MISSOURI PUBLIC SERVICE COMMISSION

CORRECTED STAFF REPORT

A WORKING CASE REGARDING
ELECTRIC VEHICLE CHARGING FACILITIES

FILE NO. EW-2016-0123

AUGUST 9, 2016

JEFFERSON CITY, MISSOURI

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TABLE OF CONTENTS

I. Executive Summary

This report provides information related to whether the electric vehicle ("EV") charging station is a public utility service, and whether any entity other than a certificated electric utility can legally provide the service of charging EVs. This report will also provide the Commission with information related to cost recovery for the electric vehicle charging stations operated by regulated utilities. Lastly, the report provides Staff's conclusions and recommendations. In summary, Staff recommends the Commission recognize that it generally has jurisdiction over the EV charging stations and networks whether owned by a certificated electric utility or by third-party vendors. Where persons using EV charging stations are not charged for the service, Staff opposes recovery of cost of service from ratepayers. When ratepayer recovery of prudently incurred costs is appropriate, recovery should be limited to the useful life of the charging station, and should be adjusted to reflect tax credits and other non-ratepayer funding.

Introduction

On September 2, 2015, the Missouri Public Service Commission ("Commission") issued its *Report and Order* in Kansas City Power & Light Company's ("KCPL") rate case, Case No. ER-2014-0370. One of the disputed issues in that case was whether KCPL should be permitted to include the costs of installing and operating a network of EV charging stations, the Clean Charge Network ("Network"), in rate base as part of its revenue requirement. The Commission's order denied KCPL's request, but also established a working case to address the unresolved legal and long-term policy issues related to EV charging stations. This working docket was designed to facilitate the Commission's efforts to obtain input from interested stakeholders.

On November 20, 2015, the Commission issued its *Notice of New Proceeding*, opening File No. EW-2016-0123, captioned *In the Matter of a Working Case Regarding Electric*

Charging Facilities. On December 2, 2016, the Commission issued its *Order Opening a Working Case Regarding Electric Vehicle Charging Facilities*.

The Commission directed Staff to investigate and report on the legal and policy issues relating to the installation and operation of EV charging facilities, as well as the associated sale of electricity to EV owners. Specifically, Staff was ordered to consider and evaluate the opinions of relevant stakeholders and the experience of regulators in other jurisdictions. To assist in obtaining information, Staff filed a motion requesting the Commission to schedule a workshop, at which stakeholders could express their views. Staff held a workshop on May 25, 2016.

On January 20, 2016, the Commission issued a *Notice Scheduling Workshop and Requesting Responses*. The notice consisted of a draft workshop agenda and legal questions on policy and regulatory issues pertaining to EV charging facilities. Interested stakeholders submitted pertinent information in the Commission's Electronic Filing Information System ("EFIS") to assist Staff's investigation.

Staff reviewed the legal opinions submitted by the stakeholders and used the information to finalize the workshop agenda and develop questions for panel speakers at the workshop. The workshop facilitated conversations about ratepayer cost recovery and potential impacts to the local electric grid. Each presentation was submitted in EFIS for further review and analysis. Staff would like to thank all of the speakers and attendees of the workshop for their comments, contributions, presentations and submissions.

This report will provide a summary of the legal opinions submitted by stakeholders, information on the efforts of other states to promote EVs and to develop the infrastructure required to support the vehicles, and present Staff's legal analysis. The report will also describe

the current technologies available for charging EVs and the future of EV charging, such as wireless mobile charging. The report will address the potential environmental impacts of EV charging networks and the various ways the networks may be funded.

II. Legal Opinion Analysis: Stakeholder Comments

Stakeholders provided legal opinions, attached to this report as Appendix A, based on questions developed by Staff. Staff received a tremendous amount of information from the stakeholders. The opinions varied greatly from no cost recovery to full cost recovery of the expenses associated with the implementation of the network. There were also concerns voiced by the stakeholders about the negative impacts on the marketplace for EV charging stations.

On March 1, 2016, Ameren Missouri provided the following responses to the legal questions posed by Staff.

> ***1. What is the Missouri Public Service Commission's role in regulation of electricity from a charging station to an electric vehicle? Please provide legal justification for your response.***
> If electric vehicle charging is offered by a public utility, the Commission has full authority to regulate the service, including prescribing rates and rules for electricity from the charging station to an electric vehicle. *See State ex rel. Utility Consumers Council of Missouri v.Public Service Commission*, 585 S.W.2d 41, 49-49 (Mo. banc 1979) (the Commission has authority to supervise, regulate, and control public utilities within its jurisdiction).
>
> ***2. What is the Missouri Public Service Commission's role in regulation of electricity from a utility to a charging station? Please provide the legal justification for your response.***
> The Commission's role in regulating electricity from a utility to a charging station includes (i) determining what service terms and conditions should apply, (ii) determining what rate class and rate design are appropriate, and (iii) setting fair and reasonable rates for electricity the utility sells its retail customers, including electricity provided to vehicle charging stations.
>
> ***3. Are Investor Owned Utilities ("IOU") the only entities that can provide electricity to electric vehicles via a charging station? What other entity(ies) can provide electricity to electric vehicles via charging stations? Is the answer dependent on whether the entity(ies) charges for the electricity? Please provide the legal justification for your response.***

a. Is there a legal restriction which would prevent any company other than the local IOU electric company from providing electricity to an EV charging station?

An IOU holding a certificate from the Commission has the exclusive right to provide retail electric service to customers within the IOU's certificated service area. Whether and under what circumstances an entity other than a certificated IOU could provide electricity to an electric vehicle charging station is a question that is difficult, if not impossible, to answer in the abstract because the answer depends on facts that likely will vary from case to case.

KCPL provided initial and additional legal opinions. KCPL asserts that it is the only legal entity that can provide EV charging stations due to the restriction of reselling electricity and that the network as a whole is subject to the regulation of the PSC. The comments below were received from KCPL on June 8, 2016.

> 2. Consistent with its March 1, 2016, filing herein, KCP&L continues to assert that EV charging station service ("EVCS") provided by an investor-owned utility ("IOU") is subject to Commission authority and regulation. Similarly, KCP&L continues to assert that long-standing case law, as well as existing tariff provisions which bar the re-sale of electricity in IOU service territory, also serve to prohibit entities other than the Commission-regulated IOU from providing and charging for EVCS service in that IOU's service territory.
>
> 3. However, as a result of studying the issue further and particularly rationales advanced by certain other interests, KCP&L has concluded that at the right time and under the right conditions, entities other than Commission-regulated IOUs should be permitted to provide and charge for EVCS service in the service territory of Commission-regulated IOUs. (Footnotes omitted.)

The Empire District Electric Company ("Empire") did not agree with the other IOUs in the state regarding costs for electric vehicle charging.

> Empire is not aware of a Missouri statute or court ruling directly on point. At this time, it appears that the role of the Commission would be in the regulation and prescription of rates for electricity from the electric vehicle ("EV") charging station, if the EV charging service is offered by a public utility as an above-the-line utility service. *See State ex rel. Utility Consumers Council of Missouri, Inc. v. Public Service Commission*, 585 S.W.2d 41 (Mo. banc 1979) (the scope of the Commission's authority is limited to those activities necessary to supervise, regulate, and control the public utilities within its jurisdiction). [1]

[1]Empire's Responses to Staff Questions. File No. EW-2016-0123. March 2, 2016. Page 1.

Empire's response to the second question takes into consideration "above the line" utility service, which Staff typically defines as expenses incurred in operating a utility that are charged to the ratepayer.

Earth Island Institute, d/b/a Renew Missouri provided comments on June 6, 2016 stating the following:

> Renew Missouri disagrees with KCP&L and Ameren that only regulated utilities can provide this service. Besides their obvious self-interest, the practical and policy implications of their position demonstrate the absurdity of regarding EV charging stations as public utilities.
>
> The Division of Energy reaches the same conclusion as the utilities by making what it regards as a literal reading of the PSC statutes. Renew Missouri disagrees with DE as well, and agrees with the analysis of the Sierra Club and ChargePoint.
>
> The definition of "electrical corporation" incorporates the term "electric plant," which is defined as "all real estate, fixtures and personal property operated, controlled, owned, used or to be used for or in connection with or to facilitate the generation, transmission, distribution, sale or furnishing of electricity for light, heat or power …." § 386.020 (15) and (14). An electrical corporation furnishes power as a commodity for all the myriad uses its customers make of it. The fact that a few of the services offered by commercial customers involve supplying electricity for rechargeable batteries does not change the nature of the utility-customer relationship. An EV owner is in the same position as a customer who plugs a cell phone charger into a standard outlet at home or in a public place or at a commercial establishment.
>
> The statutes are not to be read with the kind of literalness shown by DE. The courts have always added at least two qualifications. First, the words "for public use" are to be read into the definitions of "electric plant" and "electrical corporation" even though not expressly included. *M. O. Danciger Co. v. PSC*, 275 Mo. 483, 205 S.W. 36, 39–40 (1918). Second, "Whether or not the business of appellants [read: EV charging stations] is a public utility depends upon what they actually do." *Cirese v. PSC*, 178 S.W.2d 788, 790 (Mo.App. W.D. 1944). [2]

On June 8, 2016, the Office of the Public Counsel ("OPC") provided an additional written legal opinion. The OPC agreed with Renew Missouri that the Commission does not have

[2]Comments of Renew Missouri, File No. EW-2016-0123. June 8, 2016. Pages 1-2.

jurisdiction over the EV charging stations and that the network itself may become "stranded assets."

> The OPC believes the Public Service Commission ("Commission") lacks the requisite jurisdiction to regulate electric vehicle ("EV") charging stations. A reading of the statute granting the Commission its authority from the Missouri Legislature – Section 393.140 RSMo specifically - reveals this authority includes "general supervision" of investor-owned electric utilities and, specifically and relevant to this topic, "electric plants". Electric plants are defined under section 386.020 (14) in pertinent part:
>
> > … all real estate, fixtures and personal property operated, controlled, owned, used or to be used for or in connection with or to facilitate the generation, transmission, distribution, sale or furnishing of electricity for light, heat or power; and any conduits, ducts or other devices, materials, apparatus or property for containing, holding or carrying conductors used or to be used for the transmission of electricity for light, heat or power.
>
> A handful of stakeholders at this workshop assert EV charging stations fit under this definition. The OPC disagrees, arguing EV charging stations do not fit under the guidelines of regulation because electricity in this instance is not sold to end users, as is the intent of the statute. Rather, electricity is sold to EV charging stations, which then provide charging services to their customers. As other states' commissions have found, the use of electricity is merely incidental to the provision of services offered through a privately-owned EV charging station. The service provided by the EV charging station owner or operator is not delivered over distribution system wires or circuits but rather by a cord and a connector. A reasonable question to ask is whether this Commission should begin regulating those services as well.
>
> …In this same vein, the OPC has further concerns that interfering with such a new market for this technology will lead to the additional issue of these EV charging stations becoming "stranded assets." Our concern is based off a situation where the utility would seek, and the Commission would allow, ratepayers to pay for these EV charging stations. A station gets set up in a location and then, for whatever reason, customers start drifting away and start using an EV charging station elsewhere. Then, the EV charging station no longer serves any purpose and ratepayer money would be wasted on this stranded asset. Then, at some future rate case, the utility would request to write-off this asset without seeking to remit any savings back to the ratepayer. While this is only a hypothetical, it demonstrates that this technology continues to grow and evolve and no one knows what direction this is going. In a competitive market, this is a good thing. Participants innovate or they die. Ratepayers benefit as a result. In a

> natural monopoly with a captive audience, that risk shifts to the ratepayer to their detriment.
>
> Moreover, the OPC is concerned that such a regulation, if determined to be in fact under the jurisdiction of the Commission, is regressive. According to the Federal Reserve Bank of St. Louis, the per capita average income for a Missouri resident is $43,290.00. Almost every person pays a utility bill of some sort. According to the auto web site www.cheatsheet.com, the average household income of a purchaser of an electric Ford Focus is $199,000.00. This section of the public is much smaller and affluent. While not a direct comparison, the OPC is concerned a ratepayer of limited means would be required to subsidize those ratepayers who have the luxury to be "first adapters" thanks to their higher levels of income. Currently, these EV charging stations operate by allowing drivers to use them for free. It is incumbent upon the OPC to ask why this is not a cost that should be borne upon those most directly benefiting from these EV charging stations – the EV operators themselves. OPC believes a ratepayer who is not directly receiving a benefit from these EV charging stations should not be required to subsidize another consumer class who is more affluent. [3]

United for Missouri, Inc. ("UFM") followed up the workshop with the comments below. UFM's comments reflect its concerns and the uncertainty of the stated potential benefits of the network as stated in the workshop. According to its feedback, the claims of environmental benefits and increased efficiency through load-leveling should be verifiable and should put downward pressure on the rates. Ratepayers should anticipate a rate decrease over time as a result of the increased efficiency. UFM explains its concerns as follows:

> During the May 25 workshop, some participants made comments that it would be "good" for the development of electric vehicles and EV infrastructure for the Missouri Public Service Commission to take an active role in regulating the provision of services to charging stations and in regulating the charging stations themselves. UFM remains unconvinced that the mere prediction of something "good" resulting from regulation justifies that regulation. The Commission is a creation of statute and has only such authority as has been conferred on it by the Legislature. *State ex rel. City of St. Louis v. Pub. Serv. Comm'n.*, 73 S.W.2d 393, 399 (Mo. banc 1934). There is no quantum of public opinion however strongly held that grants the Commission authority to act. Its actions must be authorized by law.

[3] Written Legal and Policy Arguments. Office of the Public Counsel. File No. EW-2016-0123. Pages 1-4.

> Some suggested that there is no intent to stifle or preclude other entities from entering into the market. Notwithstanding these encouragements and admonitions toward regulation, regulation inherently results in market distortions advantaging some and disadvantaging others.
>
> For example, a regulated electric rate subsidized by ratepayers to foster EV charging stations provides an advantage in the marketplace. It engenders an artificially low charging rate that other competitors are not able to meet because such competitors do not have a captive customer base from which to subsidize service. The manifestation of that advantage permanently impacts how the market operates. It discourages competition. And when the subsidy is removed, if the subsidy is removed, customers experience rate shock. A new marketplace should not be initiated with such distortions.
>
> Rather, if the marketplace is to develop, it should develop on viable, sustainable laws of supply and demand. There are sufficient indications of demand forces to conclude that a market can develop naturally without regulatory intervention. Automobile manufacturers have a natural incentive to foster charging stations. Employers, apartment complexes, retail merchants, and other investors have a motivation to attract EV owners and provide a desired service if the service is indeed so desirable. The risks of this developing marketplace should remain with private investors and not imposed on utility ratepayers. Utility ratepayers should not be made to insure the success of this infant market no matter how many groups say it is a "good" thing. Let the market prove it is a "good" thing.[4]

III. Analysis of Other State Activities

Some states have legislative directives related to regulatory oversight of EV charging stations, including whether EV charging stations should be included in rate base. Other states have tackled issues similar to those being discussed in Missouri. Their experiences may provide useful examples for Missouri going forward.

