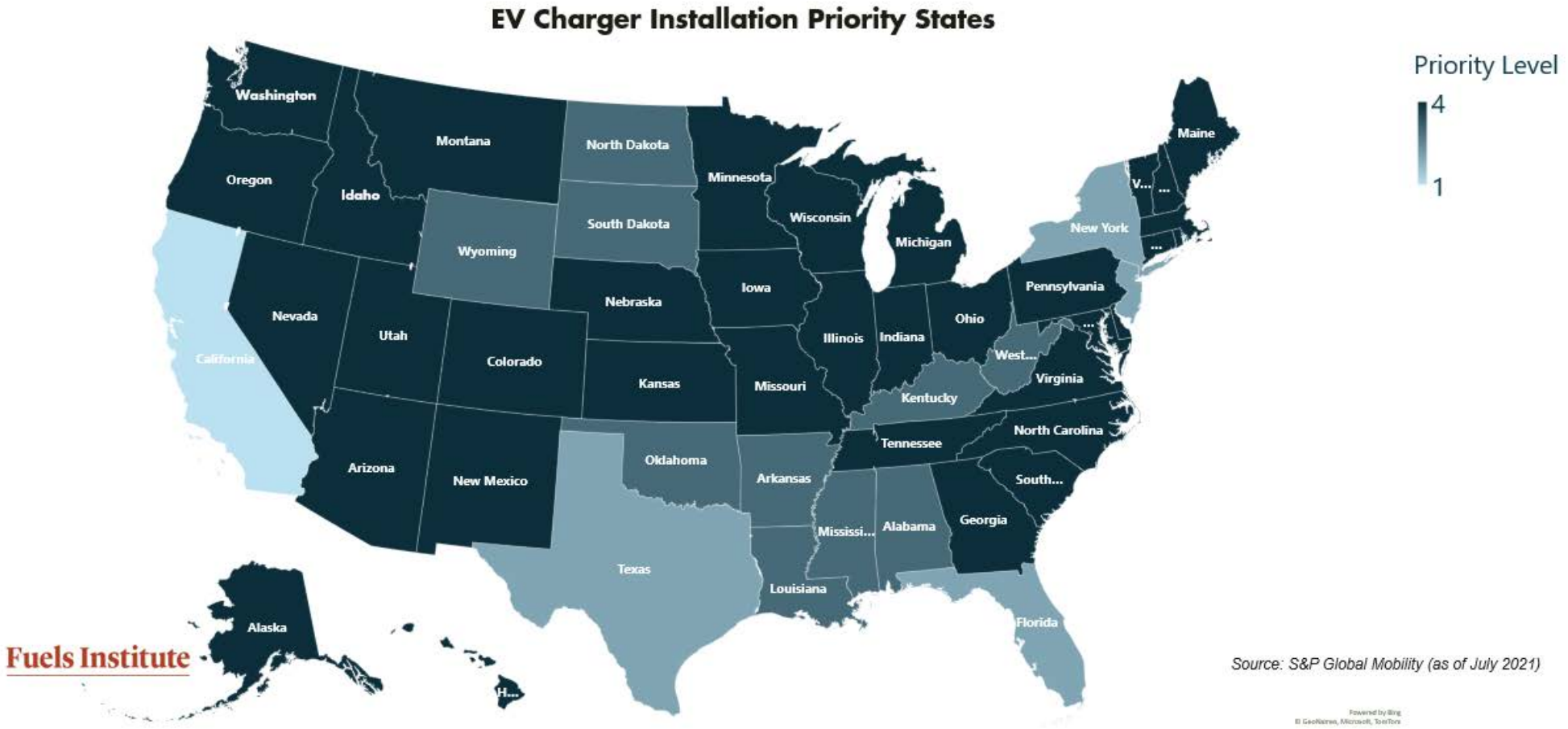




Source: S&P Global Mobility (as of July 2021)

Prioritizing EVSE Deployments

Building upon their knowledge about the vehicles and transportation market, S&P Global Mobility prioritized states based upon their need for EV charging installations. Taking into consideration the expected future plug-in EVs in operation along with factors which influence out-of-home charging requirements, including housing mix, miles traveled, and parking habits, researchers combined these inputs and used them to forecast EVSE requirements at a census track level. This highly granular forecast was then aggregated to create a state-level prioritization to help guide industry stakeholders to strategically deploy stations to support the expanding demand of the EV driver.



U.S. may need more than 1.7 million charging stations in 2030

How did they arrive at this number?

- Applied international benchmark for ideal EV-to-charger ratio of 10.4:1
- Applied S&P Global Mobility forecast of EVs in operation in 2030 of 18 million
- Charging Stations Needed – 1.737 million
- More than 90% could be Level 2 - based upon census track analysis combined with driving patterns and observed dwell times

It is worth noting that this figure is based upon a forecast that is significantly lower than many other published forecasts. If the market for EVs develops faster than provided for in this study, the number of required charging stations to minimize market congestion will be much higher than 1.7 million.

FIGURE 26: 2030 U.S. ELECTRIC VEHICLES IN OPERATION AND ELECTRIC VEHICLE SUPPLY EQUIPMENT RATIO FORECAST, TOP 15 STATES

STATE	ELECTRIC VEHICLES IN OPERATION	AC REQUIRED	DC REQUIRED	AC RATIO	DC RATIO	OVERALL RATIO
California	4,518,839	455,915	24,216	9.9	186.6	9.4
Florida	1,413,638	120,153	6,382	11.8	221.5	11.2
Texas	1,367,370	129,196	6,862	10.6	199.3	10.0
New York	1,118,911	83,065	4,412	13.5	253.6	12.8
New Jersey	690,699	74,426	3,953	9.3	174.7	8.8
Illinois	585,425	49,072	2,606	11.9	224.6	11.3
Pennsylvania	577,492	44,072	2,341	13.1	246.7	12.4
Michigan	490,824	46,548	2,472	10.5	198.5	10.0
Ohio	474,604	42,619	2,264	11.1	209.7	10.6
Washington	465,586	33,079	1,757	14.1	265.0	13.4
Georgia	439,410	44,814	2,380	9.8	184.6	9.3
North Carolina	411,960	36,184	1,922	11.4	214.4	10.8
Massachusetts	408,620	54,115	2,874	7.6	142.2	7.2
Arizona	393,973	27,380	1,454	14.4	270.9	13.7
Virginia	378,517	34,414	1,828	11.0	207.1	10.4
Top 15	**13,735,870**	**1,275,050**	**67,724**	**10.77**	**202.8**	**10.2**
National	**18,149,360**	**1,649,942**	**87,636**	**11.00**	**207.1**	**10.4**

Metro-level EVSE Forecasting – Case Studies

It is important to view the EVSE forecasts on a micro-level of geography, because EVSE deployment is going to physically occur in the locales and municipalities where people live and work – and not on a federal or even state level. To this point, the report includes three case studies (Detroit, MI; Dallas, TX; Portland, OR) to demonstrate how infrastructure looks today and how these cities should be addressing future charging demand and equity.

FIGURE 31: DETROIT, MICHIGAN: MAP OF ELECTRIC VEHICLE SUPPLY EQUIPMENT INSTALLATION REQUIREMENTS BY 2030

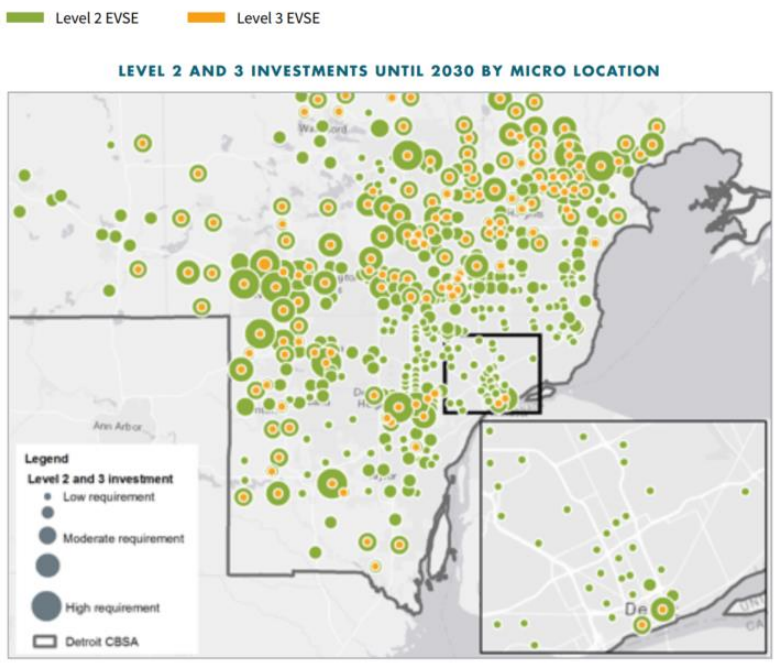


FIGURE 27: DETROIT, MICHIGAN: CHARGING DESERT IN THE CITY

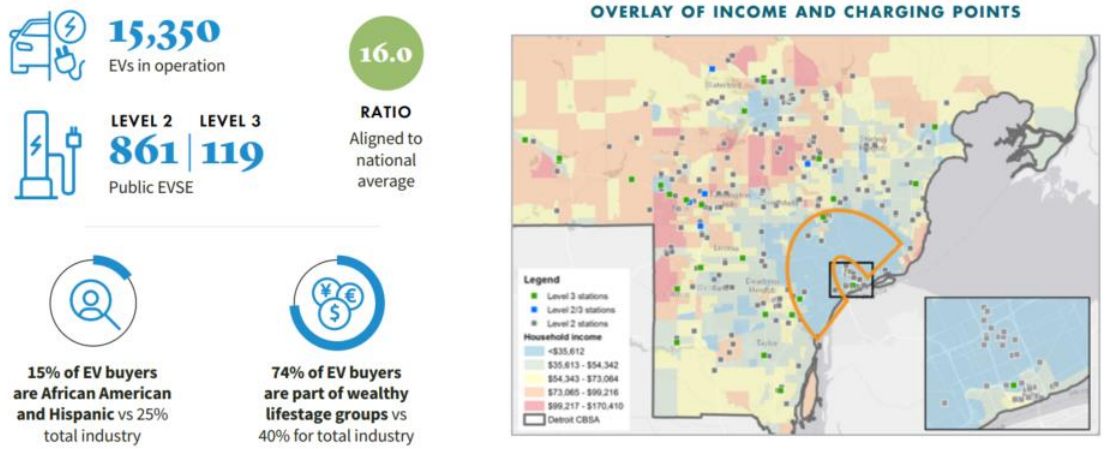
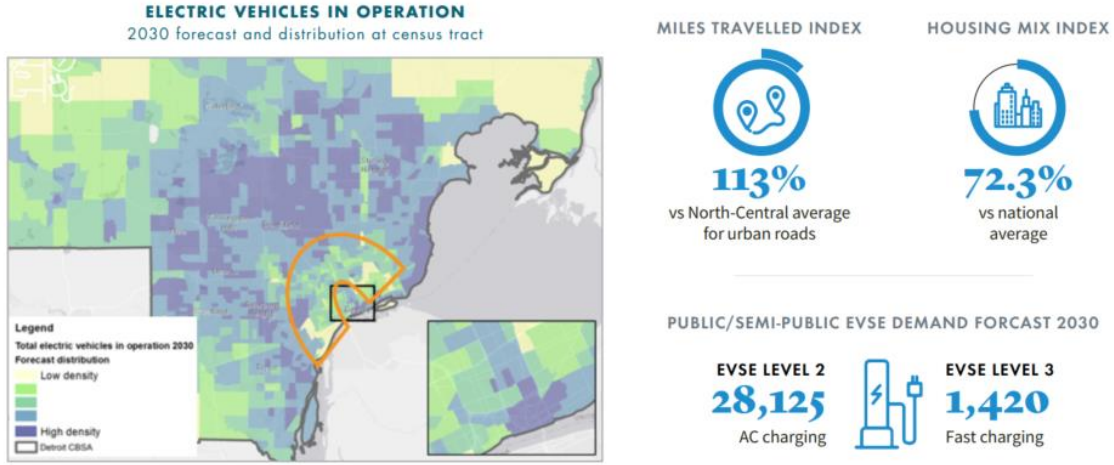


FIGURE 28: DETROIT, MICHIGAN: 2030 ELECTRIC VEHICLES IN OPERATION DISTRIBUTION BY CENSUS TRACT

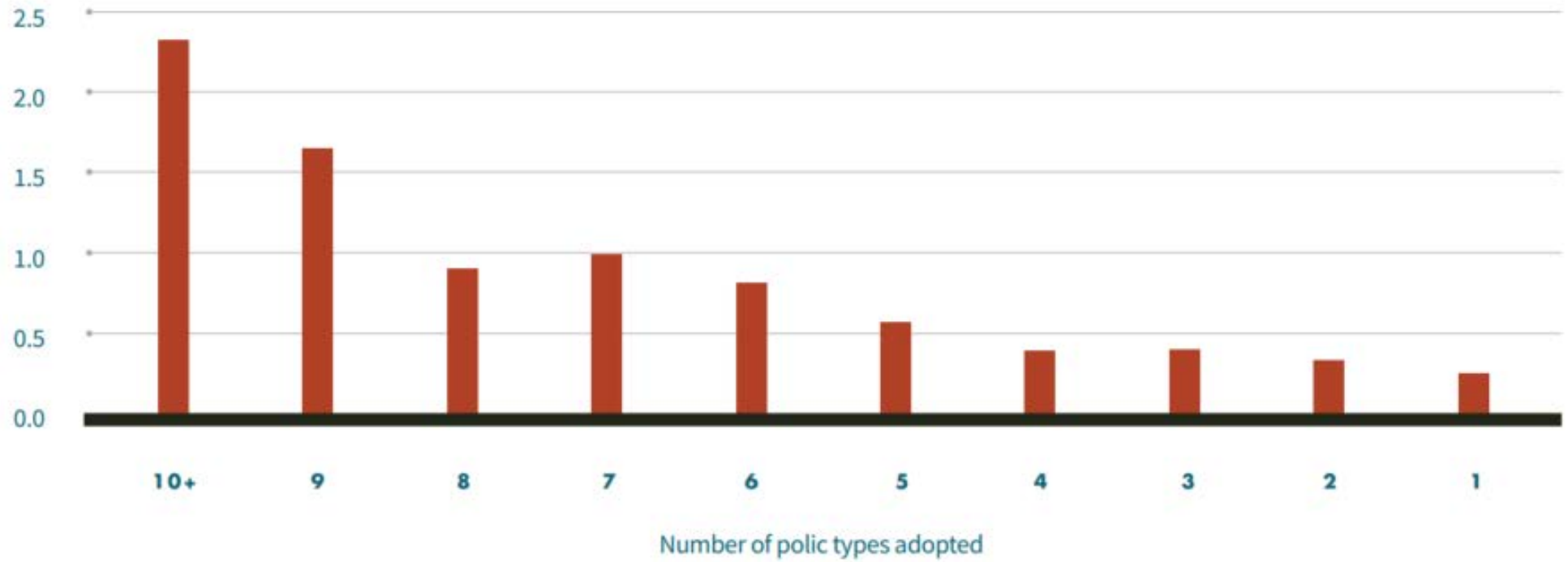


States with more programs have higher EVSE market development scores

Fuels Institute

Market Development Score: A weighted average of EVSE stations per capita (75%) and EV sales per capita (25%) between 2016 – 2020.