> **Massachusetts**: The MA Department of Public Utilities ("DPU") determined costs are recoverable "only if the utility could demonstrate the service (a) is in the public interest, (b) is meeting a need not being met by non-utility providers, and (c) utility participation is not hindering development of a competitive vehicle market." See ***Investigation by the Department of Public Utilities Upon Its Own Motion Into Electric Vehicles and EV Charging***, 315 P.U.R. 4th 139 and dated August 4th, 2015.[5][6]

[4] Comments of United for Missouri, Inc., File No. EW-2016-0123.

[5] Written Legal and Policy Arguments. Office of the Public Counsel. File No. EW-2016-0123. Page 5.

[6] OPC asserts this not only addresses consumer concerns but also precludes utilities or their third-party partners from seeking ratepayer money in areas where a competitive and cost-effective market is already in place.

> **Oregon**: The Public Utility Commission of Oregon ("OPUC") decided, in Order 12-013 titled *In the Matter of the Public Utility Commission of Oregon Investigation of Matters Related to EV Charging*, 295 P.U.R. 4th 7 and dated Jan. 19, 2012, that charging stations are a "non-regulated, non-rate base venture", but are subject to regulation if they operate them above the line… The Legislature of Oregon intervened to change some of the standards by which the OPUC regulated EV charging stations.
>
> **California**: Section 740.3(c) of California's Public Utilities Code states in pertinent part, according to OPC: "The (California Public Utilities Commission) policies authorizing utilities to develop equipment or infrastructure needed for electric-powered and natural gas-fueled low- emission vehicles shall ensure that the costs and expenses of those programs are not passed through to electric or gas ratepayers *unless the commission finds and determines that those programs are in the ratepayers' interest*. The commission's policies shall also ensure that utilities do not unfairly compete with nonutility enterprises."[7] (Footnotes omitted.)

In October, 2015, California enacted SB 350, which directs utilities to plan for transportation electrification in their Integrated Resource Plans ("IRPs"). It requires utility and air quality regulators to accept applications by electric utilities for programs and investments that encourage electrification of vehicles, vessels, trains, boats, and other equipment. It also directs regulators to approve those applications and allow cost recovery if they satisfy ratepayer interest tests.

> **Washington**: By statute (proposed under SHB 1571, SHB 1853), EV charging stations provided by utilities are regulated and incorporated into rate base, while those provided by other entities are unregulated.[8]

Washington State law explicitly allows utilities to provide and subsidize EV charging service, up to a maximum impact on nonparticipants of a 0.25% increase in electricity prices.

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[7] Written Legal and Policy Arguments. Office of the Public Counsel. File No. EW-2016-0123. Page 6.

[8] Id.

Utilities in various states have proposed providing rebates for EV charging equipment, or attractive rates for providing EV charging services, arguing that the incremental revenue will more than cover the incremental costs, even at lower-than-average rates.

IV. Staff's Analysis of Missouri Law

The positions suggested by the stakeholders or taken by PUCs in other states are of interest but are not dispositive. The relation of the Missouri Commission to EV charging stations located in Missouri necessarily is governed by existing Missouri law. The legislature may make other arrangements for the future and the policy considerations offered by some stakeholders could be considered at that time.

As has been explained by some of the participants, the Commission is a creature of statute and its jurisdiction in any situation must be found by reference to the plain language of the Missouri statutes.[9] Statutory language applicable to EV charging stations is not hard to discover. Section 386.250, RSMo, provides:

> The jurisdiction, supervision, powers and duties of the public service commission herein created and established shall extend under this chapter (1) To the manufacture, sale or distribution of . . . electricity for light, heat and power, within the state, and to persons or corporations owning, leasing, operating or controlling the same; and to . . . electric plants, and to persons or corporations owning, leasing, operating or controlling the same[.]

Section 386.020(14), RSMo., defines "electric plant" as "all real estate, fixtures and personal property operated, controlled, owned, used or to be used for or in connection with or to facilitate the generation, transmission, distribution, sale or furnishing of electricity for light, heat or power; and any conduits, ducts or other devices, materials, apparatus or property for containing, holding or carrying conductors used or to be used for the transmission of electricity

[9] ***State ex rel. Utility Consumers Council of Missouri, Inc. v. Public Service Commission,*** 585 S.W.2d 41, 47 (Mo. banc 1979).

for light, heat or power[.]" EV charging stations are devices designed and used to convey electricity into electric vehicles where it is used for light, heat and power. Therefore, EV charging stations fall within the definition of electric plant. It is irrelevant that the electricity conveyed to the vehicle is stored in a battery before use. Section 386.020(15), RSMo., in turn, defines every entity "owning, operating, controlling or managing any electric plant" to be an "electrical corporation." Section 386.020(43), RSMo., defines every electrical corporation as a public utility "subject to the jurisdiction, control and regulation of the commission and to the provisions of this chapter[.]" Consequently, the operation of an EV charging station is generally subject to the regulation of the Commission.

It has also been pointed out that "[w]hether or not the business of appellants is a public utility depends upon what they actually do."[10] Section 386.020(15), RSMo., contains certain exceptions and the courts have also glossed this statutory definition. Railroads that generate power for railroad purposes or for the use of their tenants are not electrical corporations. Any entity that generates and distributes electricity on private property for railroad purposes or for its own use or for the use of its tenants is not an electrical corporation. However, both of these exemptions may be lost if the electricity is sold to others.[11] The Missouri Supreme Court has held that, in addition to using electric plant to produce electricity for light, heat and power, an entity must hold itself out as serving the general public before it becomes a public utility.[12]

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[10] ***Terminal Taxicab Company v. Kutz,*** 241 U.S. 252, 254, 36 S.Ct. 583, ___, 60 L.Ed. 984, ___ (1916); ***State ex rel. Lohman & Farmers Mutual Telephone Company v. Brown et al.,*** 328 Mo. 818, 821, 19 S.W.2d 1048, 1049 (1929); ***State ex rel. M. O. Danciger & Company v. Public Service Commission,*** 275 Mo. 483, ___, 205 S.W. 36, 39 (1918); ***State ex rel. and to the use of Cirese v. Public Service Comm'n of Missouri,*** 178 S.W.2d 788, 790 (Mo. App., W.D. 1944).

[11] § 386.020(15), RSMo. While the statute is clear that "sale to others" extinguishes the exemption, the ***Danciger*** case conditions the loss of the exemption on the nature of the relationship of the buyer and seller. By "others," presumably the statute means buyers that are not tenants.

[12] ***Danciger,*** *supra*.

Applying these considerations to various fact patterns:

- An entity that uses an EV charging station to sell electricity to anyone that wants it is thereby an electrical corporation and a public utility. This is true even if the activity is viewed as the sale of a service rather than the sale of electricity.
- An entity that uses an EV charging station to charge its own vehicles and those of its tenants and contractees is not an electrical corporation and a public utility. Thus, a homeowner that uses his or her residential current to charge his or her own vehicles and those of friends and family is not an electrical corporation and a public utility. Under ***Danciger,*** this is true even if the homeowner charges for the service/electricity.
- An existing electrical corporation and a public utility that uses an EV charging station to charge vehicles is generally engaged in the utility business and the EV charging station is therefore part of plant in service and a component of rate base. However, other fact patterns can be imagined, with different legal outcomes. How the utility is compensated for that service, and by whom, is a rate case issue for the Commission to determine.

It is generally the case that electric utilities in Missouri have monopoly service areas. However, that is a matter within the Commission's discretion.[13] Likewise, where existing tariffs prohibit the resale of electricity, the Commission can require that those tariffs be altered.[14]

It is Staff's view that EV charging stations should be treated in a manner similar to pay telephones. Telephone companies that operated pay telephones within their certificated service areas did not need any additional certification to do so; the telephones were treated as utility plant and the Commission regulated the rates. Third-party operators had to obtain a certificate for each pay telephone that they operated. At one time, there were many hundreds of active pay telephone certificates.

[13] ***State ex rel. City of Sikeston v. Pub. Serv. Comm'n of Missouri,*** 336 Mo. 985, 997-98, 82 S.W.2d 105, 110 (1935): "The question of whether regulated monopoly or regulated competition will best serve the public convenience and necessity in a particular area at any time is for the commission to decide[.]"

[14] Sections 393.260 and 393.270, RSMo.

V. EV Network Grid Connectivity Barriers

The Natural Resources Defense Council ("NRDC") states that a major barrier to the growth of EV implementation is the lack of charging stations outside single-family dwellings. According to NRDC, a substantial investment is needed and suggests the following methods to eliminate barriers:[15]

1. Removing Barriers To Adoption, Ensuring Grid Reliability, And Maximizing Fuel Cost Savings.

- Clarify that EV charging companies will not be regulated as utilities
- Inform distribution system planning
- Provide consistent and fair treatment of EV load
- Adopt appropriate rates to maximize fuel savings and manage charging
- Target customer education and outreach programs

2. Closing the Charging Infrastructure Gap and Promoting Equity

- Utility-facilitated deployment of charging infrastructure
- Increase access to electricity as transportation fuel in disadvantaged communities
- Promote broader awareness through mass-market education and outreach

3. Capturing the Value of Grid Services and Integrating Renewable Energy

- Implement traditional demand response programs for EV customers
- Implement advanced demand response programs for EV customers
- Integrate vehicle-to-grid ("V2G")[16] and battery second life programs into wholesale and retail markets

VI. Environmental Impacts of Electric Vehicles

According to a NRDC Report, a 2016 Nissan LEAF can store as much electricity as the average American home uses in a day, equal the instantaneous demand of several homes, and be recharged while its owner is sleeping, eating, working, or doing anything other than driving.[17]

[15] Baumhefner, Max and Hwang, Roland. Driving Out Pollution: *"How Utilities Can Accelerate the Market for Electric Vehicles*" https://www.nrdc.org/sites/default/files/driving-out-pollution-report.pdf
[16] V2G technology is discussed in more detail below.
[17] Baumhefner, Max and Hwang, Roland. Driving Out Pollution: *"How Utilities Can Accelerate the Market for Electric Vehicles*" https://www.nrdc.org/resources/driving-out-pollution-how-utilities-can-accelerate-market-electric-vehicles

A 2015 study by the Union of Concerned Scientists found that driving an average new EV produces fewer emissions than driving an average new gasoline car in all regions of the U.S., and that in states with the cleanest grid power, driving an electric car is equivalent to getting 85 miles per gallon.[18] A 2015 study by the Electric Power Research Institute ("EPRI") and NRDC produced similar findings, stating flatly that "[plug-in electric vehicles] pollute less than today's conventional petroleum-fueled vehicles in the United States," even after accounting for the emissions resulting from electricity generation.[19] Total emissions associated with EVs depend more on the carbon intensity of the electricity grid than on the charging scenario[20]. (Footnotes omitted)

Joe Halso, on behalf of Sierra Club, made a presentation at the workshop, "Electric Vehicles & Environmental Impacts," that showed the carbon emissions of an average EV in Missouri is equivalent to a 35 or 36 mpg gasoline vehicle due to the high carbon-based fuel mix of Missouri's existing electric generation fleet. However, these equivalencies are expected to improve as Missouri utilities move away from coal-based generation and incorporate more renewable generation into their portfolios.[21] NRDC also submitted a report titled *Driving Out Pollution*[22] on June 16, 2016. The executive summary states the following:

> Widespread adoption of electric vehicles (EVs) is an essential strategy for driving carbon pollution out of the transportation sector.[1] Large-scale deployment of EVs can also help replace dirty power plants with clean energy like wind and solar power. And EVs powered by those renewable resources are virtually emissions-free.

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[18] "Cleaner Cars from Cradle to Grave, How Electric Cars Beat Gasoline Cars on Lifetime Global Warming Emissions". Union of Concerned Scientists. Rachael Nealer, David Reichmuth, Don Anair. November 2015.
[19] "Environmental Assessment of a Full Electric Transportation Portfolio. Volume 2: Greenhouse Gas Emissions. Electric Power Research Institute and Natural Resources Defense Council. September 2015. Page v.
[20] Fitzgerald, Garrett, Nelder, Chris and Newcomb, James. Rocky Mountain Institute, eLab, Electricity Innovation Lab, "*ELECTRIC VEHICLES AS DISTRIBUTED ENERGY RESOURCES*", n.d. Web. 20 July 2016. http://www.rmi.org/Content/Files/RMI_Electric_Vehicles_as_DERs_Final_V2.pdf. removed.)
[21] See Item No. 100 in EFIS.
[22] Baumhefner, Max and Hwang, Roland. Driving Out Pollution: "*How Utilities Can Accelerate the Market for Electric Vehicles*" https://www.nrdc.org/sites/default/files/driving-out-pollution-report.pdf

VII. EV Charging Station Network Value

NRDC explains the benefits of EVs which are properly managed.

> Researchers at the Pacific Northwest National Laboratory found sufficient spare capacity in the nation's grid to power nearly all of our passenger cars and trucks, if vehicle charging is properly managed. Charging EVs during hours when the grid is underutilized increases utility revenues without commensurate increases in costs, putting downward pressure on electricity rates. This effect is the opposite of the utility "death spiral," whereby increasing costs borne by a decreasing pool of customers causes rate increases that drive away more customers, leaving those who cannot afford distributed (onsite) generation or home energy storage to pay for an aging grid. In fact, a recent study estimates large-scale commercialization of EVs in California would generate net revenues of $2 billion to $8 billion for Southern California Edison (SCE), San Diego Gas & Electric (SDG&E), Pacific Gas & Electric (PG&E) and the Sacramento Municipal Utility District (SMUD), enough to allow those utilities to both invest in charging infrastructure and reduce consumer bills. (Footnotes omitted.) [23]

Mr. Nick Nigro of Atlas Public Policy was unable to attend the workshop, but uploaded his presentation into EFIS. Mr. Nigro's presentation provides some information on the value of EV charging stations.

a. Indirect Value of Charging Services Can Increase Private Investment [24]

- Business models based solely on direct revenues from EV charging services are currently financially infeasible
- Models that capture indirect value form EV charging services will increase private sector investment

b. Direct Value of Electric Vehicles to the Grid

NRDC submitted a report titled *Driving Out Pollution*[25] on June 16, 2016. The report provides additional information on the value of EVs to the grid.

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[23] Baumhefner, Max and Hwang, Roland. Driving Out Pollution: *"How Utilities Can Accelerate the Market for Electric Vehicles*" https://www.nrdc.org/sites/default/files/driving-out-pollution-report.pdf,
[24] See: Slide 6, "New Business Models to Expand EV Charging". Nick Nigro, Atlas Public Policy, May 24, 2016.
[25] Baumhefner, Max and Hwang, Roland. Driving Out Pollution: *"How Utilities Can Accelerate the Market for Electric Vehicles*" https://www.nrdc.org/sites/default/files/driving-out-pollution-report.pdf.

> In the future, EV batteries could even put electricity back onto the grid when it is most needed. This can be accomplished both via "vehicle-to-grid" or "V2G" (storing energy in EVs and putting it back onto the grid later) and via "Battery Second Life" (storing energy in used EV batteries redeployed as stationary energy storage and putting it back onto the grid later). American drivers have already purchased, in the form of EV batteries, more than enough energy storage to power all the homes in the District of Columbia on an average day. That sunk investment grows with every EV purchase. Researchers at the National Renewable Energy Laboratory (NREL) estimate massive amounts of energy storage will likely be needed to balance a U.S. electric grid that is 80 percent renewable by the year 2050. That need could theoretically be met entirely with batteries from as few as 10 percent of the EVs on the road in that year. Stand-alone energy storage on that scale could require an investment somewhere between $120 billion and $180 billion. Directing even some portion of that investment away from capital-intensive, utility-scale projects and toward EV drivers to provide energy storage with the batteries they have already purchased could reduce the cost of transitioning to a cleaner grid and accelerate the electrification of the transportation sector. (Footnotes omitted.)
>
> To realize this potential, we need utility policies to unleash greater investments in charging infrastructure and other programs that expand EV adoption in a manner that supports the grid and returns the value of doing so to EV drivers. Utility policies to accelerate the EV market can be broken down into three phases…

Beginning at page 10 of the report, NRDC explains the possible grid services that can be provided by EVs.

c. The Types of Grid Services Electric Vehicles Could Provide

> Imagine a vehicle that stops charging when demand for electricity peaks in the early evening and begins again late at night when most people are asleep and electricity is cheap. Now picture that EV being driven to work in the morning, charging up on excess solar generation during the afternoon, being driven home, selling electricity back to the grid when demand peaks in the evening, and then recharging again at midnight when there is an oversupply of cheap wind energy. Imagine further that after many years of service, when the battery in that EV has lost enough capacity that it no longer provides the range its driver requires, it is redeployed as a form of stationary energy storage that could be charged and discharged whenever or wherever most needed to support the grid. All of these functions are already being proved in the real world. They can be categorized as follows:

1. Traditional Demand Response: Turning charging off.

2. Advanced Demand Response: Turning charging on or off and/or changing the rate of charging.

3. Vehicle-to-Grid, or V2G: Putting electricity stored in EVs back onto the grid.

4. Battery Second Life: Putting electricity stored in used EV batteries redeployed in stationary applications back onto the grid.

These four functions can potentially provide the full range of services required to keep the grid stable at all levels. Supply of electricity must instantaneously and precisely match demand to prevent blackouts. Yet both demand and supply of electricity change by the second, minute, hour, day, and season. Grid operators must maintain this equilibrium, even as they integrate greater levels of variable renewable resources, like wind and solar.

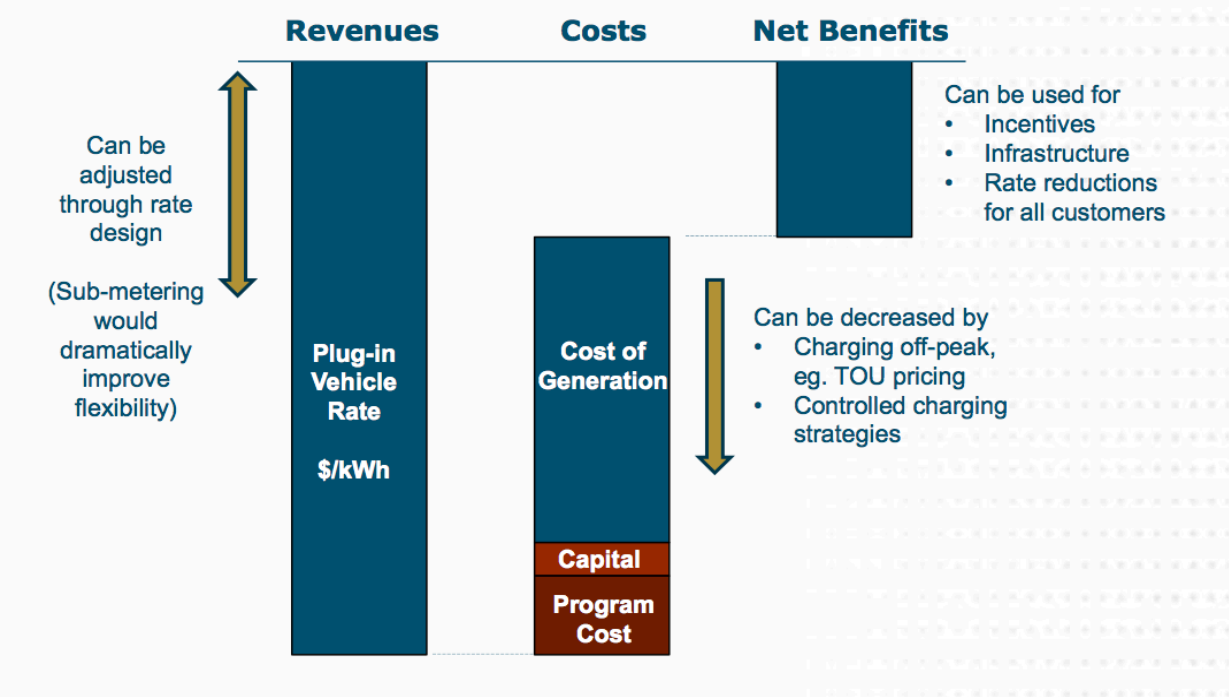
d. Reducing Electricity Rates

There have been many claims made that the increased adoption of EVs will put downward pressure on the electricity rates. In contrast, more EVs on the road could mean higher total costs for generating, transmitting, and distributing electricity. Energy and Environmental Economics completed a study for the California Electric Transportation Coalition that assessed the costs and benefits of California's Zero Emission Vehicle Program. The study found California's utility customers are better off as a result of growing electric vehicle use. According to the study, higher revenues to the utility can improve margins that can be shared with customers in the form of reduced electricity prices. Effective management of EV charging loads to optimize the grid could also reduce electricity unit costs[26]. (Footnote omitted.)

There were also statements made by the presenters at the workshop of increased efficiency on the local grid through the implementation of the Network. The efficiency is to be realized through the assumption of increased load leveling due to charging overnight in the off-

[26] Fitzgerald, Garrett, Nelder, Chris and Newcomb, James. Rocky Mountain Institute, eLab, Electricity Innovation Lab, "*ELECTRIC VEHICLES AS DISTRIBUTED ENERGY RESOURCES*", n.d. Web. 20 July 2016. http://www.rmi.org/Content/Files/RMI_Electric_Vehicles_as_DERs_Final_V2.pdf .

peak period. Noah Garcia, on behalf of Natural Resources Defense Council (NRDC) made a presentation at the workshop[27] which discusses time of use ("TOU") rates. According to the presentation, EV owners will have no incentive to charge their vehicles during Off-Peak hours. The following diagram demonstrates the purported effect of TOU rates.[28]



Staff is concerned that absent mandatory TOU rates for EV owners, the EV owners may go home and plug in immediately, exacerbating the evening load of the utility. A utility needs to have sufficient capacity to cover peak load demands. However, Missouri IOUs do not currently have mandatory Time-Of-Use ("TOU") rates in their tariffs to encourage charging in off-peak hours, although optional TOU rates are available.[29] Therefore, it is anticipated by Staff that there could be an increase on peak demand since there is no incentive to charge off-peak.

[27] Garcia, N. (2016). "Environmental Impacts of Electric Vehicle Charging" Presented at the May 25, 2016 Workshop for File No. EW-2016-0123, "In the Matter of a Working Case Regarding Electric Vehicle Charging Facilities." http://pscprodweb/mpsc/commoncomponents/viewdocument.asp?DocId=936010097.
[28] See: EFIS Item No. 104, Slide 8.
[29] KCPL has frozen the availability of its TOU rates to new customers pending a proposed re-design.

VIII. EV Charging Station Network Funding/Financing: Executive Actions of the Obama Administration

The Obama administration announced on July 21, 2016, that the Administration is using Executive Orders to accelerate the deployment of EV charging station networks nationwide throughout the most frequently traveled transportation corridors. According to the *FACT SHEET: Obama Administration Announces Federal and Private Sector Actions to Accelerate Electric Vehicle Adoption in the United States,*[30] (See Appendix B for the complete Fact Sheet.), these collaborative actions will reportedly provide $4.5 Billion in loans to facilitate the development of the charging station infrastructure throughout the nation.

> The Obama Administration is taking responsible steps to combat climate change, increase access to clean energy technologies, and reduce our dependence on oil. That is why, today, on the heels of the United States Department of Energy's (DOE) first-ever Sustainable Transportation Summit, the Administration is announcing an unprecedented set of actions from the Federal government, private sector, and states, as well as a new framework for collaboration for vehicle manufacturers, electric utilities, electric vehicle charging companies, and states, all geared towards accelerating the deployment of electric vehicle charging infrastructure and putting more electric vehicles on the road. The collaboration, forged by the White House in partnership with DOE and the Department of Transportation (DOT), the Airforce and the Army, and the Environmental Protection Agency, and is centered on a set of *Guiding Principles to Promote Electric Vehicles and Charging Infrastructure* that nearly 50 organizations are signing on to today.
>
> By working together across the Federal government and with the private sector, we can ensure that electric vehicle drivers have access to charging stations at home, at work, and on the road – creating a new way of thinking about transportation that will drive America forward. Today's announcements include:
>
> - Unlocking up to $4.5 billion in loan guarantees and inviting applications to support the commercial-scale deployment of innovative electric vehicle charging facilities;
> - Launching the FAST Act process to identify zero emission and alternative fuel corridors, including for electric vehicle charging across the country, and standing

[30] The White House, Office of the Press Secretary, "*FACT SHEET: Obama Administration Announces Federal and Private Sector Actions to Accelerate Electric Vehicle Adoption in the United States",n.d. Web. 22 July 2016.* https://www.whitehouse.gov/the-press-office/2016/07/21/fact-sheet-obama-administration-announces-federal-and-private-sector

up an effort to develop a 2020 vision for a national network of electric vehicle fast charging stations that will help determine where along the corridors it makes the most sense to locate the fast charging infrastructure;

- Announcing a call for state, county, and municipal governments to partner with the Federal government to procure electric vehicle fleets at a discounted value;
- Leveraging the power of data and hosting an 'Electric Vehicle Hackathon' to discover insights and develop new solutions for electric vehicle charging;
- Publishing a guide to Federal funding, financing, and technical assistance for electric vehicles and charging stations; and
- 35 new businesses, non-profits, universities, and utilities signing on to DOE's Workplace Charging Challenge and committing to provide electric vehicle charging access for their workforce.

Today's announcements build on a record of progress from multiple programs across the Administration that are working to scale up electric vehicles and fueling infrastructure, including at the Departments of Energy, Transportation, Defense, and at the Environmental Protection Agency. In fact, in the past eight years the number of plug-in electric vehicle models increased from one to more than 20, battery costs have decreased 70 percent, and we have increased the number of electric vehicle charging stations from less than 500 in 2008 to more than 16,000 today – a 40 fold increase.

IX. Emerging Electric Vehicle Charging Technologies

Vehicle to Grid Technology ("V2G")

As discussed in Mr. Halso's presentation, "Vehicle-Grid Integration", V2G is a concept in which charging stations work bi-directionally; charging the vehicle in off-peak periods and providing energy to the grid for demand response and ancillary services during peak periods. This is distinct from V1G, which only offers demand response and rate design and only incentivizes charging in off-peak periods. All panelists who discussed V2G during the workshop agreed that V2G is currently not a viable technology for Missouri and is unlikely to become viable at any time in the near future.

According to Mr. Halso, the benefits that should result from the implementation of a network are:

- **Vehicle-Grid Integration:** Scheduling, planning, or varying EV charging to reduce impact or provide benefits.

- **Rate Design:** special rates for EV charging (TOU, dynamic, etc.)
- **V1G:** Using VGI communications to affect **unidirectional** demand response at peak demand periods.
- **V2G:** Using VGI communications and **bidirectional** charging technologies to provide DR and ancillary services.[31]

The latest technology being developed is on-the-go mobile wireless charging of EVs. This new technology may soon make stationary chord connected charging a thing of the past and cause the assets, potentially paid for by ratepayers, to become "stranded assets" that would no longer be needed. The International Journal of Advanced Computer Science and Applications (IJACSA), explains the concept of mobile charging in the abstract[32] and introduction below:

> Abstract - Dynamic wireless charging of electric vehicles (EVs) is becoming a preferred method since it enables power exchange between the vehicle and the grid while the vehicle is moving. In this article, we present mobile energy disseminators (MED), a new concept, that can facilitate EVs to extend their range in a typical urban scenario. Our proposed method exploits Inter-Vehicle (IVC) communications in order to eco-route electric vehicles taking advantage of the existence of MEDs. Combining modern communications between vehicles and state of the art technologies on energy transfer, vehicles can extend their travel time without the need for large batteries or extremely costly infrastructure. Furthermore, by applying intelligent decision mechanisms we can further improve the performance of the method.
>
> Introduction - With regards to the future transport arena, electric vehicles (EVs) are considered as the likely replacement of internal combustion engine driven vehicles, especially given the CO2 reduction and alternative energy perspectives. Electric cars have the potential to reduce carbon emissions, local air pollution and the reliance on imported oil [1]. In Europe, the European commission aims to reduce road transport emissions by 70% by 2050 [2]. Taking into account the fact that road transport is expected to double by 2050, passenger cars need to reduce their emissions significantly. Advanced internal combustion engine (ICE) technologies are expected to enable emissions reduction, but are not expected to meet long term targets. Electric vehicles, especially plug-in ones (PEVS), are penetrating the market and they are currently counted as zero emissions vehicles. Apart from the additional cost of their lithium-ion battery pack that makes them

[31] See: EFIS Item No. 104, slide 9.