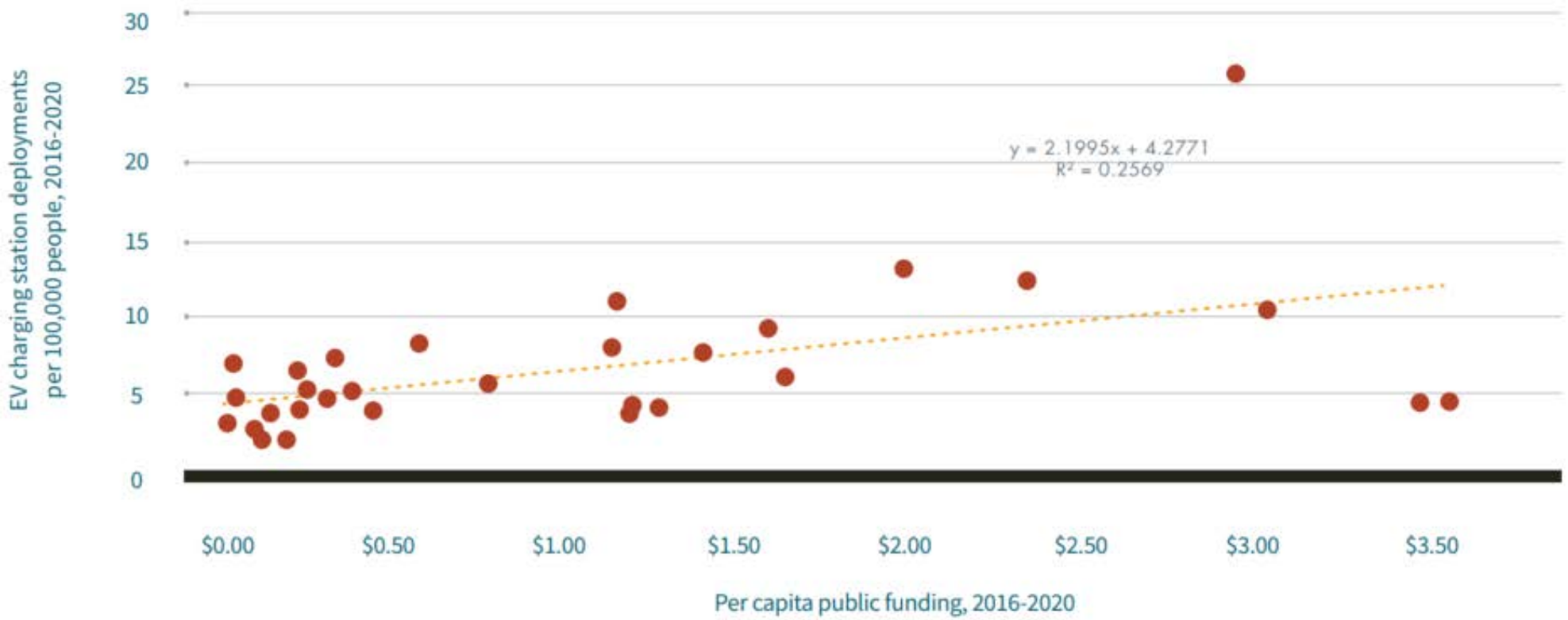
FIGURE 5: AVERAGE EVSE MARKET DEVELOPMENT SCORE BY BREADTH OF POLICY ADOPTION



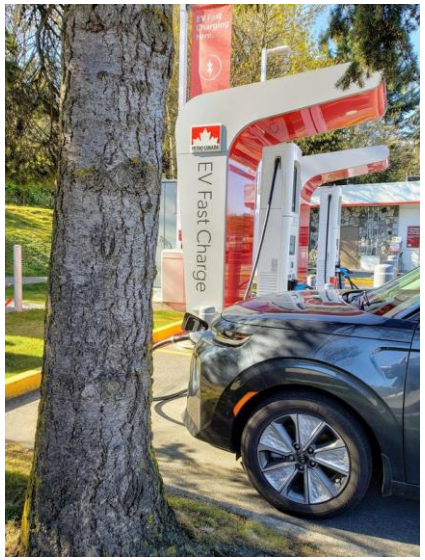
Financial incentives are important

Public funding may account for roughly 26% of the variation in charging station deployments across the states, on average

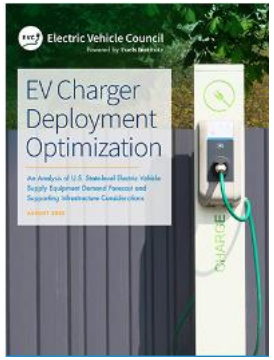
FIGURE 12: CHARGING STATION DEPLOYMENTS PER 100,000 PEOPLE VS. PER CAPITA PUBLIC FUNDING, 2016-2020 (ONLY FUNDING AWARDED AND FUNDING ENDED)



Retailers have decisions to make



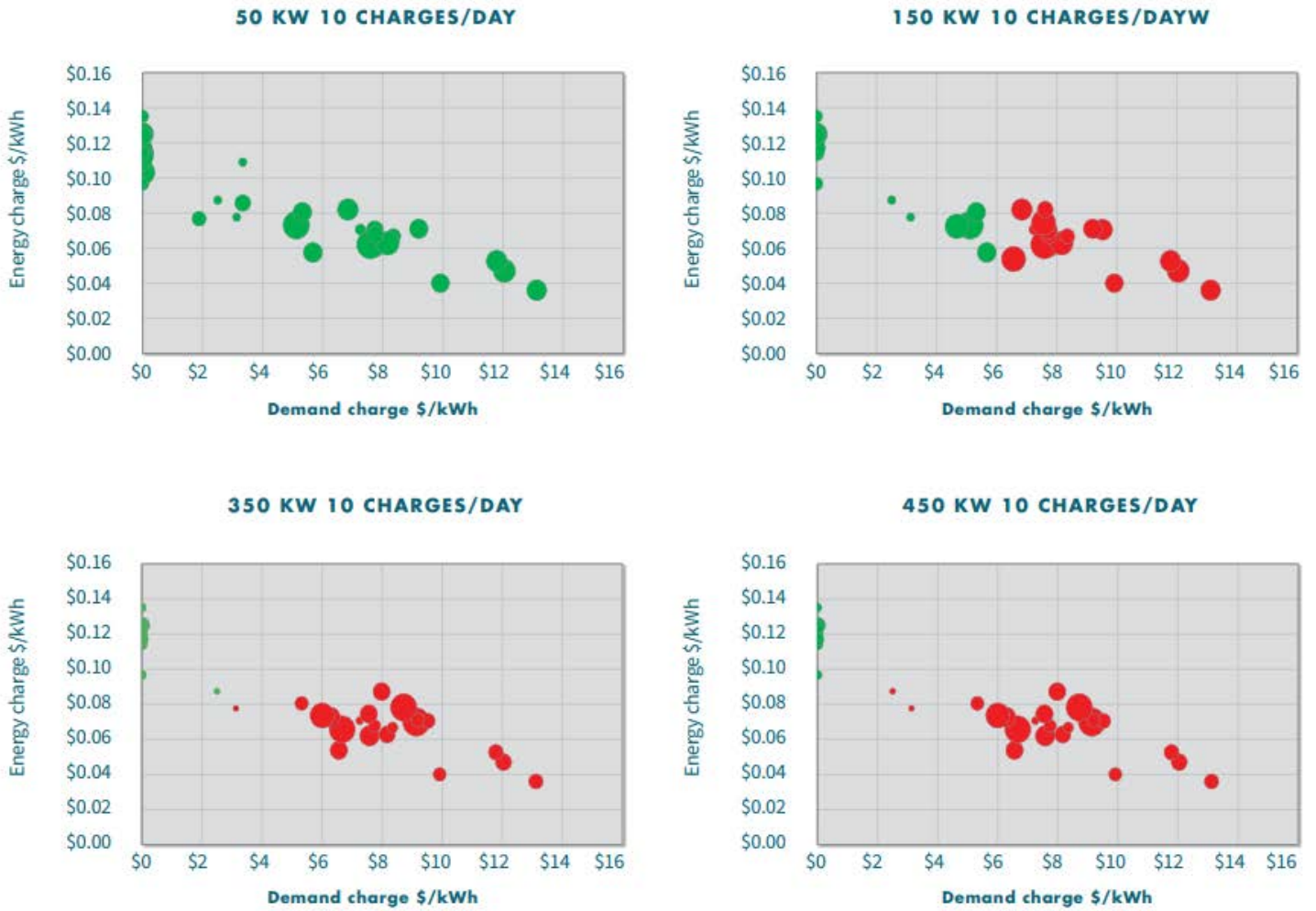
- How do I enter the market – third party network or my own system?
- How much will it cost? Should I try to get NEVI funding?
- How much power should I install, what do my customers need?
- Where should I locate the chargers? How far from my fuel pumps?
- Can I make money on this?
- What is my effective utility rate?
- What are demand charges?



Demand Charges

- One interviewee defined demand charges as “the **biggest existential threat** for the economic viability for EVSE implementation, especially DCFC”
- Operating expenses are among the greatest challenge to profitability at a charging station.
- Several utilities are experimenting with alternate fee structures to mitigate the negative impact of demand charges on EVSE deployment, but these may not be sustainable long-term.
- The regulatory structure governing the utility sector was not designed for retail transactions like those that occur at the EV charging station.

FIGURE 18: BREAKEVEN PERFORMANCE OF DCFCS UNDER VARYING UTILITY DEMAND AND ENERGY CHARGES (VARYING POWER LEVELS AND RELATIVELY HIGH CONSTANT UTILIZATION RATE)[45]



How can localities support EVSE deployment?

"This guide has been prepared to help these officials and other readers understand in brief form the policy landscape in the U.S. at both the state and local levels, noting the types of policies that have been set and providing several examples of how different authorities having jurisdiction (AHJ) have implemented them."

"The guide concludes with best practice recommendations from regulated entities themselves, that is, stakeholders that have accumulated years of experience installing and operating EV-charging infrastructure around the U.S. Stakeholders from the EV-charging industry, fuel retailing, utility, and metropolitan planning organizations (MPOs) shared their expertise and actionable and practical recommendations as AHJs begin to develop and implement EV-charging policies."

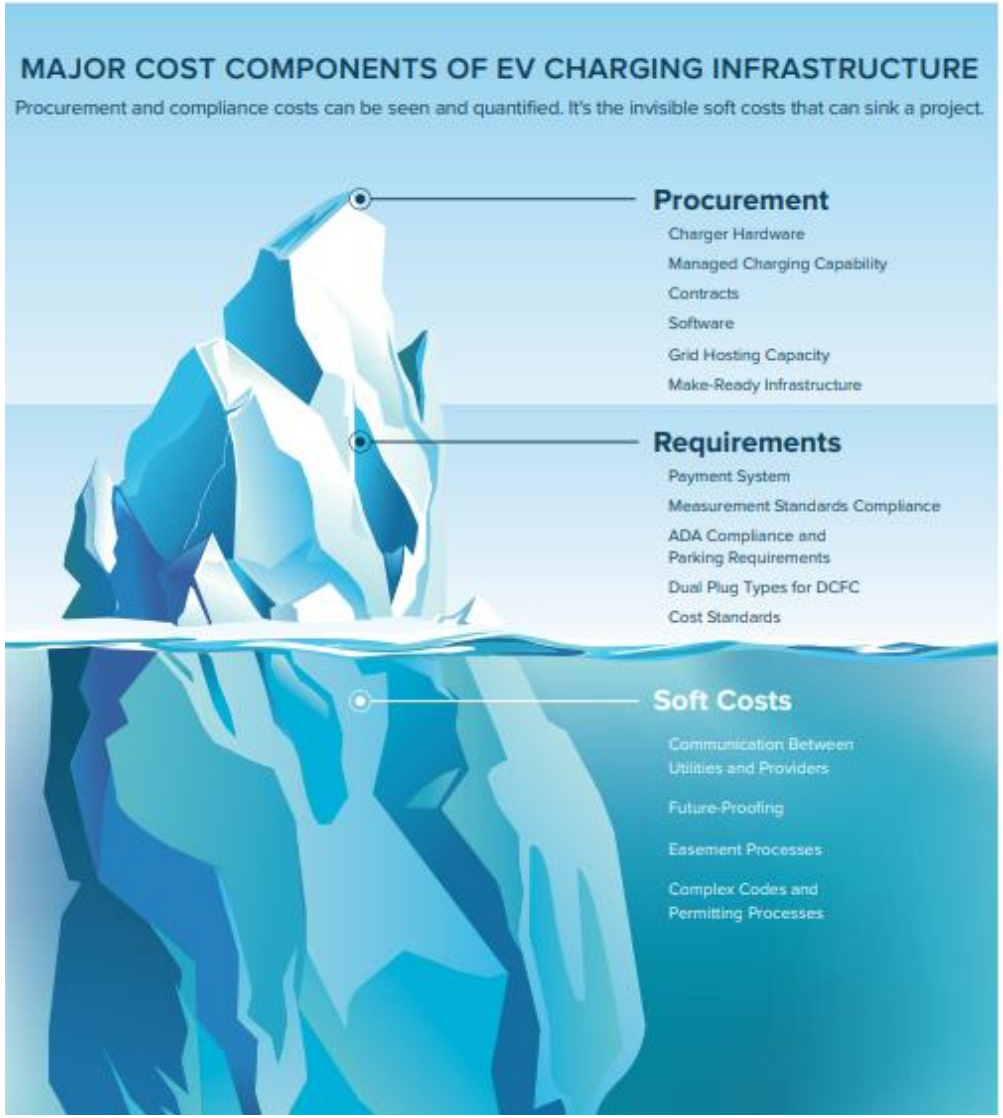
Permitting Complications

Clear, coherent guidance from higher levels of government to foster coordination and lead AHJs