[32] Maglaras, Leandros, Jiang, Jianmin, Maglaras, Athanasios, Topalis, Frangiskos and Moschoyiannis, Sotiris. "*Dynamic wireless charging of electric vehicles on the move with Mobile Energy Disseminators.*" International Journal of Advanced Computer Science and Applications, Vol. 6, No. 6, 2015, n.d. Web. 20 July 2016. http://thesai.org/Downloads/Volume6No6/Paper_34-Dynamic_wireless_charging_of_electric_vehicles.pdf. removed)

> more expensive than conventional vehicles, there are also some other factors that discourage drivers from switching to an EV. For instance, electric battery vehicles have a limited driving distance [3] and hence, the current lack of charging infrastructure as well as the total time needed to recharge such a vehicle add to their lack of desirability. (Footnotes omitted.)

The technology will require the EVs to be built with this charging feature, as well as the new infrastructure to be built. The article *Future electric cars could refill batteries from roads infused with wireless charging*[33] paints a picture of vehicles charging on-the-go in just a few short years.

> Charging an electric car while driving may sound like a wild idea, but Qualcomm wants to bring that capability to automobiles.
>
> Qualcomm is developing what it calls "dynamic wireless charging" technology, so drivers won't have to worry about plugging in their cars. Just cruise the streets, enjoy the scenery, and recharge your car, all at the same time.
> In the future, there may be "charging elements in the highway, so as you drive over them, your car charges automatically," Derek Aberle, president of Qualcomm, said during a speech at the Mobile World Congress trade show this week.
>
> The basic premise of the technology is similar to the way many people charge mobile devices today. Charging pads would be installed in roads and parking lots.
> The technology is still years away, but it will help self-driving cars be truly autonomous, Aberle said.
>
> "How can you have an autonomous car that you actually have to plug in?" he said. "That's pretty counterintuitive."
>
> The technology promises several benefits. Electric cars could have a nearly unlimited range. In addition, many people now forget to plug in their cars overnight and wake up to empty batteries. That problem will be a thing of the past, Aberle said.
>
> Cars could also have smaller batteries, allowing changes in vehicle design, Aberle said.
>
> The dynamic wireless charging technology is an advanced version of a static wireless charging system for cars already being developed by Qualcomm. The

[33] Shah, Agam. "*Future electric cars could refill batteries from roads infused with wireless charging*". IDG News Service, PCWorld.com, n.d. Web. 20 July 2016. http://www.pcworld.com/article/3038196/hardware/electric-cars-of-the-future-could-charge-batteries-while-driving-using-qualcomm-tech.html

> static charging technology will reach cars in the next two to three years, Aberle said.
>
> Qualcomm is working on charging pads that can be placed in your garage. When your car parks, it connects to the pad and starts charging.
>
> The chip maker is working with DaimlerChryser to install a "next-generation" static wireless charging system in cars.
>
> Qualcomm's plan to bring wireless charging to moving vehicles would require costly and time-consuming infrastructure change, however.

The United Kingdom and Korea are currently testing this technology, which was developed at Stanford University. The article *UK to trial in-road wireless charging tech for electric vehicles*[34] shows the technology will be tested over the next 18 months.

[34] Robarts, Stu. *"UK to trial in-road wireless charging tech for electric vehicles"*, Gizmag.com - Automotive, n.d. Web 20 July 2016. http://www.gizmag.com/uk-electric-highways-trial/38897/

The technology could allow EVs to be driven for longer distances, without the need to stop and charge their batteries.

For the trials, vehicles will be fitted with the requisite wireless technology, and equipment will also be installed underneath a test-road surface. Full technical details will be released once a contractor has been appointed to build the system.

IOUs in Missouri have not proposed any supply-side or demand response technologies specific to EV charging stations. In Staff's opinion, Missouri utilities should enhance the "learning experience" of the pilot programs by researching these technologies. Descriptions and illustrations of the various technologies and charging station options are attached.

X. Current Missouri EV Activities

KCPL and KCP&L Greater Missouri Operations Company ("GMO") (Collectively KCPL/GMO)

In Case No. ER-2014-0370, KCPL presented evidence on an initiative to install and operate more than 1,000 electric vehicle charging stations throughout the Greater Kansas City, Missouri area and within KCPL/GMO service areas.[35] KCPL/GMO's proposal was to provide ratepayer-subsidized charging stations to host sites at no cost to the host site owner on the condition that the host will not require a fee to charge the vehicles for the first two years of operation.

As of During the EV workshop, Mr. Chuck Caisley provided an update on the Network, stating that KCPL/GMO received a tax credit of about $10 Million for the Network. Data Request No. 0001 was submitted to KCPL/GMO requesting detailed information on any and all

[35] Transcript Volume 11. Case No. ER-2014-0370. Pages 529-530.

financial assistance applicable to the pilot project. This information will be reviewed further in the KCPL/GMO funding section of this report.

a. KCPL/GMO EV Network Usage Analysis

KCPL/GMO have installed the majority of the Network charging stations throughout their service areas. On May 12, 2016, the Commission issued its *Order Directing Filing* of the usage data for the installed stations in the Network. Below are two tables illustrating the number of charging sessions by month and accumulated and the amount of energy consumed by month and accumulated.

KCPL/GMO Charging Station Sessions by Month[36]

Month	Year	No. of Sessions	Accumulated
May	2015	1278	1278
June	2015	1921	3199
July	2015	2295	5494
August	2015	2504	7998
September	2015	2544	10542
October	2015	2708	13250
November	2015	2844	16094
December	2015	3124	19218
January	2016	3337	22555
February	2016	3494	26049
March	2016	4087	30136
April	2016	4462	34598

[36] *Response of Kansas City Power & Light Company and KCP&L Greater Missouri Operations Company to Order Directing Filing*. May 25, 2016. Page 1.

KCPL/GMO EV Charging Station Energy Consumption by Month[37]

Month	Year	Date	Energy (kWh)	Accumulated (MWh)
May	2015	5/1/2015	6864.573	6.865
June	2015	6/1/2015	9010.04	15.875
July	2015	7/1/2015	11200.9	27.076
August	2015	8/1/2015	12861.29	39.937
September	2015	9/1/2015	14654.86	54.592
October	2015	10/1/2015	17244.53	71.836
November	2015	11/1/2015	16584.6	88.421
December	2015	12/1/2015	19366.96	107.788
January	2016	1/1/2016	20334.9	128.123
February	2016	2/1/2016	22907.74	151.03
March	2016	3/1/2016	27154.87	178.185
April	2016	4/1/2016	29242.49	207.428

Each charging station has four plugs. Therefore, if there are two charging stations located at a site, there would be eight plugs available. A charging session is the actual event of charging an EV on the Network. In order for proper analysis to be performed, data per plug was required. In Data Request No. 0003, Staff requested additional data on the per plug activity, asking for the location of the charging stations, sessions per plug, length of time for each session a vehicle was plugged in, and the amount of electricity consumed per session per plug.

Analysis of the response to DR No. 0003 revealed some disparities between the charging stations with respects to overall usage. For instance, the Lead Bank has four plugs, which were used for 78 charging sessions during the month of June 2016. The Plaza Parking Garage has six charging plugs, which were used for 95 charging sessions during the month of June 2016. These are examples of high usage of the Network charging stations for the month. However, 7th Heaven has six plugs but only had one charging session for each plug during the month of June 2016. The Bayer location also has six plugs with one charging session for each plug. These

[37] Id. Page 2.

two locations are examples of low usage of the charging stations. [38] The pilot project for KCPL/GMO service areas should provide useful information to KCPL/GMO on effective siting of charging stations.

b. KCPL/GMO Funding

*** _____

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_____ [39] ***

Data Request No. 0002 asked for any and all expenses pertaining to the Network. The data provided in KCPL's response shows a total of $5,243,470.26 in expenses for the implementation of the Network in the Missouri jurisdictions of KCPL/GMO.

[38] EFIS. File No. EW-2016-0123, Data Request No. 0003
[39] File No. EW-2016-0123, Data Request 0001

c. Ameren Missouri

On March 28, 2016, Ameren Missouri filed a 60-day notice of intent to file an electric rate tariff for EV charging stations in EFIS.[40]

d. Empire

A July 21, 2016, news article titled, *Empire Launches Electric Vehicle Initiative, Joplin Charging Station* indicates Empire has worked with Missouri Southern State University on plans to install a public EV charging station on the campus. Empire has pledged to allocate five percent (5%) of its vehicle budget to purchase EVs as a part of its fleet and to offer rebates to customers within its jurisdiction. The excerpt below provides the perspective of the Empire's CEO, Brad Beecher.

> As part of the initiative, Empire has committed to spend 5 percent of its annual vehicle fleet budget on electric vehicles, and the company is offering rebates ranging from $750 to $2,000 to customers who purchase an electric vehicle. A customer would receive $2,000 for purchasing a total-electric car, $1,000 for an electric-fuel hybrid and $750 for a total-electric fork truck.
>
> "Electricity's use has evolved over time," Empire CEO Brad Beecher said. "We think the next evolution for electricity is electric cars. The government thinks the next evolution for electricity is electric cars."
>
> Beecher said that evolution will be driven primarily by two factors: environmental concern and cost-effectiveness. As automakers have released more models of electric and hybrid vehicles, prices have dropped. That, along with federal tax credits available to electric car owners, means gas prices have to drop to $1.25 per gallon for a fuel-powered car to be cheaper to drive than an electric one, Beecher said. [41]

e. ChargePoint

When the Commission asked KCPL/GMO for information regarding their Network usage, Staff reached out to ChargePoint for data related to EV charging station usage statewide. ChargePoint provided a table with the public ChargePoint EV charging stations in Missouri.

[40] Case No. ET-2016-0246.
[41] Larimore, Jordan. Joplin Globe, "*Empire Launches Electric Vehicle Initiative, Joplin Charging Station*", n.d. Web. 21 July 2016. http://www.joplinglobe.com/news/local_news/empire-launches-electric-vehicle-initiative-joplin-charging-station/article_38a0ec66-c4f7-591c-9bef-ba12039b5c9d.html

There were 677 publicly available charging ports throughout Missouri as of May 31, 2016. Many of the stations offer free charging, while others have a per hour and a minimum charge. Details on the specific locations can be found in the table attached as Appendix C.[42] ChargePoint also provided ChargePoint specific data on the usage of the public charging stations in Missouri.[43]

XI. Staff's Conclusions and Recommendations

After reviewing all of the information presented at the workshop and provided in the docket, Staff is of the opinion that existing Missouri law generally requires the Commission to regulate the operation of EV charging stations and the rates charged for their use. Captive ratepayers should not be required to pay for charging station networks that will only directly benefit a small number of ratepayers. The cost causer or the end user (EV owners) of the electricity should be required to pay. Further, the indirect benefits commonly praised by the industry are dependent on the utilities' use of EVs for supply-side and demand response resource technologies.

Where persons using EV charging stations are not charged for the service, Staff opposes recovery of cost of service from ratepayers. Recovery from ratepayers of the cost of EV charging stations should be limited to the useful life of each charging station. Staff recommends the Commission ensure tax credits and all other non-ratepayer funds received for the network are fully accounted for and removed from the overall costs of the projects, thereby reducing the ratepayer recovery.

[42] See Item No. 94 in EFIS. ChargePoint Public Charging Stations in Missouri.
[43] Id. ChargePoint Missouri Charging Station Utilization Data.

Staff has assembled the following recommendations.

I. EV charging stations and their operation are generally within the jurisdiction of the Commission.

II. If ratepayer recovery of network implementation, operation and maintenance costs is considered:

1. IOUs consider mandatory TOU rates for all public charging stations and for EV owners.

III. To learn from the pilot projects, Staff recommends the IOUs gather data and report annually to the Commission and interested stakeholders on the impact of EVs on grid reliability as items such as:

a. 1. EV Load Leveling

i. Did the load increase overnight due to EV charging?

ii. Did the load level as a direct result of the EV charging network?

iii. Did the EV load allow the utilities to spread out fixed generation cost and recover over a greater amount of electricity sold?

iv. Impact on customer bills due to EV load and the resulting load leveling?

v. Did the EV network prevent periods of over-generation?

vi. Did the EV network smooth out large load ramps in the morning and evening?

IV. The IOUs explore various emerging technologies and their impact on the areas of demand-response, supply-side resourcing and second battery life programs.

Attachments

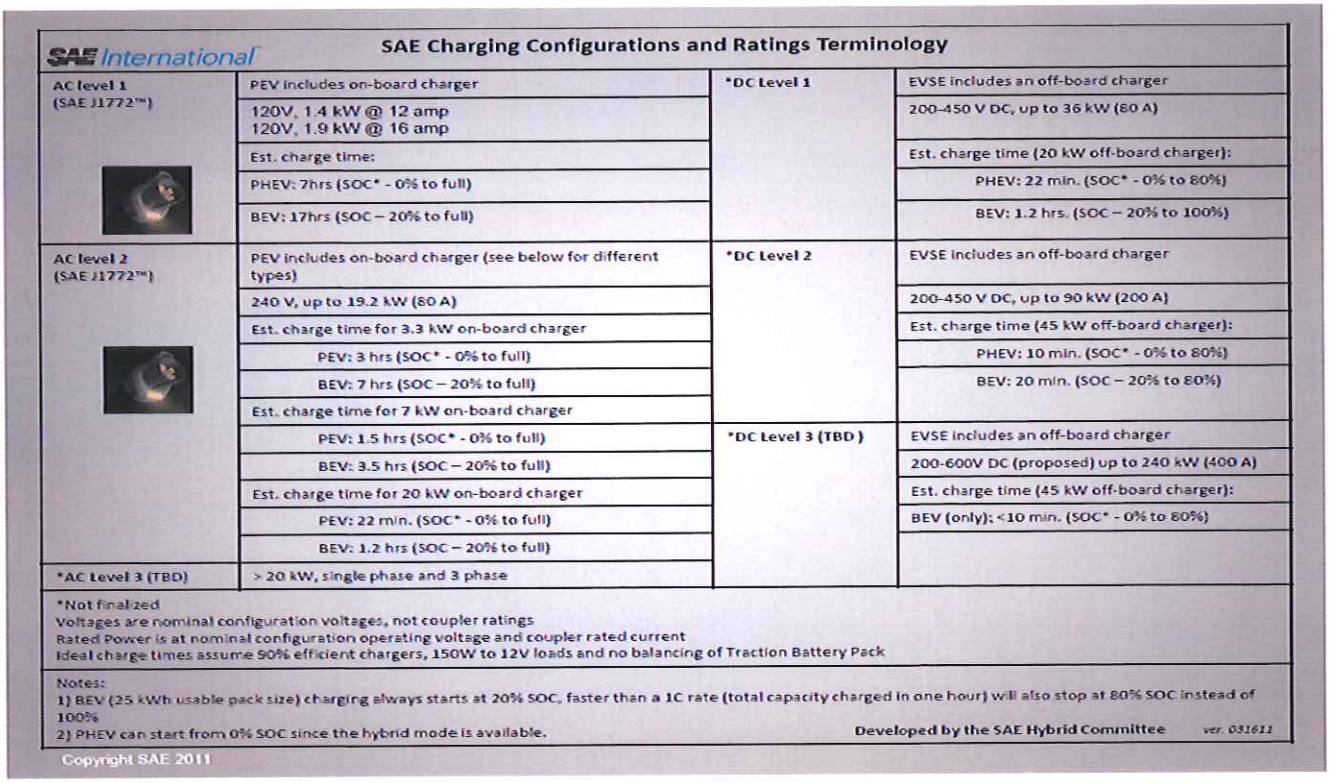
Attachment A: ChargePoint Infrastructure 101[35]

Type	Power Supply		Charger Power	Charging Level	Charger Location	Charge Time	Miles Per Hr Charge
Trickle Normal	120VAC Single Phase	12A	1.4kW	Level 1 (L1)	On-board	18+hr	5
	240VAC Single Phase	15A	3.3kW	Level 2 (L2)		8hr	12
		30A	6.6kW			4hr	25
DC Fast	480VAC 3-phase		50kW	DC Fast Charge (DC L2)	Off-board	<30min	200

Attachment B: SAE Charging Configurations and Ratings Technology[36]

[35] Ex. 97, presentation - are all electric vehicle charging stations created equal - ellis - chargepoint.pptx, Slide 13
[36] Ex. 97, presentation - are all electric vehicle charging stations created equal - ellis - chargepoint.pptx, Slide 14

Attachment B



SAE International

SAE Charging Configurations and Ratings Terminology

AC level 1 (SAE J1772™)	PEV includes on-board charger	*DC Level 1	EVSE includes an off-board charger
	120V, 1.4 kW @ 12 amp 120V, 1.9 kW @ 16 amp		200-450 V DC, up to 36 kW (80 A)
	Est. charge time:		Est. charge time (20 kW off-board charger):
	PHEV: 7hrs (SOC* - 0% to full)		PHEV: 22 min. (SOC* - 0% to 80%)
	BEV: 17hrs (SOC – 20% to full)		BEV: 1.2 hrs. (SOC – 20% to 100%)
AC level 2 (SAE J1772™)	PEV includes on-board charger (see below for different types)	*DC Level 2	EVSE includes an off-board charger
	240 V, up to 19.2 kW (80 A)		200-450 V DC, up to 90 kW (200 A)
	Est. charge time for 3.3 kW on-board charger		Est. charge time (45 kW off-board charger):
	PEV: 3 hrs (SOC* - 0% to full)		PHEV: 10 min. (SOC* - 0% to 80%)
	BEV: 7 hrs (SOC – 20% to full)		BEV: 20 min. (SOC – 20% to 80%)
	Est. charge time for 7 kW on-board charger		
	PEV: 1.5 hrs (SOC* - 0% to full)	*DC Level 3 (TBD)	EVSE includes an off-board charger
	BEV: 3.5 hrs (SOC – 20% to full)		200-600V DC (proposed) up to 240 kW (400 A)
	Est. charge time for 20 kW on-board charger		Est. charge time (45 kW off-board charger):
	PEV: 22 min. (SOC* - 0% to full)		BEV (only): <10 min. (SOC* - 0% to 80%)
	BEV: 1.2 hrs (SOC – 20% to full)		
*AC Level 3 (TBD)	> 20 kW, single phase and 3 phase		

*Not finalized
Voltages are nominal configuration voltages, not coupler ratings
Rated Power is at nominal configuration operating voltage and coupler rated current
Ideal charge times assume 90% efficient chargers, 150W to 12V loads and no balancing of Traction Battery Pack

Notes:
1) BEV (25 kWh usable pack size) charging always starts at 20% SOC, faster than a 1C rate (total capacity charged in one hour) will also stop at 80% SOC instead of 100%
2) PHEV can start from 0% SOC since the hybrid mode is available.

Developed by the SAE Hybrid Committee ver. 031611

Copyright SAE 2011

Attachment C: Connectors

EV Charging Station Connectors ChargePoint

	SAE J1772 (AC)	SAE J17772 CCS (DC)	CHAdeMO (DC)	Tesla
Connector				
Vehicle Inlet				

ChargePoint is the charging station provider for KCPL[37].

[37] Ex. 97, presentation - are all electric vehicle charging stations created equal - ellis - chargepoint.pptx, Slide 15

Attachment D: Where are drivers charging their EVs[38]?

Where Are Drivers Charging Their EVs?

Home	Work	Public - Retail	Highway Charging
Single Driver	Employees	General Public, Customers	Long Distance Drivers
Level 1 and 2	Level 2	Level 2, Fast DC 20KW	Fast DC 50KW
Overnight	Daytime	Business Hours	Occasionally, Quick Charge
Residential Garage/Driveway	Designated Parking Spaces	Retail Outlets, Public Parking	InterCity. Highways

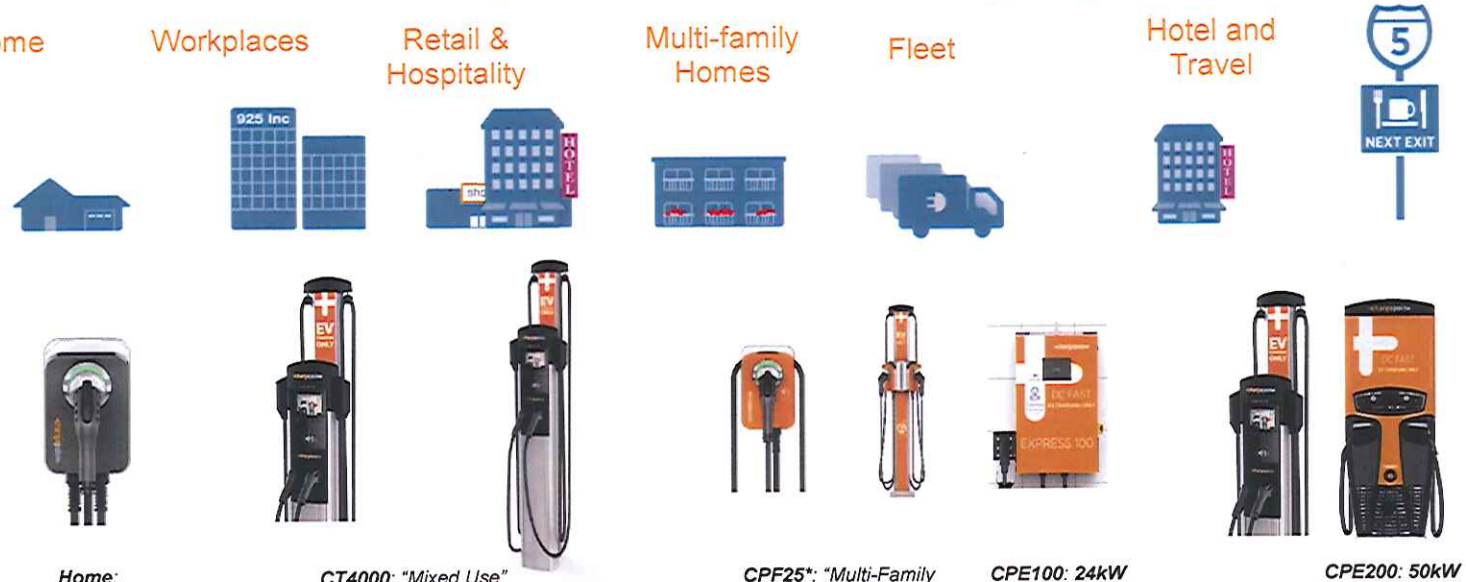
19

[38] Ex. 97, presentation - are all electric vehicle charging stations created equal - ellis - chargepoint.pptx, Slide 19

Attachment E: Different Sites Require Different Charging Stations

Different Sites Require Different Charging Stations...

Home | Workplaces | Retail & Hospitality | Multi-family Homes | Fleet | Hotel and Travel



Home:
Single Family Home

CT4000: *"Mixed Use" Level 2 charger*

CPF25*: *"Multi-Family and Fleet Applications*

CPE100: 24kW
DC Fast Charger

CPE200: 50kW
DC Fast Charger

Appendix A

Workshop for Working Case – File No. EW-2016-0123

Working Case Regarding Electric Vehicle Charging Facilities

NOTE: The Commission ordered the establishment of a working case to gather information and address the unresolved legal and long-term policy issues related to electric vehicle (EV) charging stations. Staff was directed to investigate and file a report by June 1, 2016. Your input is very much appreciated and will be used to inform Staff's report to the Commission regarding electric vehicle charging facilities. The Commission values the input of all stakeholders and is soliciting input from everyone. Feel free to skip any questions that aren't specific to your individual area of responsibility. Please review the questions below and submit your written response in EFIS.

1. What is the Missouri Public Service Commission's role in regulation of electricity from a charging station to an electric vehicle? Please provide the legal justification for your response.

2. What is the Missouri Public Service Commission's role in regulation of electricity from a utility to a charging station? Please provide the legal justification for your response.

3. Are Investor Owned Utilities ("IOU") the only enties that can provide electricity to electric vehicles via a charging station? What other entity (ies) can provide electricity to electric vehicles via charging stations? Is the answer dependent on whether the entity (ies) charges for the electricity? Please provide the legal justification for your response.

    a. Is there a legal restriction which would prevent any company other than the local IOU electric company from providing electricity to an EV charging station?
    b. Is the local IOU electric company obligated by law to provide electricity to EV charging stations?
    c. What impact do the responses provided above in sub-bullets a and b have on EV charging stations that are installed and operational as of this date?

4. Is each charging station a distinct electric utility?

5. How will there be accessibility to electric vehicles for low-income ratepayers? At what point in time would accessibility to electric vehicles for low-income ratepayers occur?

6. How many EV charging stations are there in your company's service territory?

    a. Who owns the charging station(s)?
    b. Who operates the charging station(s)?
    c. Does the EV owner pay for the electricity used to charge the vehicle?

7. What are other states doing to fund the development and installation of EV charging stations? Is cost recovery allowed through a utility's rates? Please include a reference to any legal authority that explicitly authorizes the method of funding or cost recovery.
8. Based on the current generation mix of your utility, will carbon emissions, NOx, or SOx increase or decrease if electric vehicle adoption increases? Please explain.

9. Who should pay for the equipment, installation and maintenance for the EV charging station networks?

10. How are other countries promoting public use of EV charging stations?

Questions for Natural Gas Utilities:

1. Does your utility own or operate compressed natural gas (CNG) facilities for vehicular use? If so, please state the number of CNG facilities, who can access them (e.g. open to the public), and if they are included as a regulated activity.

2. Is your Company aware of other entities that own or operate CNG facilities in your service territory? If so, please provide an estimate of the number of CNG facilities and who can access them (e.g. open to the public).

3. Please state the Company's current assessment of the CNG vehicle market, including potential and likely future growth.

4. Is the Company aware of actions that other states have done to promote the adoption of CNG vehicles? If so, please describe.

5. Is the Company aware of any state policies that promote or inhibit the further adoption of CNG vehicles in Missouri? If so, please describe.

APPENDIX B

The White House
Office of the Press Secretary

For Immediate Release

July 21, 2016

FACT SHEET: Obama Administration Announces Federal and Private Sector Actions to Accelerate Electric Vehicle Adoption in the

United States

The Obama Administration is taking responsible steps to combat climate change, increase access to clean energy technologies, and reduce our dependence on oil. That is why, today, on the heels of the United States Department of Energy's (DOE) first-ever **Sustainable Transportation Summit**, the Administration is announcing an unprecedented set of actions from the Federal government, private sector, and states, as well as a new framework for collaboration for vehicle manufacturers, electric utilities, electric vehicle charging companies, and states, all geared towards accelerating the deployment of electric vehicle charging infrastructure and putting more electric vehicles on the road. The collaboration, forged by the White House in partnership with DOE and the Department of Transportation (DOT), the Airforce and the Army, and the Environmental Protection Agency, and is centered on a set of *Guiding Principles to Promote Electric Vehicles and Charging Infrastructure* that nearly 50 organizations are signing on to today.

By working together across the Federal government and with the private sector, we can ensure that electric vehicle drivers have access to charging stations at home, at work, and on the road – creating a new way of thinking about transportation that will drive America forward. Today's announcements include:

- Unlocking up to $4.5 billion in loan guarantees and inviting applications to support the commercial-scale deployment of innovative electric vehicle charging facilities;
- Launching the FAST Act process to identify zero emission and alternative fuel corridors, including for electric vehicle charging across the country, and standing up an effort to develop a 2020 vision for a national network of electric vehicle fast charging stations that will help determine where along the corridors it makes the most sense to locate the fast charging infrastructure;
- Announcing a call for state, county, and municipal governments to partner with the Federal government to procure electric vehicle fleets at a discounted value;
- Leveraging the power of data and hosting an 'Electric Vehicle Hackathon' to discover insights and develop new solutions for electric vehicle charging;
- Publishing a guide to Federal funding, financing, and technical assistance for electric vehicles and charging stations; and
- 35 new businesses, non-profits, universities, and utilities signing on to DOE's Workplace Charging Challenge and committing to provide electric vehicle charging access for their workforce.