Policies coordinated among jurisdictions to create consistency, predictability, economies of scale

Streamlined permitting application process and review procedures

- Single universal application for all required permits
- Clarify at the beginning what documents must be submitted to satisfy all permits
- Enable online application
- Appoint an EVSE permitting point person to assist applicants
- Enable review of application for multiple permits simultaneously rather than sequentially



Source: Rocky Mountain Institute, January 2019

Specific recommendations

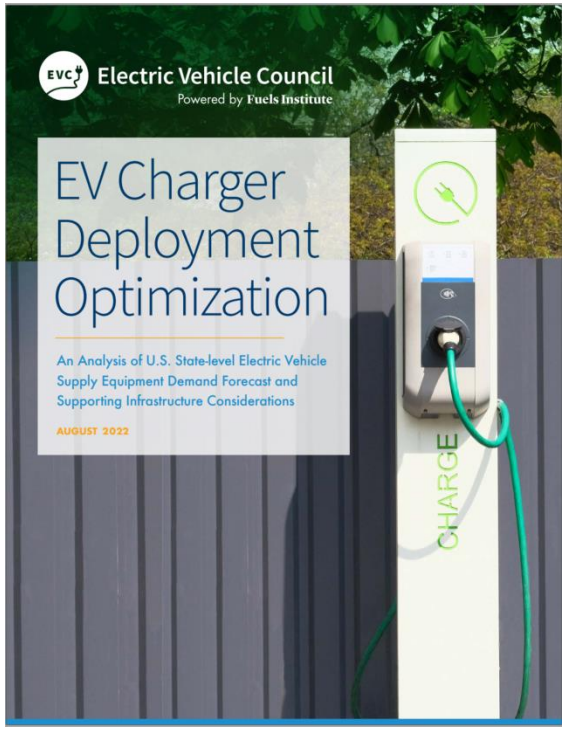
- Establish and enforce **permitting turnaround times**.
- Establish an **expedited EV permit review process** that encourages permit reviewers to administratively approve permits
- Amend zoning codes to clarify that public EVCS does not require further zoning board approval and to clearly identify any exceptions.
- Appoint an EV-infrastructure **permitting point person** to help applicants through the entire permitting process.
- Align planning codes so that EVCS application reviews are limited to health and safety.
- Clarify that EV-charging spaces count as one or more parking spaces for zoning purposes. Count EVCS spaces as regular parking stalls in the parking count study to include supporting equipment (transformer, switchboards, power cabinets).
- Classify **EVCS is as an accessory use to a site**, not as a traditional fueling station.
- Allow EVCS as an approved use as a primary use of a site with streamlined permit and zoning review.
- **Require only an electrical permit**, as opposed to an additional EVCS permit.
- Adopt an **online permitting process**. Clear permitting and inspection processes, requirements, and forms should made available on a public-facing website for single-family home, multi-family home, and workplace, public, and commercial medium- and heavy-duty charging. Establish an online submittal and payment process, ideally through a portal.
- Route permit **applications through one department**, not multiple. In cases where multiple departments need to review, the reviews should be concurrent rather than sequential. Limit the number of review comments and consolidate when possible.
- Incorporate and prioritize planning for zero emission vehicles and supporting infrastructure within documents, such as the general plan, capital improvement plan, climate action plan, and design guidelines.
- **Offer pre-application meetings** with knowledgeable staff.

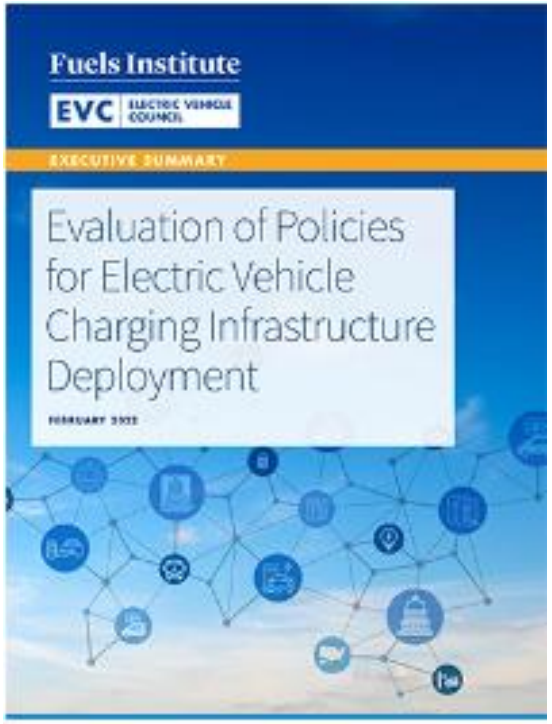
Additional recommendations wrt utilities

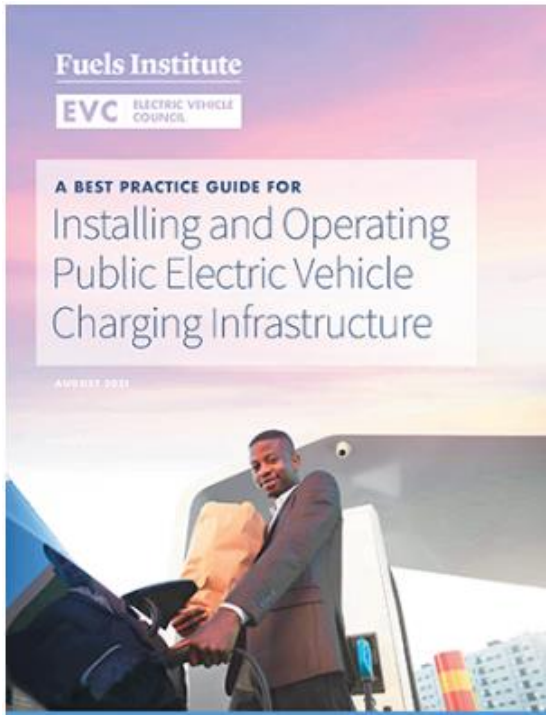
- Require utilities to disclose average timelines for service connection for EV-charging accounts.
- Provide **special easement considerations** for EV charging, including the ability to include utility easement language in site leases and contracts between an EV-charging developer and landowner or a long-term ground lessee.
- Allow for **utility make-ready** for EV charging.
- Allow **visibility into where power is available on the grid**, such as with hosting capacity maps or a way to check with the utility if power is available at a specific site.
- Improve the feasibility study phase for new projects without having to go through the full design process.
- Maintain an inventory of utility equipment commonly used in EV-infrastructure installations, specifically transformers that otherwise can be “made to order” and require long lead times.
- Provide **dedicated design and construction staff** for EV-infrastructure projects.
- **Streamline utility design approvals**.

Resources:

Fuelsinstitute.org/research - Other papers relative are also available and more are being developed







Final Thoughts & Questions

John Eichberger
Executive Director, Fuels Institute
jeichberger@fuelsinstitute.org
703.518.7971

Electric Vehicle Task Force

APPENDIX 8

MISSOURI DEPARTMENT OF REVENUE

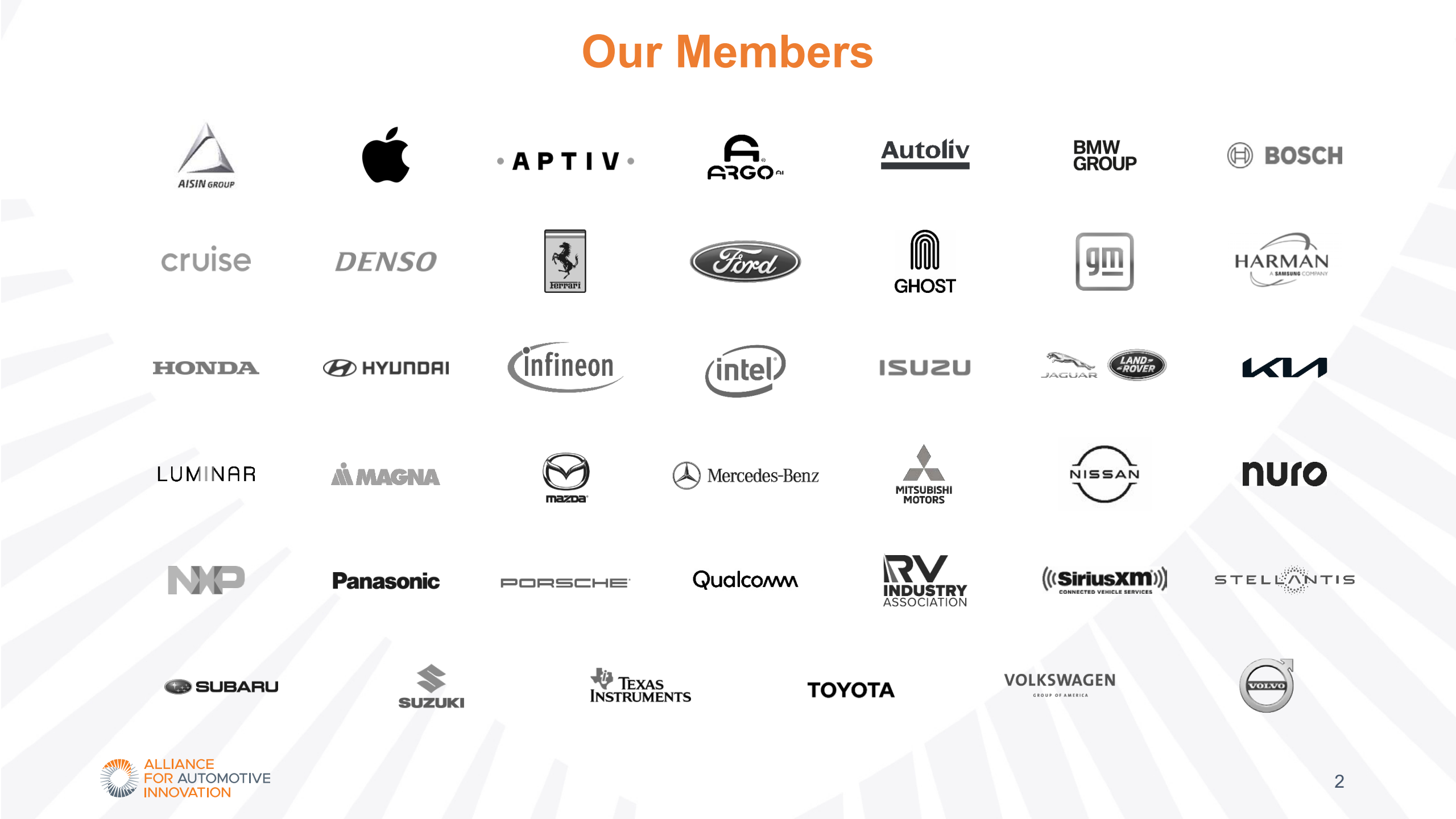
The EV Transformation

Amy Brink, Vice President, State Government Affairs

November 16, 2022

ALLIANCE
FOR AUTOMOTIVE
INNOVATION

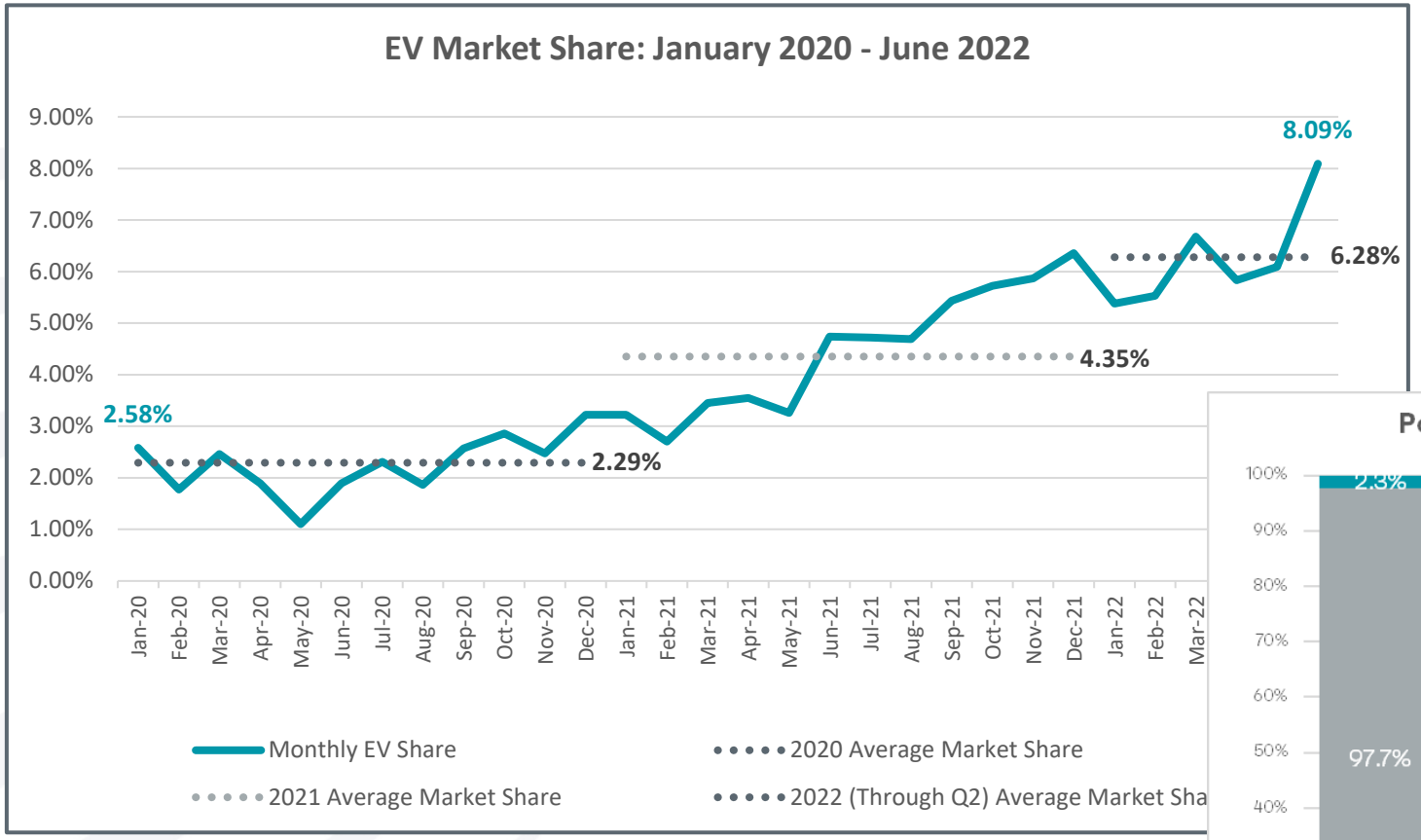
Our Members

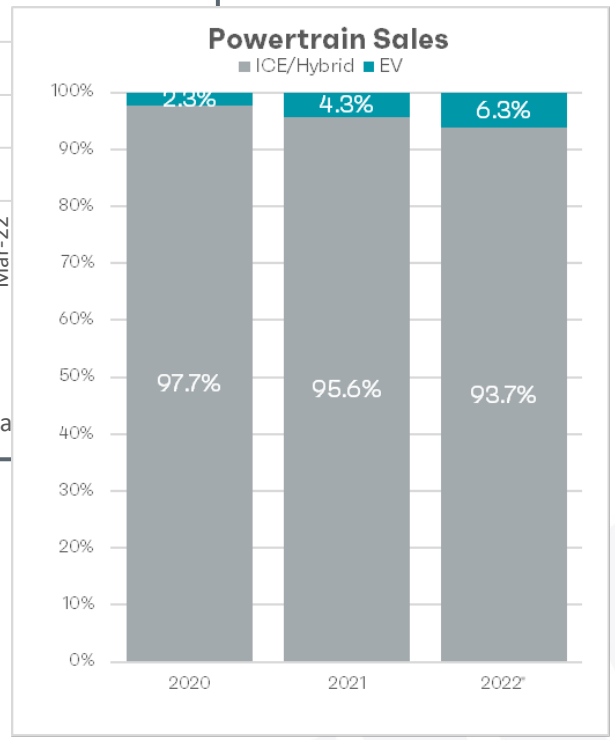

AISIN GROUP
APTIV
ARGO AI
Autoliv
BMW GROUP
BOSCH
cruise
DENSO
Ferrari
Ford
GHOST
gm
HARMAN
A SAMSUNG COMPANY
HONDA
HYUNDAI
Infineon
intel
ISUZU
JAGUAR
LAND ROVER
KIA
LUMINAR
MAGNA
mazda
Mercedes-Benz
MITSUBISHI MOTORS
NISSAN
nuro
NXP
Panasonic
PORSCHE
Qualcomm
RV INDUSTRY ASSOCIATION
SiriusXM
CONNECTED VEHICLE SERVICES
STELLANTIS
SUBARU
SUZUKI
Texas Instruments
TOYOTA
VOLKSWAGEN
GROUP OF AMERICA
VOLVO

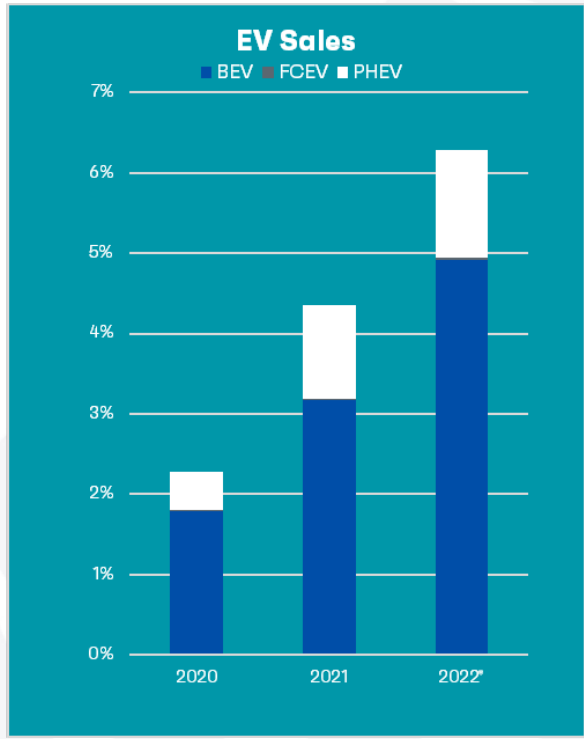
The industry is undergoing a tectonic transformation, which will impact workers, consumers, the economy and society

ALLIANCE FOR AUTOMOTIVE INNOVATION

EV Market Landscape

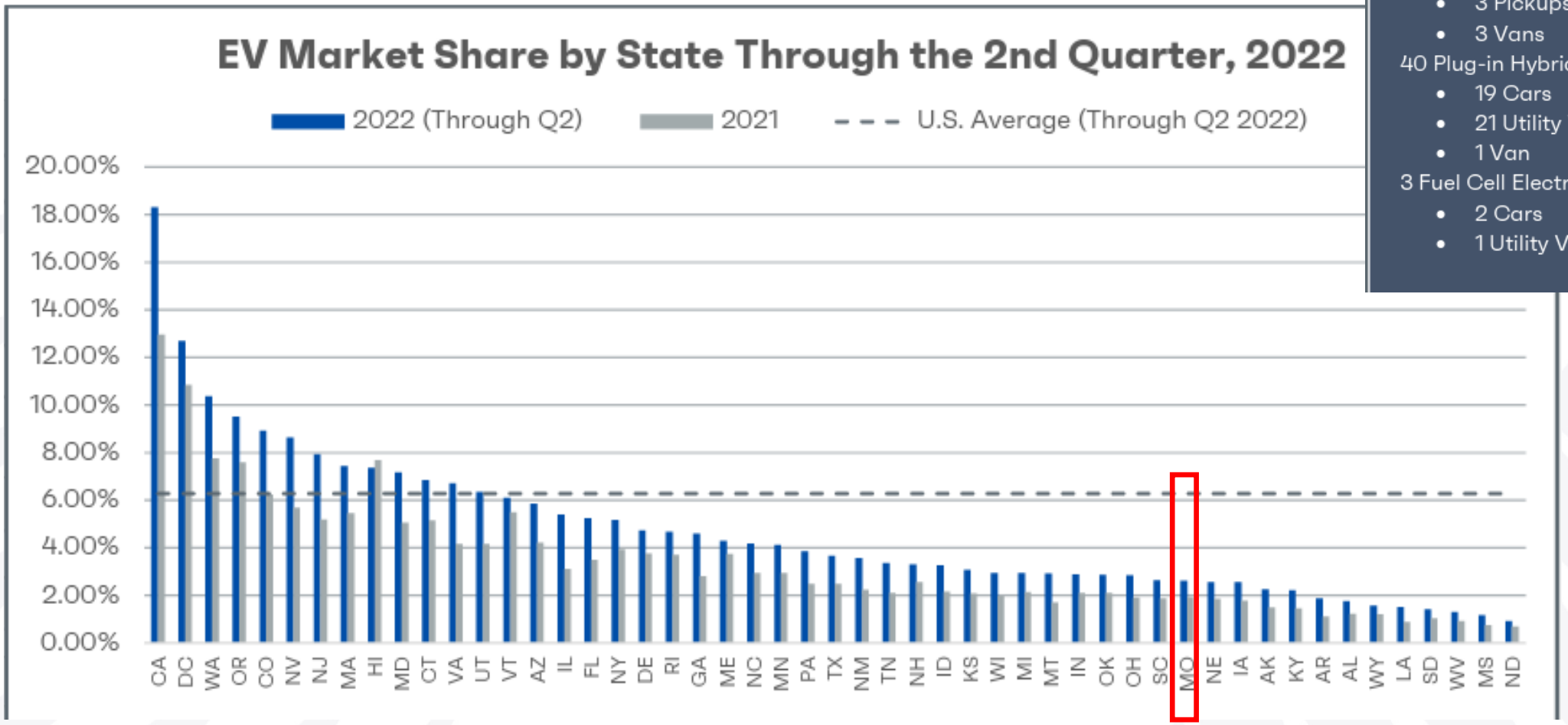






ALLIANCE FOR AUTOMOTIVE INNOVATION

EV Market Share by State



EV Model Availability

83 Vehicle Models Sold in Q2 2022:

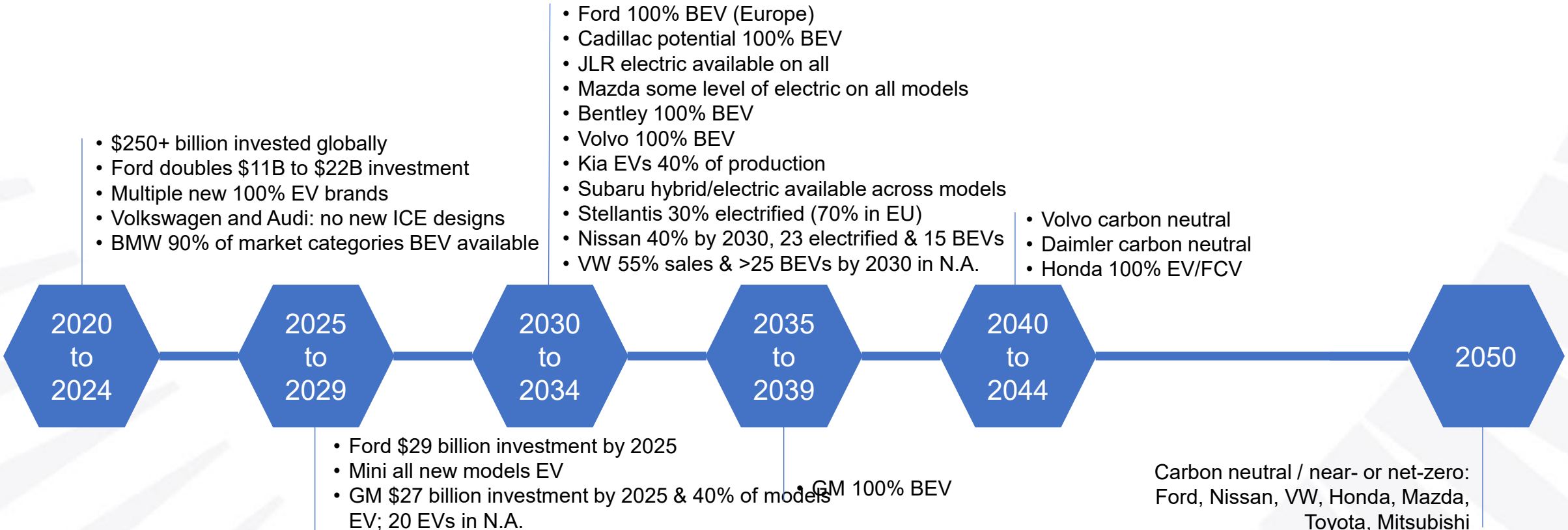
40 Battery Electric Vehicles
- 15 Cars
- 19 Utility Vehicles
- 3 Pickups
- 3 Vans

40 Plug-in Hybrid Vehicles
- 19 Cars
- 21 Utility Vehicles
- 1 Van

3 Fuel Cell Electric Vehicles
- 2 Cars
- 1 Utility Vehicle

First Half of 2022, New Light-Duty Vehicle Registrations By Powertrain					Change In Market Share (H1 2022 vs H1 2021), New Light-Duty Vehicle Registrations Powertrain			
State	Advanced Powertrain Market Share				Advanced Powertrain Market Share (Percentage Point Change)			
	PHEV	BEV	FCEV	ZEV	PHEV	BEV	FCEV	ZEV
MN*	1.06%	3.06%	0.00%	4.12%	0.36	1.26	0.00	1.62
MO	0.85%	1.76%	0.00%	2.61%	0.39	0.71	0.00	1.10
MS	0.36%	0.81%	0.00%	1.17%	0.15	0.50	0.00	0.64
MT	0.81%	2.11%	0.00%	2.92%	0.42	1.43	0.00	1.84
NC	0.94%	3.24%	0.00%	4.18%	0.29	1.51	0.00	1.80
ND	0.27%	0.65%	0.00%	0.92%	0.04	0.35	0.00	0.38
NE	0.91%	1.65%	0.00%	2.57%	0.28	0.71	0.00	0.99
NH	1.22%	2.08%	0.00%	3.30%	0.26	0.85	0.00	1.12
NJ*	1.64%	6.29%	0.00%	7.93%	0.61	3.59	0.00	4.21
NM	0.87%	2.69%	0.00%	3.57%	0.27	1.50	0.00	1.77
NV*	1.41%	7.23%	0.00%	8.64%	0.53	3.88	0.00	4.41
NY*	1.83%	3.33%	0.00%	5.16%	0.37	1.41	0.00	1.79
OH	0.76%	2.07%	0.00%	2.84%	0.27	0.98	0.00	1.25
OK	1.36%	1.50%	0.00%	2.86%	1.22	1.01	0.00	2.22
OR*	3.02%	6.49%	0.00%	9.51%	0.81	2.42	0.00	3.23
PA	1.04%	2.82%	0.00%	3.85%	0.36	1.45	0.00	1.81
RI*	1.91%	2.76%	0.00%	4.67%	0.62	0.99	0.00	1.60
SC	0.82%	1.83%	0.00%	2.64%	0.33	0.85	0.00	1.18
SD	0.53%	0.89%	0.00%	1.42%	0.12	0.42	0.00	0.54
TN	0.78%	2.59%	0.00%	3.36%	0.37	1.42	0.00	1.78
TX	0.62%	3.04%	0.00%	3.67%	0.22	1.58	0.00	1.80
UT	1.23%	5.12%	0.00%	6.35%	0.47	2.96	0.00	3.44
VA*	1.55%	5.17%	0.00%	6.71%	0.60	2.84	0.00	3.44
VT*	2.64%	3.46%	0.00%	6.10%	0.46	0.81	0.00	1.28