Today's announcements build on a record of progress from multiple programs across the Administration that are working to scale up electric vehicles and fueling infrastructure, including at the Departments of Energy, Transportation, Defense, and at the Environmental Protection Agency. In fact, in the past eight years the number of plug-in electric vehicle models increased from one to more than 20, battery costs have decreased 70 percent, and we have increased the number of electric vehicle charging stations from less than 500 in 2008 to more than 16,000 today – a 40 fold increase.

UNPRECEDENTED ELECTRIC VEHICLE COALITION FORGED AMONG NEARLY 50 VEHICLE MANUFACTURERS, ELECTRIC UTILITIES, ELECTRIC VEHICLE CHARGING COMPANIES, STATES, AND ORGANIZATIONS TO INCREASE ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Today, in collaboration with the Administration, nearly 50 industry members are signing on to the following ***Guiding Principles to Promote Electric Vehicles and Charging Infrastructure***. This commitment signifies the beginning of a collaboration between the government and industry to increase the deployment of electric vehicle charging infrastructure.

Building on existing partnerships among federal government, states and communities, electric vehicle and charging infrastructure manufacturers and retailers, electric utilities, national laboratories, universities, and nongovernmental organizations, we endorse the following guiding principles to enhance electric vehicle use and create a national, household, workplace, and urban charging infrastructure that is available to all Americans:

- *Drive the market transformation to electric vehicles by making it easy for consumers to charge their vehicles with grid-connected infrastructure that is accessible, affordable, available and reliable, and interconnected with other low-carbon transportation options where feasible.*
- *Promote electric vehicle adoption by increasing access to charging infrastructure and supporting the development of plug-in electric vehicles that are as accessible, available, and convenient as gasoline-powered vehicles.*
- *Promote a robust market for vehicle manufacturers, utilities, equipment service providers, and support industries that ensures a consistent user experience, customer choice, and allows for a streamlined permitting process.*
- *Enhance American manufacturing competitiveness, innovation, and the development of advanced technology.*
- *Attract and leverage private, State, and Federal investment in electric vehicle deployment, infrastructure, research and development, and education and outreach.*
- *Enable smart charging and vehicle grid integration through solutions such as demand response, and other energy storage and load management strategies.*

Signatories to the *Guiding Principles to Promote Electric Vehicles and Charging Infrastructure* include the following industry members, agencies, organizations, and states:

- Avista
- Berkshire Hathaway Energy
- BMW
- California Air Resources Board
- ChargePoint
- Consumers Energy

- Con Edison
- Connecticut Green Bank
- Dayton Power & Light Company
- Duke Energy
- Edison Electric Institute
- Electric Drive Transportation Association (EDTA)
- Eversource Energy
- EVGo
- Florida Power and Light Company
- Ford
- Georgia Power
- General Motors
- Greenlots
- Hawaiian Electric
- Hawai`i Electric Light
- Maui Electric
- Indianapolis Power & Light Company
- Kansas City Power & Light
- Louisville Gas & Electric and Kentucky Utilities
- Mercedes-Benz USA, LLC
- National Association of State Energy Officials (NASEO)
- National Grid
- NextGen Climate America
- New York State
- Nissan
- Orange and Rockland
- Portland General Electric
- PPL Electric Utilities
- Pacific Gas & Electric
- PNM Resources
- Puget Sound Energy
- Southern California Edison
- Southern Company: Alabama Power
- Southern Company: Georgia Power
- Southern Company: Gulf Power
- Southern Company: Mississippi Power
- State of California
- TECO Energy
- Tesla
- Westar Energy

EXECUTIVE ACTIONS TO INCREASE CHARGING INFRASTRUCTURE

Providing Financing to Scale Up Charging Infrastructure

Unlocking Up $4.5 billion in Loan Guarantees and Inviting Applications to Support Innovative Electric Vehicle Charging Facilities: Today, the DOE's Loan Program Office (LPO) issued a supplement to its Title XVII Renewable Energy and Efficient Energy (REEE) Projects Solicitation, clarifying that certain electric vehicle (EV) charging facilities – including associated hardware and software – is now an eligible technology under the solicitation. The solicitation can provide up to $4.5 billion in loan guarantees to support innovative renewable energy and energy efficiency projects in the United States. Loan guarantees can be an important tool to commercialize innovative technologies because these projects may be unable to obtain full commercial financing due to the perceived risks associated with technology that has never been deployed at commercial scale in the United States. The DOE's LPO supports a large, diverse portfolio of more than $30 billion in loans, loan guarantees, and commitments to approximately 30 closed and committed projects nationwide, including leading edge renewable energy projects, advanced technology vehicle manufacturing facilities, and two of the first new nuclear reactors to begin construction in the United States in more than three decades.

Publishing a Guide to Federal Funding, Financing and Technical Assistance for EVs and Charging Stations: DOE and DOT are publishing a guide to outline specific examples of funding programs, financing incentives, and technical assistance to help advance the nation's economic, environmental, and energy security, through the support of EVs and charging stations that reduce petroleum use and greenhouse gas emissions from the transportation sector. It will also list current tax credits and incentives applicable to EV charging. The DOE's Alternative Fuels Data Center provides a comprehensive database of federal and state programs that support EVs and infrastructure.

Supporting the Development of Electric Vehicle Charging Corridors

Launching the Process to Designate Alternative Fuel Corridors as Part of the Fixing America's Surface Transportation (FAST) Act: Today, the DOT is soliciting nominations from State and local officials to assist in making designations for alternative fuel corridors. Section 1413 of the FAST Act requires that the Secretary of Transportation designates national EV charging, hydrogen, propane, and natural gas fueling corridors, and the nomination process will ensure that the corridors proposed for designation will create a national network of alternative fuel facilities. In designating corridors, the DOT will (1) consider the nominated facilities, (2) incorporate existing corridors designated by States, and (3) consider the demand for, and location of, existing fueling stations and infrastructure. DOT will also evaluate applications based on their ability to reduce emissions and collaborate across the public and private sector. Details on this program can be found here or here.

Developing Criteria and Proposing a Plan for a National Network of Fast Charging Stations for EVs: DOE and DOT have agreed to partner on the development of a 2020 vision for a national network of fast charging stations for EVs in order to facilitate coast to coast, nationwide zero emissions travel.

Building upon DOT's planned designation of alternative fuel corridors under the FAST Act, DOE and DOT, in cooperation with the DOE National Laboratories, DOT Volpe Center, and other government and industry stakeholders, will commence efforts in fiscal year 2017 to develop criteria that will help identify specific locations for siting fast charging infrastructure adjacent to the DOT-designated national and community corridors. The proposed effort will address four key areas important to evaluating the potential for a national network for fast charging including: (1) siting criteria for charging locations; (2) charging and utility infrastructure needs and cost assessment; (3) impacts of electric demand charges to consumers and utilities; and (4) potential longer-term innovations including evolution up to 350 kilowatt (kW) fast charging. The partnership will address these questions to provide the necessary information for the basis of a dialogue with stakeholders to help define public-private partnerships, funding, and financing models for implementing a national fast charging network. Along those lines, the DOE and DOT will be convening stakeholders this fall to identify critical needs for a national network of fast charging stations.

Expanding the Electric Vehicle Fleet

Inviting State, County, and Municipal EV Fleets to Join Forces with the Federal Government in EV Procurement: The Office of Federal Sustainability is inviting State, county and municipal government fleets to join forces with Federal agencies to maximize their collective buying power, and aggregate their EV and charging infrastructure purchases. In doing so, governments at all levels can lower their procurement costs, expand technology availability, and increase automotive manufacturers' demand certainty. The Office of Federal Sustainability will partner with government and agency fleet purchasers to coordinate and aggregate the purchasing of EV fleets, with distinct acquisition procurement strategies to be determined. Alone, the federal government plans to purchase more than 500 plug-in hybrid electric vehicles (PHEV) or EVs in fiscal year 2017.

DOE's Office of Energy Efficiency and Renewable Energy (EERE) will be Signing a Memorandum of Understanding (MOU) with the American Public Power Association (APPA) to Collaborate on Municipal Fleet Electrification: Through this agreement, EERE and APPA will ensure collaborative efforts to enable electrification of personal and fleet transportation in municipalities throughout the United States. EERE and APPA will provide information to increase education and awareness of the benefit of EVs to public power utilities and local officials, and develop a community action plan focused on smaller communities with fewer than 200,000 electric customers. The partnership will also work to enhance workplace charging efforts at public power utilities, study the impacts of EVs in public power communities, and share insights regarding infrastructure installation and EV interaction with the modern grid.

Driving Technological Innovation and Increasing Access to Data

Leveraging the Power of Data through an 'EV Hackathon': Today, the White House Office of Science and Technology Policy (OSTP) is announcing that they will host an EV hackathon this fall. Hackathons are events that bring together coders, data scientists, topic experts, and interested members of the public to discover insights and develop new solutions. The event will take place in concord with the release of anonymized data on EV charging stations to the research and software development community. The 'EV

Hackathon' represents a unique opportunity to bring together the EV and software communities to collaborate to enhance EV deployment.

Conducting a Technology Study to Explore the Feasibility for Fast Charging, up to 350 KW, for EVs: DOE will partner with industry, the National Laboratories, and other stakeholders to develop a study that will examine the vehicle, battery, infrastructure, and economic implications of direct current (DC) fast charging of up to 350 kW, which is expected to be completed by the end of 2016. A 350 kW charging system could charge a 200 mile range battery in less than 10 minutes. The implementation of DC fast charging has the potential to impact many technology areas and tackle key technological barriers associated with high rate charging (50 kW and above), and fast charging increases the utility of EVs, aides in their adoption, and helps enable widespread use of EVs.

Announcing that the Pacific Northwest National Laboratory (PNNL) will Lead Research to Achieve the Strategic Battery500 Goal: A multi-partner team, led by PNNL as part of the Battery500 research consortium, will receive an award of up to $10 million per year for five years to drive progress on DOE's goal of reducing the cost of vehicle battery technologies. Battery costs exceeded $500/kWh when President Obama launched his EV Everywhere Grand Challenge goal of making EVs that are as affordable and convenient for the American family as gasoline-powered vehicles, and low-cost, high performance batteries are a key component of the strategy to attain the President's goal. The Battery500 Consortium aims to triple the specific energy (to 500 WH/kg) relative to today's battery technology while achieving 1,000 electric vehicles cycles. This will result in a significantly smaller, lighter weight, less expensive battery pack (below $100/kWh) and more affordable EVs. The Battery500 consortium will include four DOE National Laboratories and five universities in an effort aimed at achieving revolutionary advances in battery performance. Consortium partners include the following:

- Pacific Northwest National Laboratory (research partner and advisory board)
- Brookhaven National Laboratory
- Idaho National Laboratory
- SLAC National Accelerator Laboratory
- Binghamton University (State University of New York)
- Stanford University (research partner and advisory board)
- University of California, San Diego
- University of Texas at Austin
- University of Washington
- IBM (advisory board)
- Tesla Motors, Inc. (advisory board)

Increasing Charging Infrastructure in Our Homes and Workplaces

The Standard for High Performance Green Buildings Will Consider a Revision to Encourage EV-Ready Building Practices: By employing EV-Ready building practices, multi-unit dwelling and

commercial building developers can prepare a facility with electrical infrastructure to accommodate a future charging station installation, resulting in significant cost savings for building owners and tenants. To encourage more EV-Ready development in cities and states across the country, an EV-Ready building code measure has been introduced to the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 189.1, a standard for high performance green buildings that in 2018 will become the basis for the International Green Construction Code. Through the adoption of this EV-Ready building practice, cities and states can align with the EV building strategies identified by Federal agencies in the 2016 **Guiding Principles for Sustainable Federal Buildings**.

Expanding DOE's Workplace Charging Challenge to Include 35 New Businesses, Non-profits, Universities, and Utilities: DOE's **Workplace Charging Challenge** encourages America's employers to commit to providing EV charging access for their workforce. Vehicles are parked at homes and workplaces most of the time, making the Workplace Charging Challenge a significant opportunity to expand our nation's charging infrastructure. In fact, charging at work can potentially double an EV driver's all-electric daily commuting range. Participating employers include organizations that are assessing their employees' need for charging to those who have successfully launched workplace charging programs. DOE's Workplace Charging Challenge has grown to more than 350 partners since its launch in January 2013, and is on track to meet its goal to partner with 500 United States employers by 2018. The 35 new partners announced today include:

- Bates College
- Berkshire Hathaway Energy
- CenterPoint Energy, Inc.
- City of Seattle
- Clean Future, Inc.
- Confluence Environmental Center
- Con Edison
- Duke Energy Carolinas
- Duke Energy Florida
- Duke Energy Indiana
- Duke Energy Kentucky
- Duke Energy Ohio
- Duke Energy Progress
- Eugene Water & Electric Board
- Fresh Start Detail Co.
- Hawai`i Electric Light Company
- Hawaiian Electric Company
- Hyundai
- Joseph Hughes Construction
- Maui Electric Company

Morris Energy Consulting
- NIKE, Inc.
- North American University
- North Coast Electric
- Olympic College
- Orange and Rockland Utilities
- Southern Company: Alabama Power
- Southern Company: Georgia Power
- Southern Company: Gulf Power
- Southern Company: Mississippi Power
- Southwest Clean Air Agency
- Sustainable Future LLC
- The Valley Hospital
- University of Oregon
- Utah Valley Hospital

PRIVATE SECTOR COMMITMENTS TO INCREASE ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Twelve utilities and charging companies are announcing commitments to increase deployment of EVs and charging infrastructure, and to use the ***Guiding Principles to Promote Electric Vehicles and Charging Infrastructure*** to work together to accelerate EV deployment.

Utilities

- **Avista** commits to install electric vehicle supply equipment (EVSE) in its Eastern Washington service territory, as part of a two-year pilot program recently approved by the Washington Utilities and Transportation Commission. Provided full participation levels, Avista expects to install a total of 272 EVSE connection ports in approximately 200 different locations: 120 in residential homes, 50 at workplaces, and 30 in public locations, including 7 DC fast chargers to enable regional EV travel.
- **Florida Power and Light (FPL)** is committed to the mass market adoption of EVs by working with local, state, and federal stakeholders on initiatives that will help drive EV adoption. FPL will continue to educate and support residential and commercial customers on the benefits of EVs and work with them to remove barriers to adoption. FPL also commits to continue to place EVs into its fleet when possible.
- The **Hawaiian Electric Companies** have committed to work with all stakeholders to support EVs as part of reaching the islands' goal of 100 percent renewable energy for electricity by 2045. The Hawaiian Electric Companies will continue to install more DC fast charging stations, research demand management and demand response strategies in EV charging and seek new policy and infrastructure opportunities to provide reliable, clean power for EV charging.
- **Kansas City Power & Light (KCP&L)** commits to continuing its leadership and support of the

electric transportation market by deploying 10 percent of its Clean Charge Network in underserved and low-income areas of its service territory. KCP&L believes that charging infrastructure should be available and accessible to its customers of all income levels.