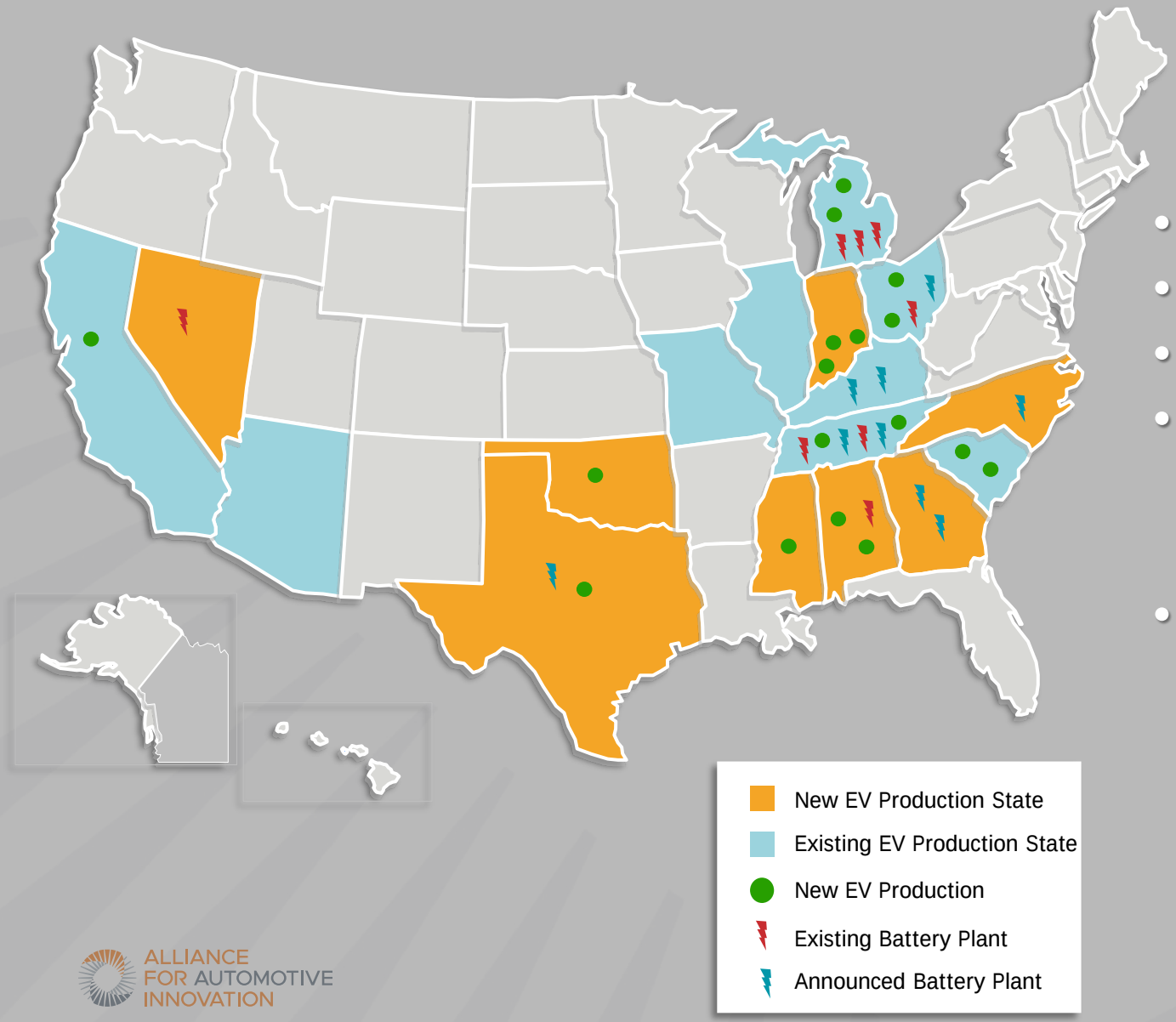
Automaker Announcements, Goals, and Aspirations



ALLIANCE FOR AUTOMOTIVE INNOVATION

Source: Compilation of public announcements, media articles, etc.

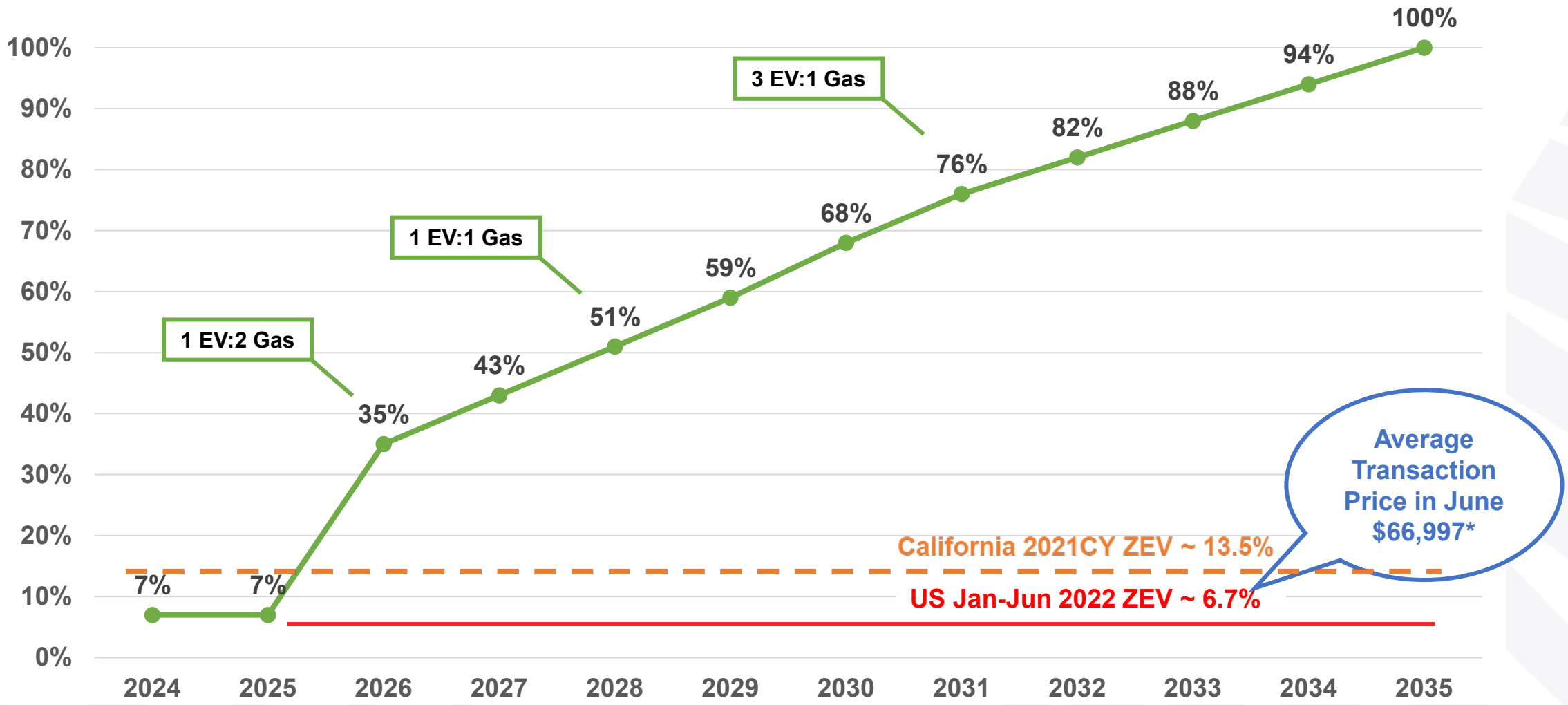
The Future Is Electric



- $91.8 Billion U.S. EV Investment
- $515 Billion Global EV Investment
- 78 Electrified Models in the U.S.
- Battery plant manufacturing capacity set to grow 383% by 2025
- More than 4 Million electric vehicles produced by 2023

ALLIANCE FOR AUTOMOTIVE INNOVATION

California ACC II – ZEV Mandate



ALLIANCE FOR AUTOMOTIVE INNOVATION

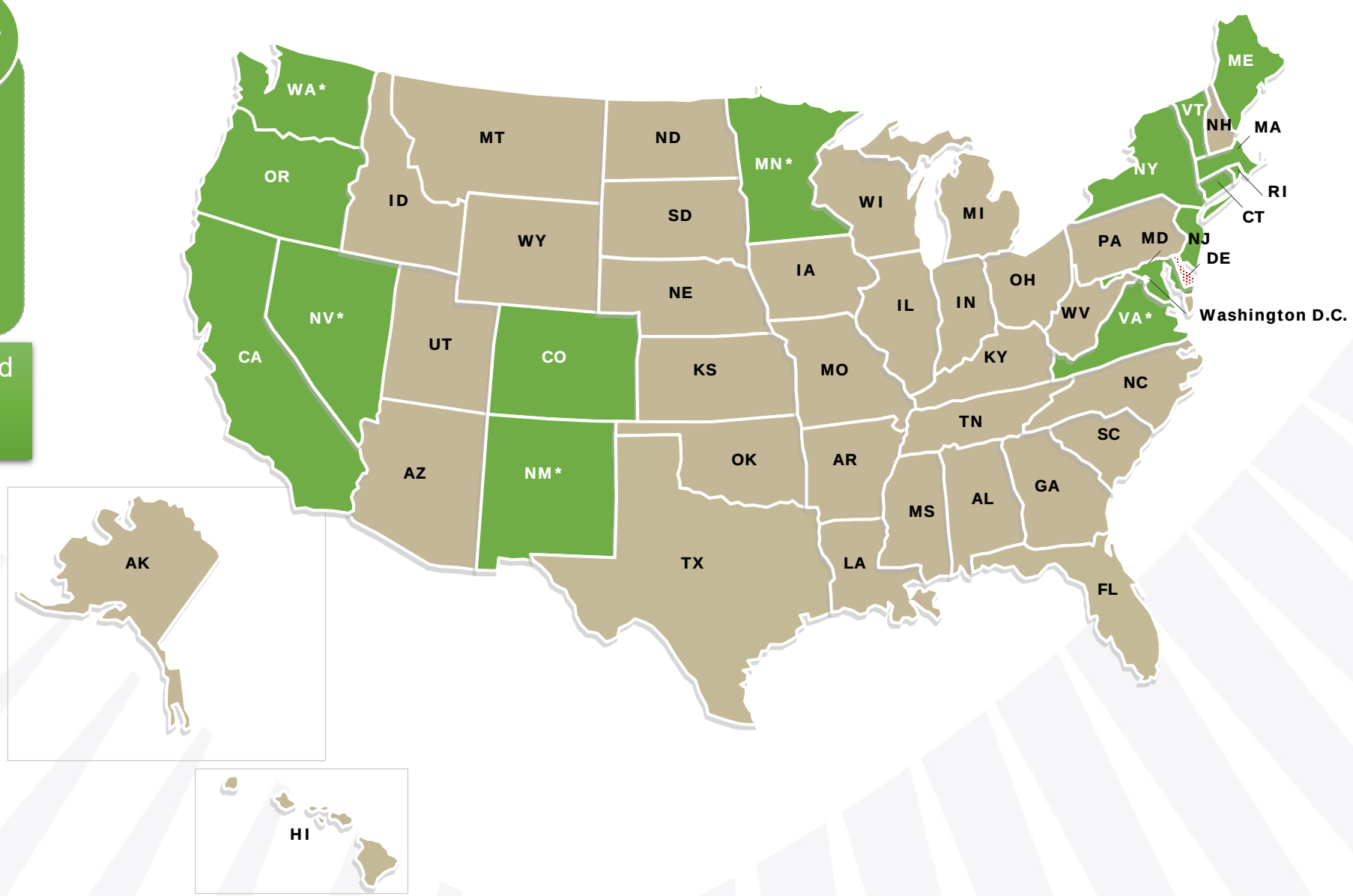
* See, https://mediaroom.kbb.com/2022-07-12-New-Vehicle-Prices-Set-a-Record-in-June,-According-to-Kelley-Blue-Book,-as-Luxury-Share-Hits-New-High

ZEV States (~ 35% of U.S. Market)

16 Existing ZEV States*

- CA
- CO
- CT
- MA
- MD
- ME
- MN*
- NJ
- NM*
- NY
- NV*
- OR
- RI
- VA*
- VT
- WA*

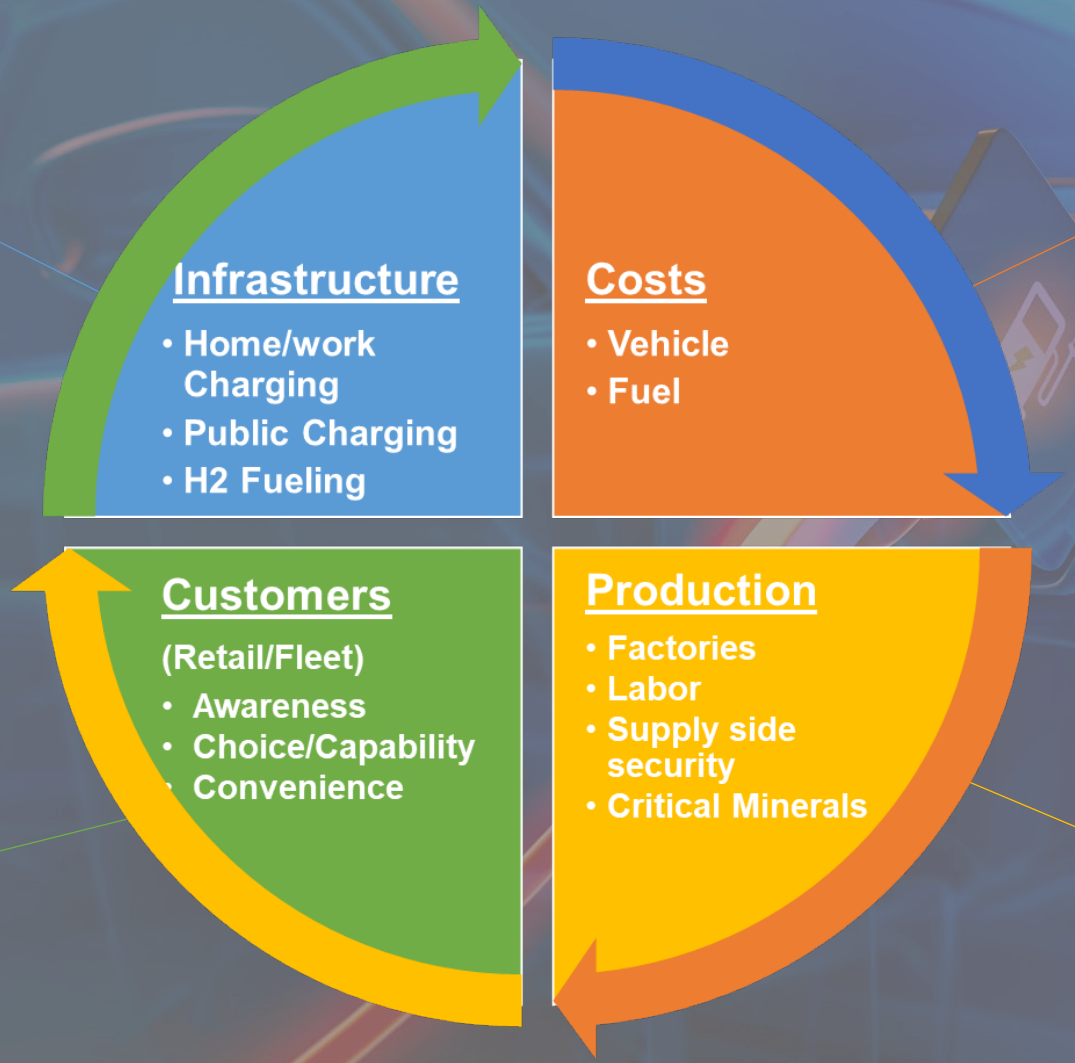
Most of these states will need to officially adopt ACC II or revert to Federal standards.



ALLIANCE FOR AUTOMOTIVE INNOVATION

Keys to Expanded Electric Vehicle Adoption

- Convenient, easy to use, everywhere
- Building codes
- Grid resiliency
- Top reason to reject an EV “nowhere to charge”



- 130+ models by 2025
- EVs still expensive - incentives help bridge the gap
- Fuel – Low Carbon Fuel Standard (LCFS)

- Buy-in from all new vehicle purchasers
- Prioritize LMI communities
- State fleets – lead by example

- Automakers investing $500 billion by 2030
- Building a new global supply chain from scratch, hundreds of factories.

Conditions Needed for ZEV Success

ALLIANCE FOR AUTOMOTIVE INNOVATION

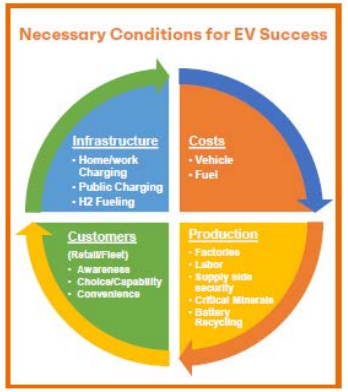
THE FUTURE IS ELECTRIC: LET'S DRIVE THERE TOGETHER

Automakers are planning to invest $330 billion in electrification by 2025, and IHS Markit predicts there will be 130 electric vehicle (EV) (EVs include fuel cell, battery, and plug-in hybrid electric vehicles (FCEV, BEV, and PHEV, respectively) models available in the U.S. by 2026.

Yet today, of the 278 million light-duty vehicles registered in the U.S., only 1.5 million are electric. Although consumer interest continues to grow, and more than 50 EV models were for sale last year, EVs only made up roughly 2% of new vehicle sales – or approximately 300,000 vehicles out of the 14.5 million vehicles sold in 2020.

So, while the vehicles are coming, there's a lot more to do to encourage customers to buy electric and to prepare the market for ever greater numbers of EVs. Here are the programs and policies states can start putting in place today to achieve a zero-emission transportation future:

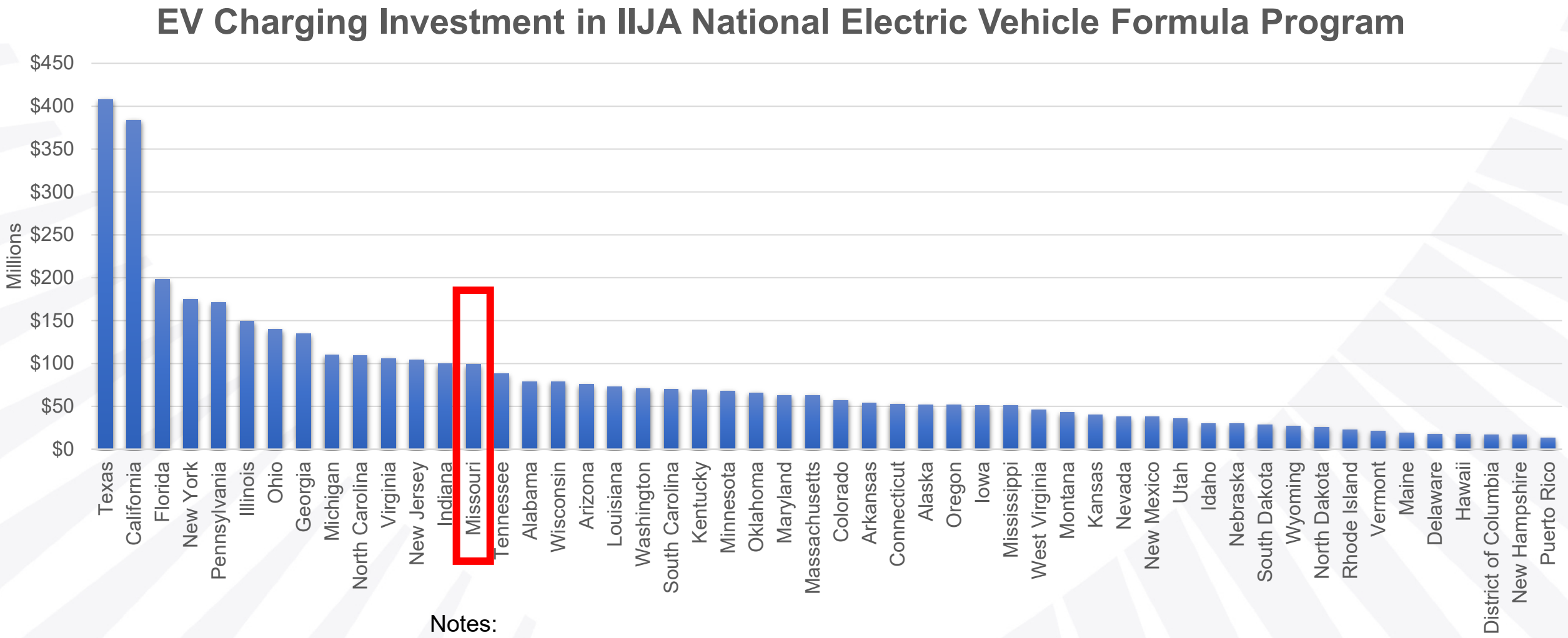
- Lead by example. Prioritize EVs for state fleet purchases
- Expand EV refueling infrastructure: charging and hydrogen refueling stations
- Sustain well-funded state-level point-of-sale EV incentives
- Update building codes for new construction and retrofits to require EV-ready charging
- Ensure the low-moderate income (LMI) community has access to EVs and charging infrastructure
- Assess the resiliency of state's electric grid
- Prioritize affordable electricity rates for recharging EVs
- Implement a low carbon fuel standard (LCFS)
- Initiate or participate in a consumer awareness campaign



Public, Non-Proprietary Charging Outlets And Registerd EVs (as of 6/30/2022)									
	EV Level 2	EV DC Fast	H2** Fueling	Total	Percent EVs of Total VIO***	Share of Registered EVs****	EVs Per Charger	Additional Chargers Needed to Support 25% EV VIO*****	EVs Per 10K Residents
AK	59	11	-	70	0.35%	0.08%	28.60	20,318	27.15
AL	400	50	-	450	0.19%	0.36%	21.08	182,015	19.40
AR	394	28	-	422	0.18%	0.19%	11.55	98,841	16.18
AZ	1,617	132	-	1,749	1.00%	2.67%	39.79	245,645	97.04
CA*	27,461	3,138	53	30,652	3.15%	37.93%	32.29	1,092,924	250.20
CO*	2,886	366	-	3,252	1.15%	2.39%	19.16	189,743	109.41
CT*	882	90	-	972	0.87%	0.99%	26.54	104,839	72.21
DC	642	19	-	661	2.01%	0.27%	10.52	11,675	98.97
DE	181	21	-	202	0.66%	0.23%	29.65	32,300	61.92
FL	4,545	449	-	4,994	0.85%	6.00%	31.36	6,251	73.54
GA	2,856	328	-	3,184	0.59%	2.13%	17.49	331,526	52.94
HI	684	41	1	726	1.77%	0.80%	28.78	41,490	147.10
IA	364	101	-	465	0.26%	0.32%	17.99	113,253	26.51
ID	161	33	-	194	0.37%	0.28%	37.84	70,298	41.85
IL	1,773	198	-	1,971	0.64%	2.49%	33.02	360,639	51.08
IN	535	63	-	598	0.33%	0.79%	34.26	219,020	30.61
KS	826	46	-	872	0.32%	0.35%	10.50	102,051	31.46
KY	402	25	-	427	0.21%	0.33%	20.42	145,995	19.51
LA	247	20	-	267	0.17%	0.25%	24.16	136,318	13.84
MA*	4,338	171	-	4,509	1.11%	2.31%	13.38	190,132	87.40
MD*	2,557	356	-	2,913	1.00%	1.96%	17.53	178,786	84.49
ME*	556	49	-	605	0.64%	0.32%	13.99	46,923	63.22
MI	1,687	224	-	1,911	0.56%	1.83%	25.02	302,547	47.83
MN*	941	85	-	1,026	0.53%	1.04%	26.47	183,445	48.40
MO	1,795	88	-	1,883	0.35%	0.75%	10.43	199,029	32.07
MS	169	13	-	182	0.10%	0.11%	16.46	106,820	10.03
MT	108	26	-	134	0.23%	0.13%	25.93	53,522	32.70
NC	1,840	180	-	2,020	0.49%	1.81%	23.36	338,477	45.44
ND	98	19	-	117	0.12%	0.04%	7.83	28,131	12.05
NE	302	45	-	347	0.27%	0.22%	16.24	74,418	29.22
NH	234	31	-	265	0.66%	0.34%	33.14	47,471	64.75

ALLIANCE FOR AUTOMOTIVE INNOVATION

State EV Charging Funding through National Electric Vehicle Formula Program



Notes:

- Values rounded to the nearest $million.
- Does not take into account $2.5B for competitive grants.
- Source - White House Fact Sheets

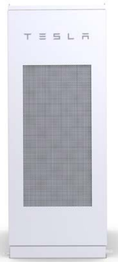
ALLIANCE FOR AUTOMOTIVE INNOVATION

ALLIANCE FOR AUTOMOTIVE INNOVATION

Transforming Personal Mobility


TESLA

PRODUCT SUITE



Vehicles | Semi | Charging | Solar | Powerwall | Powerpack | Software

T E S L A C H A R G I N G

Supercharging

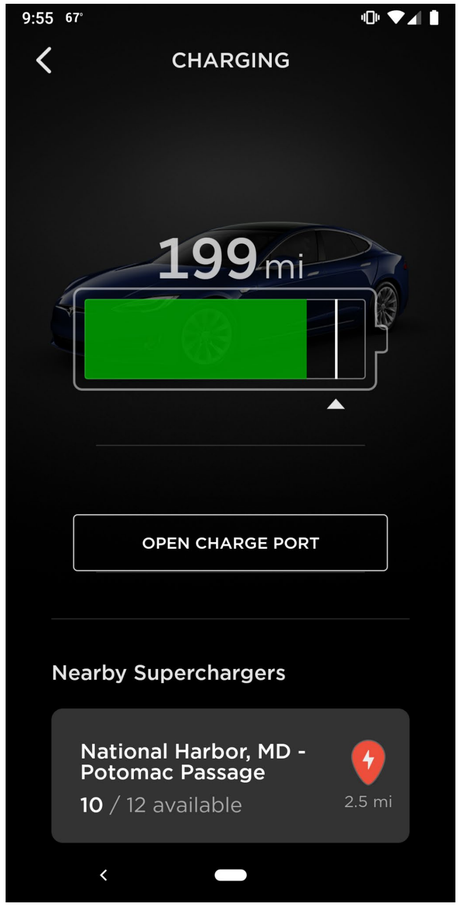
Destination Charging

Where You Park

TESLA CHARGING EQUIPMENT

	Supercharger V3 (250 kW)	Supercharger V2 (150kW)	Supercharger (72kW)	Wall Connector
				
Max Output Power	250 kW	120 kW	72 kW	7-17 kW
Typical Charge Time	20-30 minutes	30-40 minutes	50 minutes	4-8 hours
Target Use Case	Long Distance	Long Distance	Urban Fast Charging	Destination Charging (Public + Work + Home)