- **National Grid** commits to help accelerate EV and EV charging market growth in the Northeast, by bringing forward regulatory proposals for new EV charging infrastructure development and consumer education in the territories it serves. These initiatives will build on the company's planned efforts to demonstrate new technologies such as DC fast charging, expand workplace charging for employees, and increase plug-in vehicles and technology deployment within the company fleet.
- **Portland General Electric (PGE)**, Oregon's largest electric utility company, commits to engage stakeholders and submit a proposed plan to Oregon Public Utility Commission in 2016 defining the utility role in transportation electrification, pursuant to recently passed Oregon legislation, which identifies transportation electrification as key to meeting Oregon's greenhouse gas emissions targets. PGE also commits to work with Federal partners, including DOT and DOE, and the Edison Electric Institute in appropriate leadership roles to continue to advance transportation electrification. PGE will spend 5-10 percent of its corporate fleet budget on electrification, and commits to encourage and incentivize PGE employees to acquire EVs and serve as ambassadors for electrification.
- The **Public Service Company of New Mexico (PNM)** will provide the associated infrastructure to the City of Albuquerque for their purchase of an all-electric bus fleet for the soon to be built Albuquerque Rapid Transit system. The project is the first of its kind in New Mexico and the first all-electric Bus Rapid Transit system in the United States.
- **Southern California Edison (SCE)** will collaborate with stakeholders to develop plans to meet California Senate Bill 350 requirements for on-going, comprehensive utility programs and investments to accelerate widespread adoption of transportation electrification. SCE's plans will complement stakeholders' efforts to expand available charging infrastructure, deliver effective market education and outreach, encourage incentives, and improve customers' experience. SCE will also launch its Clean Fuel Reward program in 2016 to provide incentives to residential EV owners using proceeds from California's Low Carbon Fuel Standard program.
- **Southern Company** and its electric-generating traditional operating companies – Alabama Power, Georgia Power, Gulf Power, and Mississippi Power – have been and will continue to be leaders in the advancement and promotion of the electric transportation market. Southern Company remains active in both the on-road and non-road markets, working with industry, municipalities, government, and the military to further the use of electric transportation and to ensure the development of necessary charging infrastructure. Southern Company is committed to consumer education through social media outreach and community charging programs as well as special concierge events provided through the REVolution program. The Southern Company Energy Innovation Center, meanwhile, continues to facilitate and encourage industry research aimed at improving the effectiveness and cost-efficiency of EV technology.
- **The Edison Electric Institute (EEI)** will work with its member electric companies and their associated state regulatory commissions to a) provide the charging infrastructure needed to scale electric transportation, b) develop measures that support the market while controlling costs and

ensuring benefits are shared by all customers, and c) engage in direct outreach and education to customers.

Charging Companies

- **ChargePoint** commits up to $20 million toward the deployment of a national network of high-speed charging stations as part of public-private partnerships. This includes research and development investments, site identification, smart city deployments and DC fast charger corridors. ChargePoint will work with the DOT, other Federal, State, and local government agencies, and private entities to determine the optimal location for such high-speed charging stations, and to secure financing from private entities and through public-private partnerships. In order to future-proof the network, ChargePoint is committed to developing a line of high-speed DC fast chargers with 125-350 kW charging capacity. ChargePoint commits to work with the broader industry to develop the standards necessary for interoperability, allowing drivers to use one account to charge at stations manufactured by multiple vendors. ChargePoint commits to make access to its high-speed network simple, accessible and convenient through industry-leading driver services and mobile applications. ChargePoint commits to work with original equipment manufacturers (OEMs) to make data available to help optimize their vehicle programs and better understand driver behavior. ChargePoint commits to work with utilities to make data available to help improve vehicle grid integration and better understand driver behavior.
- **EVgo** commits to invest $100 million in EV infrastructure over the next 5 years to expand its nation-leading charging network. This investment will focus on providing customers with access to high-speed charging at charging rates significantly faster than what is available on the market today.

BUILDING ON PROGRESS

The above-mentioned private sector commitments announced today build on a history of progress to increase EV adoption and promote EV charging infrastructure, which is illustrated by the following:

Automakers

- **BMW Group** is dedicated to improving EV technology and increasing EV adoption. In pursuit of this goal, the BMW Group has committed to producing BMW iPerformance vehicles, or plug-in hybrid versions of all of its volume models. The first model, the BMW X5 xDrive40e, was released in fall 2015, and was followed this year by the 330e Sedan and the 740e xDrive Sedan. The BMW Group is committed to advancing battery technology through research partnerships, including with the DOE's Argonne National Laboratory, and will continue to support DC fast charging infrastructure in the United States. BMW successfully launched 'project i' with the plug-in hybrid i8 and the all-electric i3 in 2014, and the inclusion of a plug-in hybrid version in all of its volume models.
- **Ford** is investing an additional $4.5 billion in electrified vehicle solutions, adding 13 new electrified

vehicles to its product portfolio by 2020. More than 40 percent of Ford's nameplates globally will be electrified by the decade's end.

- **General Motors** will introduce the industry's first long-range, affordable EV later this year. The Chevrolet Bolt EV will provide more than 200 miles of range on a full charge, be priced under $30,000 (net full federal tax credits) and will be produced at General Motor's assembly plant in Orion Township, Michigan. The 2017 Chevrolet Bolt EV, along with the range-extended electric Chevrolet Volt, will soon be included in the General Motors and Lyft Express Drive fleets in select markets. This short-term vehicle access program will provide exposure to EVs from the largest EV fleet in ridesharing to drivers and passengers alike. General Motors also will continue investing in battery technology and expertise, including at the largest battery lab of any automaker in North America, and remain a champion of workplace charging. General Motors has installed over 500 workplace chargers for use by employees and visitors to General Motors campuses around the United States.
- **Mercedes Benz** will have 10 plug-in hybrids available by next year.
- **Nissan** has sold more than 95,000 LEAF EVs in the United States, and uses a multi-pronged approach to invest with charging partners to install EV charging infrastructure at corporate workplaces, metro communities and Nissan dealerships. Nissan has led the tenfold increase in CHAdeMO fast chargers available nationally since 2013 with now more than 1,840 fast chargers available at retail, hospitality, fueling station, and dealership locations. These fast chargers can charge an all-electric LEAF up to 80 percent in 30 minutes, greatly extending the range of the vehicle. In addition, under the 'No Charge to Charge' promotion, Nissan has made over 900 of these public Fast Chargers available for free to new LEAF buyers for 2 years across 38 key markets, with another 12 markets launching in 2016. As a result, Nissan's expansion of metro-area fast charging will cover cities and communities representing 90 percent of LEAF sales. Nissan continues to work collaboratively with charging network providers, charger manufacturers, utilities, retail site hosts and importantly, other automotive OEMs to ensure the continued growth of open-standard fast charging to expand and connect Nissan's community charging network investment across the country.
- **Tesla** will start volume deliveries of Model 3 in late 2017, which will have a range of at least 200 miles, meaning that affordable long range EVs will be available on the market sooner than analysts predicted. Tesla has already started operations at the $5 billion Gigafactory it is building outside Reno, Nevada, which will manufacture batteries, ensuring that EVs are powered by American-made, high-quality, and affordable batteries.

Charging Companies

- **ChargePoint** operates the largest and most open EV charging network in the world, with more than 30,000 total charging spots and over 330 DC fast charging locations. To date, ChargePoint drivers have traveled 396,800,000 miles on the ChargePoint network. Recently, ChargePoint successfully completed the Express Corridor project, in which it deployed nearly 100 DC fast chargers along the East and West Coast, including in partnership BMW.
- **EVgo** works closely with automakers like Nissan, BMW, and Ford to develop a vehicle-centric

customer experience. These partnerships have brought customers faster charging speeds and more charging locations, allowing EVgo to operate 700 DC fast chargers in more than 35 top metro markets across the country. In 2015, EVgo's public high-speed charging network delivered more than 21 million EV miles, saving nearly 900,000 gallons of gas and offsetting nearly 10 million pounds of carbon dioxide.

Utilities

- **Avista**, in Spokane, Washington, is committed to supporting electric transportation, starting with its first installation of three public EV charging stations in 2010. Avista followed this with a commitment to electrify its fleet with at least 5 percent of fleet budget allocated to electrification, installation of workplace charging and participation in DOE's Workplace Charging Challenge, with over 40 port connections planned at its facilities over the next four years; ongoing technical support and education for residential and commercial customers; and collaboration with regional utilities to form the Pacific Northwest Utilities Transportation Electrification Collaborative as a forum to share best practices and accelerate the transition to electric transportation. Most recently, Avista successfully filed and received approval from the Washington Utilities and Transportation Commission to proceed with a pilot program to install utility-owned EV charging infrastructure at customer homes, businesses and public locations.
- **Consumers Energy** has submitted a proposal to the Michigan Public Service Commission to advance EV infrastructure in Michigan. Consumers has developed a comprehensive program to enable EV travel across the state with the placement of DC fast chargers at 30 locations, increase the presence of Level 2 chargers by 400 units, generate Workplace Charging programs with 40 employers, and reinstate home charging incentives for 2,500 customers. This broad approach will help escalate EV adoption, expand customer transportation options, incite and support Michigan's motivation toward smart mobility, emerging technologies, job creation, and sustainability.
- **Eversource Energy**, with a goal of reducing the region's carbon footprint, has created EV opportunities for its customers, and employs a multifaceted approach to reducing emissions for its fleet vehicles as well. As of the end of 2015, there were about 6,500 EVs in the company's service territory with over 700 publicly accessible charging stations in the region. In 2014, along with other utility members of the Edison Electric Institute, Eversource pledged to commit five percent of its annual fleet spending on EV technologies. The company's support has funded EV rebates for about 450 vehicles in Connecticut. In Massachusetts, Eversource serves as a commissioner on the Commonwealth's Zero Emission Vehicle Commission, which serves to study the economic and environmental benefits and costs of increased use of zero emission vehicles in the Commonwealth. Eversource is working with the Massachusetts Department of Energy Resources on programs to advance the EV market through a combination of studies, outreach and education, and the rate pilot program. Eversource is committed to explore solutions that support EV owners in its service territory, while ensuring system reliability for all of its customers.
- **Florida Power and Light (FPL)** launched its EV program in late 2010 with a focus on ensuring that it

meets customer EV needs, enabling the market to grow, and ensuring reliable service. Initiatives include education and outreach, technology pilots, employee workplace charging, fleet charging, an EV website, and local, state and federal industry involvement. The company operates a large electric fleet with over 570 HEVs and 156 PHEVs / EVs, and has installed 74 Level 1 charging stations with 139 charge ports, and 83 Level 2 stations with 160 charge ports to support both its fleet and employee vehicles. In June 2015, the company joined DOE's Employee Workplace Charging Challenge and saw employee ownership of EV's increase 500 percent in 12 months.

- **Georgia Power,** the largest subsidiary of Southern Company**,** launched a *Get Current.Drive Electric TM initiative* intended to help facilitate the adoption and use of EVs in Georgia. This comprehensive program promotes public education, the building and operation of public/community charging stations, and the offering of promotional rebates to residential and business customers for installing EV chargers. Through this two-year program, the company estimates that more than 2,500 charging stations will be installed statewide to support current and future EV drivers.
- The **Hawaiian Electric Companies** have provided customers with EV charging options since 2010, including discount utility rates for EV charging and partnerships to increase home and public charging opportunities. Hawaiian Electric, Maui Electric and Hawaii Electric Light companies have installed eight DC fast charging stations on Oahu, Maui and Hawaii Island with more to come. The stations are strategically located to reassure the islands' growing number of battery EV drivers struggling with range anxiety or unable to charge in their residences. A utility proposal for improved time-of-use rates at present is before regulators. And the JUMPSmartMaui is a collaborative demonstration project between Japan, Hawaii and Maui that incorporates Smart Grid, renewable energy, and all-EV solutions to achieve a cleaner future for Maui.
- **Kansas City Power & Light** is deploying over 1,100 charging stations as part of its Clean Charge Network to transform the market in Kansas City, Missouri. The Clean Charge Network is a network of ChargePoint Level 2 charging stations as well as DC fast chargers available to the public at locations throughout the KCP&L's service territory. Since deployment of the Clean Charge Network began in January 2015, the Kansas City metropolitan area has become number one in the United States for EV driver growth and has experienced a more than 400 percent increase in EV charging sessions, number of EV drivers, and electrical usage for EV charging.
- **Louisville Gas & Electric Co** and **Kentucky Utilities Co** developed a program that strives to expand EV infrastructure around the Commonwealth of Kentucky. In 2016, the Kentucky Public Service Commission approved the companies' application to install up to 20 Level 2 public charging stations in its service territories and an unlimited number of private entity sponsored stations. The companies will begin to roll out the stations in 2016.
- **Michigan Utilities** in conjunction with the Michigan Public Service Commission introduced a variety of Level 2 home charging reimbursement incentives in 2011. The incentive programs helped stimulate Michigan's EV adoption with over 3,500 customers participating.
- **National Grid** has supported the EV market in the Northeast since 2011 when it began installing more than 150 public charging stations, in partnership with the EVSE industry, host site customers, and state agencies. Today, more than 3,000 drivers have used these stations, filling up at locations

across Rhode Island, Massachusetts, and upstate New York. National Grid has also installed work place charging in more than 10 different company facilities and hosted multiple "ride-n-drives" for employees.