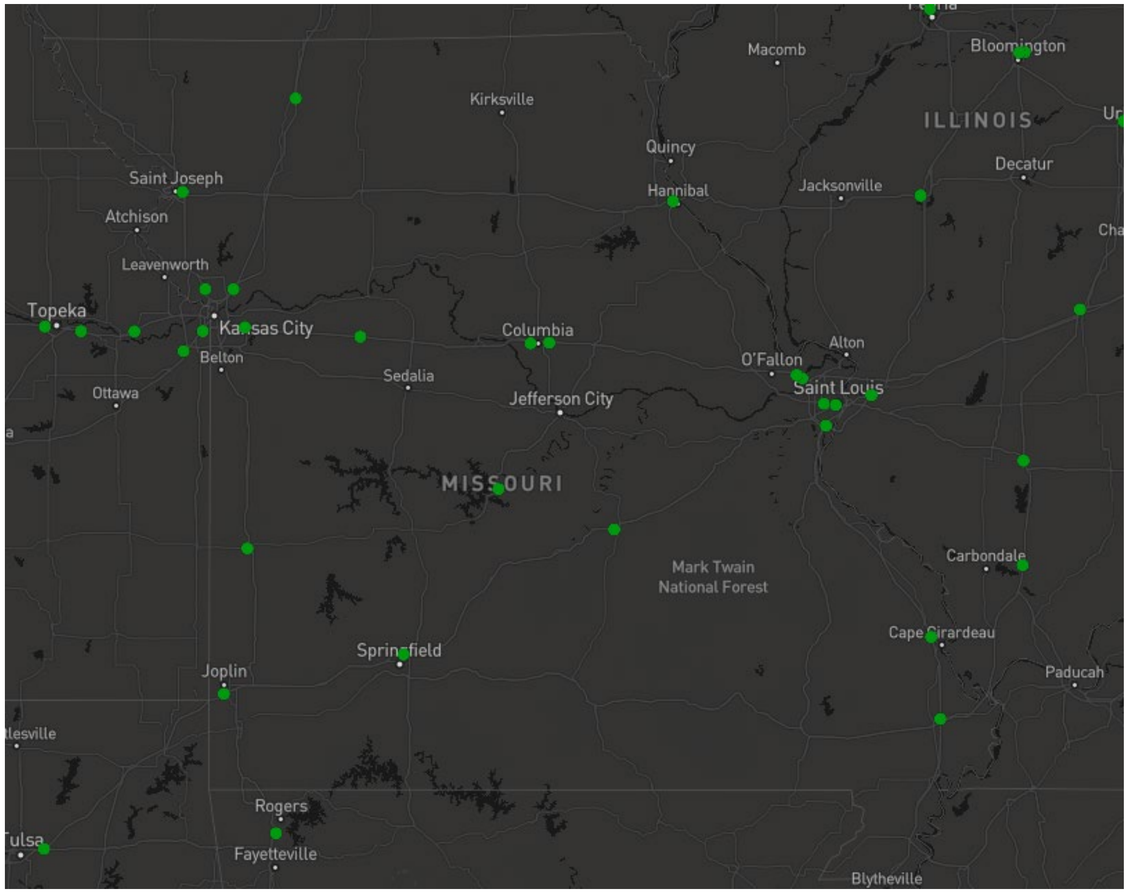
CUSTOMER EXPERIENCE



Missouri HB 355 (2019): *The term "electrical corporation shall not include: (c) Persons or corporations not otherwise engaged in the production or sale of electricity at wholesale or retail that sell, lease, own, control, operate, or manage one or more electric vehicle charging stations;*

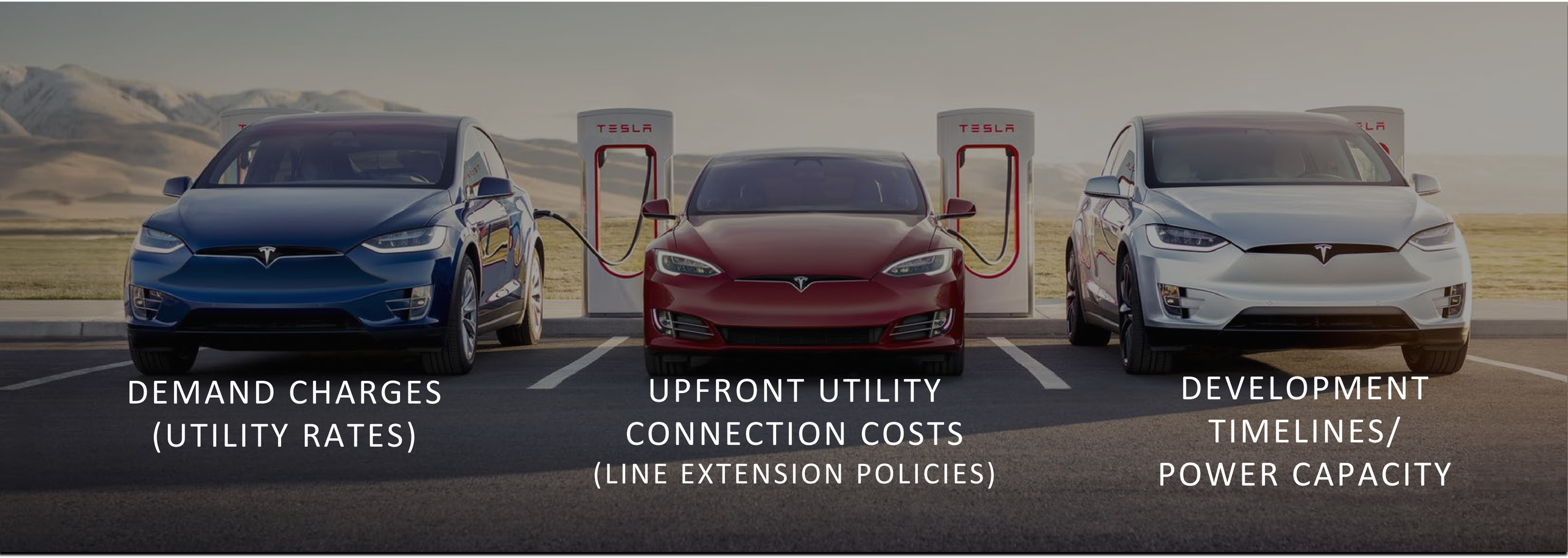
TESLA'S MISSOURI FOOTPRINT

Site Location (21 sites)	Supercharger Connectors
Bethany, MO	6
Brentwood, MO	12
Cape Girardeau, MO	8
Columbia, MO	8
Columbia, MO - West Broadway	12
Concordia, MO	8
Hannibal, MO	8
Independence, MO	6
Joplin, MO - South Main Street	8
Kansas City, MO	8
Liberty, MO	8
Mehlville, MO	10
Miner, MO	8
Nevada, MO	8
Osage Beach, MO	8
Rolla, MO	8
Saint Louis, MO	12
Springfield, MO	8
St. Charles, MO	5
St. Charles, MO - Beale Street	12
St. Joseph, MO	8
Grand Total	179



TRANSPORTATION-ELECTRIC UTILITY NEXUS

THREE BIGGEST BARRIERS TO EV CHARGER DEPLOYMENT



DEMAND CHARGES
(UTILITY RATES)

UPFRONT UTILITY
CONNECTION COSTS
(LINE EXTENSION POLICIES)

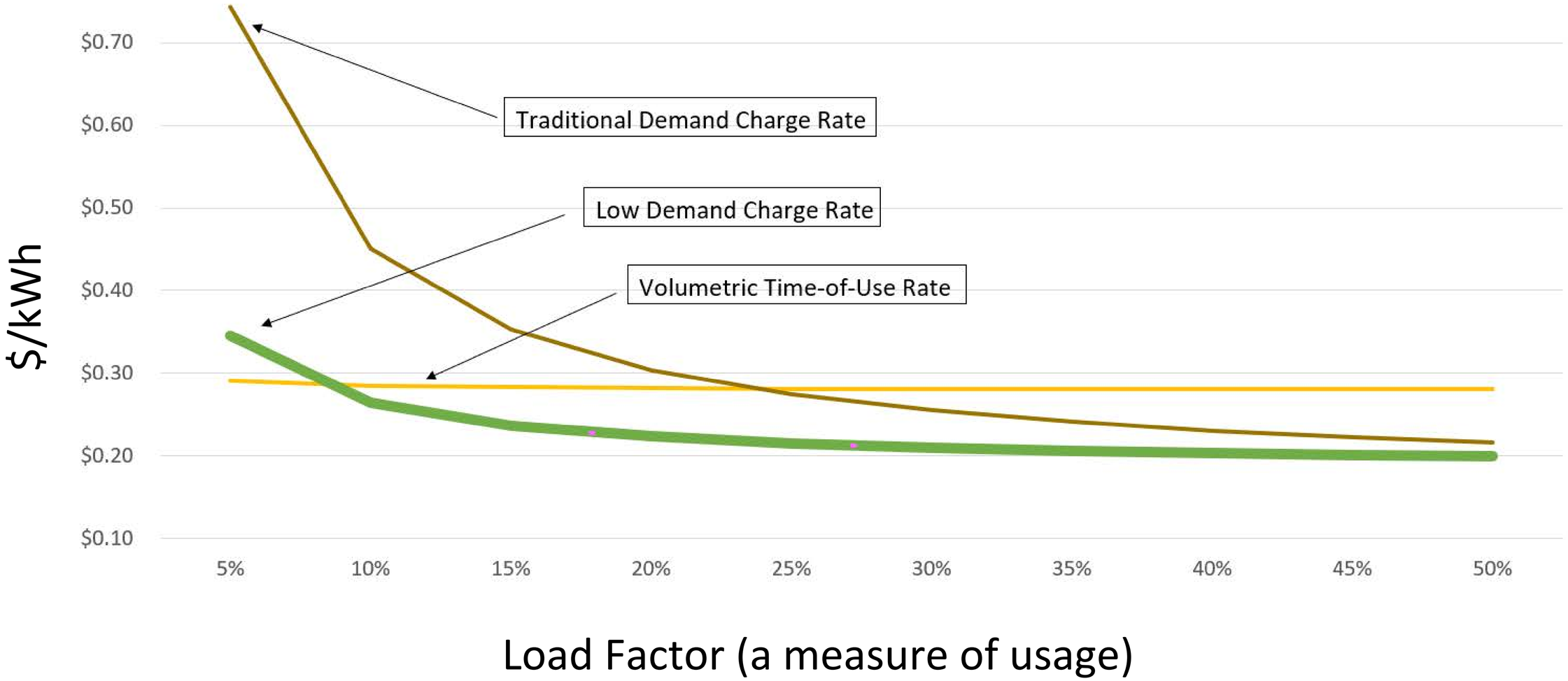
DEVELOPMENT
TIMELINES/
POWER CAPACITY

UTILITY RATES – DEMAND CHARGES CAN BE PUNITIVE

- Demand Charges – Why are these a barrier?
  - Based on max monthly peak kW – charged on a $/kW basis
  - Can function like “fixed charges”
  - Low usage customers can pay extremely high $/kWh rates
  - Many EV charging customers are low load factor

- What’s the solution?
  - Volumetric EV Time-of-Use rates
  - Demand charge discounts or holidays
  - Rate limiters
  - Load factor based relief (i.e. demand charges are phased in over time)
  - Rates should be opt-in and available to new and existing chargers.

UTILITY RATES – PRICE PER KWH BY LOAD FACTOR



UTILITY RATES – EV RATE EXAMPLES

- Liberty Utilities (MO) – Rate CEV
  - 75% demand charge reduction

The Commercial Electric Vehicle Rate Pilot (Schedule CEV) establishes a reduced billing demand for subscribing customers, calculated as the customer's billing demand under the standard rate schedule, reduced by 75% of the billing demand contribution of the chargers deployed under Schedule CEV.

- Evergy (KS) – Business Electric Vehicle Charging Service (BEVCS)
  - Low demand charge rate with volumetric time-of-use charges.

BUSINESS EV CHARGING SERVICE

RATE FOR SERVICE

A.	Customer Charge (Per Month)		$ 105.97
B.	Facility Charge (Per kW of Billing Demand per month)		$ 3.069
C.	Energy Charge per Pricing Period (Per kWh)	Summer Season	Winter Season
	On-Peak Period	$0.17979	$0.11522
	Off-Peak Period	$0.08298	$0.05458
	Super Off-Peak Period	$0.02755	$0.02416
D.	Carbon Free Energy Option Charge (Per kWh)	$0.00250	

- Ameren (IL) – Rider EVCP
  - Rate limiter that phases back in demand charges over 10 years.

$$\text{Rate Limiter}\left(\$/\text{kWh}\right) = \frac{\text{Current Distribution Delivery Demand Charge \$/kW}}{\text{yearly effective load factor} * 730}$$

Where yearly effective load factor is in the following table:

Year	Yearly Effective Load Factor
2022	30%
2023	28%
2024	26%
2025	24%
2026	22%
2027	20%
2028	18%
2029	16%
2030	14%
2031	12%
2032	10%

LINE EXTENSION POLICIES – DETERMINE UPFRONT UTILITY COSTS

- Line Extension Policy – Why do these exist?
  - Incentivize new business
  - Help defer large upfront costs for new electric service
  - Existing line extension policies may not be adequate to support new EV charging customers

- What's the solution?
  - Adjustments to existing line extension policies
    - Should allow for 2nd services for EV charging to not be considered "excess facilities"
  - Make-Ready programs that help cover infrastructure for EV charging
  - Rebates/incentives

Ameren Missouri's Line Extension Policy

B. **DEFINITIONS**

Extension Allowance: An economically justifiable investment which may be made by the Company for distribution line extensions, service extensions, or a combination thereof, and uses the following formula:

$$\text{Extension Allowance} = \frac{\text{Marginal Revenue}}{\text{Cost of Service Factor}}$$

Marginal Revenue: The estimated average annual revenue measured over the first 5 years of life associated with the line extension project, less incremental energy, capacity, and marginal network and infrastructure support cost.

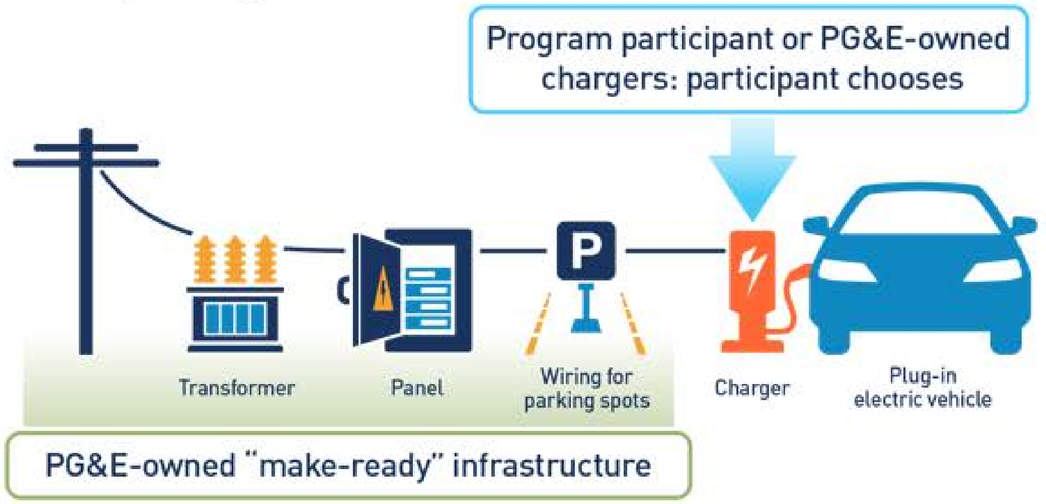
Cost of Service Factor: Comprised of the Company's cost of capital, cost of depreciation, property tax, state and federal income tax and insurance. The factor is applied to the Marginal Revenue to determine Ameren Missouri's Extension Allowance, and is determined from Ameren Missouri's most recent rate case proceeding and/or through a periodic review conducted by the Company.

Extension Charge: That portion of the total Extension Cost which is not covered by the Extension Allowance and for which the Customer is responsible.

Extension Charge = Extension Cost – Extension Allowance

LINE EXTENSION POLICIES– EV MAKE-READY PROGRAMS

- Utility side make-ready infrastructure (in front of the meter)
  - **Components:** utility service connection, transformer, conductor, connectors, and conduit up to and including the electric meter, civil construction work
- Customer side make-ready infrastructure (behind the meter)
  - **Components:** electrical panel, conduit, wiring



EV LINE EXTENSION POLICIES / EV MAKE-READY PROGRAMS

Ameren Illinois's Supplemental Line Extension Policy for EV Charging

SUPPLEMENTAL LINE EXTENSION PROVISIONS

Any stand-alone service point for a Non-Residential Customer that is primarily intended to provide power and energy to EVSE (non-EVSE will be equivalent to 10% or less of the connected kW load) will be eligible for supplemental line extension and service extension allowances. The supplemental allowance, if applicable, will be the greater of $300/kW of connected EVSE in kW or the otherwise applicable combined line extension and service extension provisions available to new Customers. Multifamily Facilities located in identified low or moderate income areas will receive an additional $200/ kW supplemental allowance, for a total of $500/ kW of connected EVSE in kW. Revenue test provisions are not applicable to Customers who receive the Supplemental Line Extension Provisions.

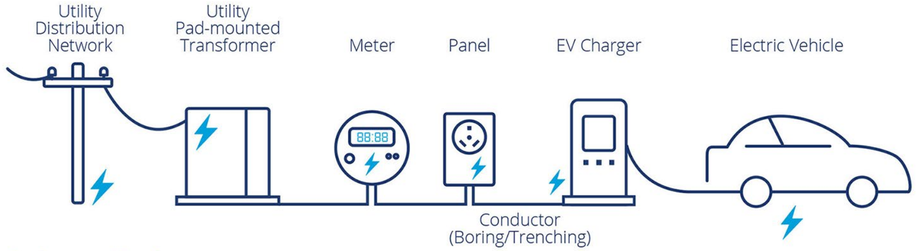
If the Customer chooses the supplemental allowance option, and the cost of the Line Extension exceeds the supplemental allowance, Customer will pay, in advance of construction, to the Company an amount equal to the difference between the actual cost and the supplemental allowance.

RECEIVED

100 kW x $300/kW = $30,000 allowance

Contribution in Aid of Construction vs Make-Ready Infrastructure

Figure 12: Models of Utility Investment in EV Charging Infrastructure



Source: M.J. Bradley & Associates, 2019.

DEVELOPMENT TIMELINES / POWER CAPACITY

- Development Timelines – How do we accelerate deployment?
  - Where is power available?
  - What is the longest step of the development process?
  - Should easements be treated differently for EV chargers?
  - Should EV charging projects have to submit full projects for feasibility?
  - Are there permitting barriers?

- Ideas for possible solutions
  - Capacity maps
  - Clear utility process for EV charging projects
  - Provide feasibility pathway without having to submit full new service application.
  - EV charging specific easement that takes into consideration specific use case while still ensuring utility's necessary land rights and access.
    - Explore term limited easements or can access language be included in lease agreements?

POLICY RECOMMENDATIONS

- Provide EV charging utility rate options in all territories.
- Favorable line-extension policies for new EV charging infrastructure deployments.
- Simple pathway by which to understand project site feasibility by working closely with utility.
- These policy recommendations will help complement the NEVI program by providing an environment friendly to sustainable EV charging infrastructure deployment in the state.

Thank You / Questions

Electric Vehicle Task Force

APPENDIX 9

MISSOURI DEPARTMENT OF REVENUE

ELECTRIC VEHICLES

A discussion with members of

The Missouri EV Task Force

ENTERPRISE HOLDINGS™

Alamo®

enterprise

National®

enterprise FLEET MANAGEMENT

ENTERPRISE HOLDINGS®

Alamo

enterprise

National

enterprise rent-a-car

enterprise CarShare

enterprise car sales

enterprise truck rental

COMMUTE with enterprise

enterprise CarClub

EXOTIC CAR COLLECTION by enterprise

enterprise FLEX-E-RENT

Subscribe with enterprise

MARKET TRAJECTORY

- **VW/Audi** – End of new ICE models
- **JLR** – 100% EV by 2025
- **GM** - $35B investment in EV/AV by 2025; 40% EVs in product portfolio; 30 new EV models globally, 20 in NA
- **Stellantis** - $30B EV investment by 2025

Now-2025

2025-2030

- **Ford** – 100% Plug-in LDV in Europe by 2026 and all BEV by 2030
- **Cadillac** – 100% EV by 2030
- **Chrysler** – 100% BEV by 2028
- **Stellantis** – 70% Low Emission in Europe, 40% in US by 2030
- **Bentley** – 100% EV by 2030

2030-2035

- **Volvo** – 100% BEV by 2030
- **Subaru** – 100% EV by 2030
- **GM** – 100% BEV by 2035
- **Lexus** – 100% EV by 2035
- **JLR** – 100% EV by 2035
- **MB** – No ICE in major markets by 2035
- **Honda** – 40% BEV and FCEV in major markets by 2030; 80% by 2035

Source: S&P Global Mobility Global Market Compliance and Sustainability Outlooks

EVs AND ENTERPRISE

Our pace of adoption will vary across our diverse range of businesses.

enterprise FLEET MANAGEMENT

enterprise rent-a-car

enterprise CarShare

enterprise car sales

enterprise truck rental

COMMUTE with enterprise

enterprise CarClub

EXOTIC CAR COLLECTION by enterprise

enterprise flex-e-rent

DISTINCT OPERATING CONDITIONS

	AIRPORT	HOME CITY
Operating Conditions	- Business and leisure travelers - High rent/return volume - Critical turnaround time - State of charge unknowns	- Insurance replacement, retail, business - Lower rent/return volume - Some distributed returns - Longer length of rental
Facility Features	- Footprint can change - Grade-level and garaged - Concessionaire to airport - Requires immediate planning for grid impacts	- Smaller but static footprint - Grade level, stand-alone - Leased and owned - Grid impacts are less impactful
Customer Experience	- Convenient, predictable and safe charging while on-rent - EV suitability and customer comfort level	

A PARTNERSHIP APPROACH

Working with partners and stakeholders in public, private and public-private efforts to promote the transition to EVs.

- City, state and federal officials
- Electric utilities
- Infrastructure providers
- Charge point operators

EHI POSITIONS

"Removal or mitigation of barriers to electric vehicle charging, including strategies, such as time-of-use rates, to reduce operating costs for current and future electric vehicle owners without shifting costs to electric ratepayers who do not own or operate electric vehicles;"

EHI is partnering closely with leading electric utilities to understand feasible technology and rate design principles that enable EV adoption while balancing rate payer impacts

"Strategies for managing electric vehicle grid impacts and beneficial services supporting the electric transmission and distribution system;"

EHI expects construction of necessary grid infrastructure to support large scale electric vehicle adoption to be a challenge. We are actively working with the utility industry to be proactive in planning so that infrastructure may proceed the vehicles.

"Electric system benefits and costs of electric vehicle charging, electric utility planning for electric vehicle charging, and rate design for electric vehicle charging;"

EHI will be working with the electric utility industry closely to understand different rate design principles that apply to varying charging scenarios such as managed charging and TOU rates.

EHI POSITIONS

"What safety standards should apply to the charging of electric vehicles;"

EHI recommends adherence to electric codes and certifications by nationally-recognized testing laboratories, installation by qualified, licensed electricians, and an operations and maintenance schedule that ensures safe, reliable operation which is key to customer satisfaction and safety

"The recommended billing and complaint procedures for charging stations;"

EHI recommends network reliability standards for uptime and repair. We consider this an indispensable element to avoid risks to EV adoption, resulting from a failure of built infrastructure to provide the level of availability and operability as a critical energy resource to the public.

"Options to address how electric vehicle users pay toward the cost of maintaining the state's transportation infrastructure, including methods to assess the impact of electric vehicles on that infrastructure and how to calculate a charge based on that impact, the potential assessment of a charge to electric vehicles as a rate per kilowatt hour delivered to an electric vehicle, varying such per-kilowatt-hour charge by size and type of electric vehicle, and phasing in such per-kilowatt-hour charge;
"

Determining how to continue to support road funding as the transition to EVs disrupts the gas tax funding stream will be critically important. This deserves an on-going discussion among diverse stakeholders to ensure we do this right. A few principles we would suggest include the need for any funding mechanism to be equitable and allocated based largely on road usage.


THANK YOU
ENTERPRISE HOLDINGS
Alamo
enterprise
National

Electric Vehicle Task Force

APPENDIX 10

MISSOURI DEPARTMENT OF REVENUE

MoDOT

105 West Capitol Avenue
P.O. Box 270
Jefferson City, Missouri 65102

Missouri Department of Transportation
Patrick K. McKenna, Director

1.888.ASK MODOT (275.6636)

December 7, 2022

Zachary Wyatt
Chairman, Electric Vehicle Task Force
Missouri Department of Revenue
301 West High Street
Jefferson City, MO 65101

Dear Chairman Wyatt,

As required in Senate Bill 262, an Electric Vehicle (EV) Task Force was formed with the goal of bringing together energy and policy leaders from both the private and public sectors to analyze and make recommendations regarding the impact of electric vehicles adoption on Missouri's transportation funding. The task force has been meeting since summer of 2022 and has heard from various subject matter experts regarding EV charging stations, adoption of electric vehicles and the impacts of how the transportation system is funded.

In November a draft report was provided to the task force members for initial review and comment. The final report and recommendations are due to the Missouri Legislative body no later than December 31, 2022. It is our opinion this complex and novel subject matter deserves further study and analysis prior to developing a final report and policy recommendations.

Through no fault of this task force, there is not yet enough available data to draw meaningful conclusions and policy guidance for the public installation and administration of EV charging stations. There are three primary areas of concern we see that need additional vetting regarding EV charging stations: accurate measurement and fee assessment of electricity flow during charging, safety policies at EV charging stations and technology security for both EV and charging equipment. First, there is no accurate field instrument to measure electricity flow of level 3 DC Fast chargers to assign a fee by kWh. This may create a disparate impact for users who pay a fee at the EV charging stations and does not allow the state to levy a fee at parity with the gas tax. In 2023 The National Institute of Standards and Technology, Conference of Weights and Measures has scheduled research to resolve the issue of measuring flow of DC fast chargers among other EV charging related ambiguities. The second and third areas that require additional study are safety and security of charging stations. This initially unregulated type of fueling technology has left states to reactively implement policies regarding implementation of safety and security features related to electric vehicle charging equipment. With the continued deployment of the National Electric Vehicle Infrastructure (NEVI) program, there will be additional research and best practices to build sound policy around the growing network of electric vehicle charging stations in Missouri.

According to an August 2022 Fuels Institute report on EV Charger Deployment Optimization, the geographic distribution and adoption of electric vehicles is uneven across the country. California leads the nation for EV growth and has been designated a #1 priority for installation of equipment to support EVs. By contrast, the State of Missouri (among many other states) has been designated a #4 priority, the lowest designation for installation of EV stations. It would be prudent for Missouri to allow the market to drive the demand of this new technology and take advantage of the ongoing policy and technical research before landing on policy recommendation.

As such, MoDOT recommends an extension of the EV Task Force into 2023 with the goal capitalize on planned studies, emerging best practices and align with market conditions for a right sized approach of EV charging stations in Missouri.

Please accept my gratitude for your efforts throughout the study period and those of the other task force members, including Elizabeth Prestwood from MoDOT. There is more to learn as this market develops and MoDOT appreciates the opportunity to participate in ongoing study, should it be recommended and authorized.

Sincerely,

Patrick K. McKenna
Director

Electric Vehicle Task Force

APPENDIX 11

MISSOURI DEPARTMENT OF REVENUE

Electric Vehicle Task Force

REQUEST FROM THE MISSOURI PETROLEUM AND CONVENIENCE ASSOCIATION

1. Equal Taxation and Regulation. EV, EV charging stations (EVCS), and electricity must be taxed and regulated exactly the same as all other motor vehicles and motor fuels - diesel, gasoline, natural gas (CNG and LNG), hydrogen, propane, etc.

2. No Unfair Competition. Utilities are government created and regulated monopolies, often with a guaranteed rate of return. Thus, it is fundamentally unfair for government and utilities to be allowed to compete in the free market against private sector motor fuel producers and retailers.

▶No Rate Basing. MPCA opposes monthly utility ratepayers being forced in any way to pay for or subsidize, either directly or indirectly, any portion of any EV charging station including the electricity, lines, infrastructure, construction, land, or ongoing costs.

This is often referred to as including EV charging stations into the "rate base" and would allow utilities to socialize the costs and risks of competing in the private sector retail motor fuel market as well as the construction and costs associated with EV charging stations.

Monthly utility ratepayers should not be paying for charging stations so that the rich can more easily charge their expensive Teslas.

▶No Demand or Peak Charges. MPCA opposes "demand charges" and "peak charges" applying to EVCS which would allow utilities to charge far more depending on usage and at certain times of the day.

MISSOURI DEPARTMENT OF REVENUE

3. Level & Fair Playing Field for All. MPCA believes in a fair and level playing field based upon free market principles.

If public utilities and government want to compete in the private sector retail motor fuel market, they should have to play by the exact same rules as other private sector motor fuel businesses.

4. Legislature Alone Should Set Public Policy. This important and far-reaching public policy issue - which will directly impact the economy, taxpayers, utility ratepayers, consumers, and the private sector retail motor fuel industry - should not be addressed by the Missouri Public Service Commission (PSC) or other unelected and unaccountable bureaucrats and should instead be addressed solely by the elected officials in the Missouri Legislature which represent the people of Missouri.