- **NV Energy,** a Berkshire Hathaway Energy operating company, has proudly supported the electrification of transportation in Nevada since 2009. The company embraced a three-pronged effort and various strategic partnerships to achieve its EV success. First, it established a favorable rate structure for residential and commercial customers to charge EVs at their homes or businesses, which has the ability to lower both EV charging and overall home or business energy costs. Second, a shared-investment program and partnership with major customers resulted in more than doubling the number of public charging stations in Nevada. These public charging stations are providing charges to EV owners at no cost for the first five years. NV Energy's third major initiative has been to partner with the Nevada Governor's Office of Energy, the DOT and rural electric associations to develop the Nevada Electric Highway, which is connecting major population centers in the state with a DC fast charging network that aligns with interconnecting highways.
- **Pacific Gas & Electric** (PG&E) continues to expand its fleet of alternative-fuel vehicles—one of the nation's largest among electric and gas utilities—by investing at least one-third of its annual fleet procurement on EVs, totaling more than $100 million.
- **Portland General Electric (PGE)** has demonstrated a commitment to EV charging and education on electrification, including: operation and improvement of "Electric Avenue" – which highlights colocation of 6 chargers, four of which are DC fast chargers; installation of EV chargers at PGE workplace locations, with 51 total chargers planned; encouraging business customers' installation of workplace charging and their participation in the DOE's Workplace Charging Challenge; delivery of education and technical assistance on electrification to retail customers; and continued annual sponsorship of the EV Roadmap Conference that emphasizes sharing of best practices and lessons learned.
- **PPL Electric Utilities** is working to encourage the everyday use of EVs throughout its service territory in central and eastern Pennsylvania. The utility uses 15 Chevy Volt vehicles as part of its fleet, and has developed an internal car-sharing program to make the EV cars available for employees' business use. PPL also offers free charging to employees through EV chargers installed at several locations. PPL is committed to investing more than 10 percent of its fleet budget on fleet electrification and is committed to buying only bucket trucks with electric lifts. Finally, the company has created a website to share information on cars and incentives with its 1.4 million customers.
- **San Diego Gas & Electric** recently received approval from the California Public Utilities Commission to install 3,500 charging stations at 350 locations in San Diego County.
- **Southern California Edison (SCE)** recently started a pilot funded by all customers to install up to 1,500 EV charging stations and launch expanded EV market education programs; is conducting a one-year pilot at the Los Angeles Air Force Base to demonstrate vehicle-to-grid vehicles; and recently completed pilots on workplace smart charging for its employees. SCE spent 20 percent of its recent annual fleet budget on electric drive vehicles; offers seven residential and commercial rates designed for transportation electrification; includes EV charging and solar carport as part of its energy

efficiency contract with Federal Aviation Administration in Palmdale California; and conducts on-going testing and evaluation of several heavy duty EVs for air districts.

- **Southern Company** launched SO Prize in 2014, an internal ideation competition that elicited nearly 1,000 innovative ideas from among the employee workforce. One of the winners of SO Prize was a proposal called REVolution, which provides for a special concierge-type service designed to help consumers pick the best EV for their lifestyle. The REVolution team has since conducted onsite events in Pensacola, Destin, and Panama City, Florida, and is exploring other ways of expanding consumer outreach through online methods. In addition, the Southern Company system's internal fleet of cars, line trucks and other vehicles is moving toward a goal of being 10 percent electric by 2018.
- The **Edison Electric Institute** signed an MOU with the DOE last year that has since led to collaboration between utilities and the Federal government on a wide range of actions, including launching an education and outreach campaign, building analytical support for investment in EV infrastructure and technology, and providing a forum for stakeholder engagement.
- **Westar Energy** was an early adopter of EVs with 10 percent of on-road fleet being electric, and has committed more than 5 percent of annual spending on EVs. Westar also installed 65 charging stations throughout its service territory. Additionally, Westar has responded to the DOE Workplace Charging Challenge by making EVs available to employees through a centralized vehicle pool for business travel and by providing free workplace charging to employees who purchase EVs.

###

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APPENDIX C

chargepoint

ChargePoint Public Charging Stations in Missouri

For more information, please visit https://na.chargepoint.com/charge_point.

Address 1	City	Port 1 Power Level	Port 2 Power Level	No. of Ports	Pricing Description
6966 Forest Park Pkwy	University City	240V30AJ1772	240V30AJ1772	2	Free
6740 Forest Park Pkwy	St Louis	240V30AJ1772	240V30AJ1772	2	Free
554 Webster University Garden Ave	Webster Groves	120V16ANEMA 5-20R	240V30AJ1772	2	Free
Hoyt Dr	Saint Louis	240V30AJ1772	240V30AJ1772	2	Free
801-899 E 24th St	Kansas City	240V30AJ1772		1	Free
5001 Oak St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5001 Oak St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5115 Oak St	Kansas City	120V16ANEMA 5-20R	240V30AJ1772	2	Free
14405 Manchester Rd	Ballwin	240V30AJ1772		1	Free
14417 Manchester Rd	Ballwin	240V30AJ1772		1	Free
14417 Manchester Rd	Ballwin	240V30AJ1772	240V30AJ1772	2	Free
5625 Veterans Memorial Pkwy	St. Peters	500V125ACHAdeMO		1	Customers & Dealership Staff Free, Visitors $5/hour
230 N Campbell Ave	Springfield	240V30AJ1772		1	Free
3050 Spruce St	St. Louis	120V16ANEMA 5-20R	240V30AJ1772	2	Free
3551-3621 State Hwy D	Springfield	240V30AJ1772		1	Free
3551-3621 State Hwy D	Springfield	240V30AJ1772	240V30AJ1772	2	Free
11858 Olive Blvd	Creve Coeur	240V30AJ1772		1	Free
11858 Olive Blvd	Creve Coeur	240V30AJ1772		1	Free

11858 Olive Blvd	Creve Coeur	240V30AJ1772	240V30AJ1772	2	Preferred Drivers Free, others $2/hour minimum $2
450 Sam Barr Dr	Kearney	120V16ANEMA 5-20R	240V30AJ1772	2	Free
1500 Bannister Rd	Kansas City	240V30AJ1772		1	Free
620 Lucas Avenue	St Louis	240V30AJ1772	240V30AJ1772	2	Preferred Drivers Free, others $1/hour minimum $1 maximum $5
6177 Delmar Blvd	St Louis	120V16ANEMA 5-20R	240V30AJ1772	2	Free
NGMO-LOG-D, DOL TRANS	Jefferson City	240V30AJ1772		1	Free
NGMO-LOG-D, DOL TRANS	Jefferson City	240V30AJ1772		1	Free
24 Davis St	St. Louis	240V30AJ1772		1	Free
Militia Dr	Jefferson City	240V30AJ1772		1	Free
4344 Shaw Ave	St Louis	240V30AJ1772	240V30AJ1772	2	Free
4344 Shaw Blvd	St Louis	240V30AJ1772	240V30AJ1772	2	Free
5555 Winghaven Blvd	O'Fallon	240V30AJ1772	240V30AJ1772	2	Free
2200 Mastercard Blvd	O'Fallon	240V30AJ1772	240V30AJ1772	2	Free
2200 Mastercard Blvd	O'Fallon	240V30AJ1772	240V30AJ1772	2	Free
2200 Mastercard Blvd	O'Fallon	240V30AJ1772	240V30AJ1772	2	Free
2200 Mastercard Blvd	O'Fallon	240V30AJ1772	240V30AJ1772	2	Free
925 N. Lindbergh Blvd.	St. Louis	500V125ACHAdeMO		1	Customers & Dealership Staff Free, Visitors $5/hour
1041 Chouteau Ave	St. Louis	240V30AJ1772	240V30AJ1772	2	Free
1011 Danforth Dr	St Louis	240V30AJ1772	240V30AJ1772	2	Free
30 West Pershing Rd	Kansas City	120V16ANEMA 5-20R	240V30AJ1772	2	Free
5000 Holmes St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5200 Rockhill Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
33200 E Johnson Rd	Sibley	240V30AJ1772	240V30AJ1772	2	Free
1204 W 27th St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4525 Oak St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
425 Volker Blvd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free

220 SE Green	Lee's Summit	120V16ANEMA 5-20R	240V30AJ1772	2	Free
4900 Swope Pkwy	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
617-699 E 48 St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4724 Tracy Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
20250 State Rte 45 N	Weston	240V30AJ1772		1	Free
20250 State Rte 45 N	Weston	240V30AJ1772		1	Free
20250 State Rte 45 N	Weston	240V30AJ1772		1	Free
20250 State Rte 45 N	Weston	240V30AJ1772		1	Free
5352 Faraon St.	St Joseph	120V16ANEMA 5-20R	240V30AJ1772	2	Free
11400 N Congress Ave	Kansas City	120V16ANEMA 5-20R	240V30AJ1772	2	Free
5008 Prospect Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5008 Prospect Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1505 Genessee St	Kansas City	240V30AJ1772		1	Free
300 Wyandotte St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
300 Wyandotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
300 Wyandotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1120 Oak	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1120 Oak St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1120 Oak St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1120 Oak	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8551 N Boardwalk Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8551 N Boardwalk Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8551 N Boardwalk Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
201 SE Salem St.	Oak Grove	240V30AJ1772	240V30AJ1772	2	Free
201 SE Salem St.	Oak Grove	240V30AJ1772	240V30AJ1772	2	Free
201 SE Salem St.	Oak Grove	240V30AJ1772	240V30AJ1772	2	Free
11601 E. US 40 Hwy	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
11601 E. US 40 Hwy	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
11601 E. US 40 Hwy	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
7207 N. M-1 Hwy	Gladstone	240V30AJ1772	240V30AJ1772	2	Free
7207 N. M-1 Hwy	Gladstone	240V30AJ1772	240V30AJ1772	2	Free
7207 N. M-1 Hwy	Gladstone	240V30AJ1772	240V30AJ1772	2	Free
10300 E Hwy 350	Raytown	240V30AJ1772	240V30AJ1772	2	Free
10300 E Hwy 350	Raytown	240V30AJ1772	240V30AJ1772	2	Free
10300 E Hwy 350	Raytown	240V30AJ1772	240V30AJ1772	2	Free
1605 S Main St	Maryville	240V30AJ1772	240V30AJ1772	2	Free
1605 S Main St	Maryville	240V30AJ1772	240V30AJ1772	2	Free
1605 S Main St	Maryville	240V30AJ1772	240V30AJ1772	2	Free
4201 N Belt Hwy	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4201 N Belt Hwy	St Joseph	240V30AJ1772	240V30AJ1772	2	Free

4201 N Belt Hwy	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
908 Walton Way	Richmond	240V30AJ1772	240V30AJ1772	2	Free
908 Walton Way	Richmond	240V30AJ1772	240V30AJ1772	2	Free
908 Walton Way	Richmond	240V30AJ1772	240V30AJ1772	2	Free
2015 W Foxwood Dr	Raymore	240V30AJ1772	240V30AJ1772	2	Free
2015 W Foxwood Dr	Raymore	240V30AJ1772	240V30AJ1772	2	Free
2015 W Foxwood Dr	Raymore	240V30AJ1772	240V30AJ1772	2	Free
8301 N Church Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8301 N Church Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8301 N Church Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
3201 W Broadway Blvd	Sedalia	240V30AJ1772	240V30AJ1772	2	Free
3201 W Broadway Blvd	Sedalia	240V30AJ1772	240V30AJ1772	2	Free
3201 W Broadway Blvd	Sedalia	240V30AJ1772	240V30AJ1772	2	Free
2250 E. Lincoln Ave.	Nevada	240V30AJ1772	240V30AJ1772	2	Free
2250 E. Lincoln Ave.	Nevada	240V30AJ1772	240V30AJ1772	2	Free
2250 E. Lincoln Ave.	Nevada	240V30AJ1772	240V30AJ1772	2	Free
1701 W 133rd St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1701 W 133rd St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1701 W 133rd St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
7900 Leeâ€™s Summit Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
7900 Leeâ€™s Summit Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
7900 Leeâ€™s Summit Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2301 Charlotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2301 Charlotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2301 Holmes St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2301 Holmes St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2301 Holmes St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2301 Holmes St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2101 Charlotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2101 Charlotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2228 Campbell St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2228 Campbell St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1211 Walnut St	Kansas City	500V125ACHAdeMO		1	Free
1 Royal Way	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1 Royal Way	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1 Royal Way	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1 Royal Way	Kansas City	240V30AJ1772	240V30AJ1772	2	Free

1 Royal Way	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
601 US-169	Smithville	240V30AJ1772	240V30AJ1772	2	Free
601 US-169	Smithville	240V30AJ1772	240V30AJ1772	2	Free
601 US-169	Smithville	240V30AJ1772	240V30AJ1772	2	Free
4401 Wornall Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4401 Wornall Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4401 Wornall Rd.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4401 Wornall Rd.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4401 Wornall Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4401 Wornall Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5830 NW Barry Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5201 N. Belt Hwy.	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
5201 N. Belt Hwy.	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
5201 N. Belt Hwy.	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
5110 N Oak Trfy	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5110 N Oak Trfy	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5110 N Oak Trfy	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1282 NW Vivion Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1282 NW Vivion Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1282 NW Vivion Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
900 W Foxwood Dr	Raymore	240V30AJ1772	240V30AJ1772	2	Free
900 W Foxwood Dr	Raymore	240V30AJ1772	240V30AJ1772	2	Free
1100 S 7 Hwy	Blue Springs	500V125ACHAdeMO		1	Free
9717 N Ash Ave	Kansas City	500V125ACHAdeMO		1	Free
1329 Baltimore Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1329 Baltimore Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1329 Baltimore Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1600 Olive St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1600 Olive St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1600 Olive St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1600 Olive St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1600 Olive St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1600 Olive St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4706 Broadway	Kansas City	500V125ACHAdeMO		1	Free
800 University Drive	Maryville	240V30AJ1772	240V30AJ1772	2	Free
800 University Drive	Maryville	240V30AJ1772	240V30AJ1772	2	Free

800 University Drive	Maryville	240V30AJ1772	240V30AJ1772	2	Free
4525 Downs Dr	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4525 Downs Dr	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4525 Downs Dr	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4525 Downs Dr	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4001 Mill St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4001 Mill St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4001 Mill St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
600 Broadway Blvd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
600 Broadway Blvd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
600 Broadway Blvd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2100 SE Blue Pkwy	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
2100 SE Blue Pkwy	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
2100 SE Blue Pkwy	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
5200 Pennsylvania Ave.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5200 Pennsylvania Ave.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
5200 Pennsylvania Ave.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1801 Main St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
2525 Glenn W. Hendren Dr.	Liberty	240V30AJ1772	240V30AJ1772	2	Free
2525 Glenn W. Hendren Dr.	Liberty	240V30AJ1772	240V30AJ1772	2	Free
2525 Glenn W. Hendren Dr.	Liberty	240V30AJ1772	240V30AJ1772	2	Free
2525 Glenn W. Hendren Dr.	Liberty	240V30AJ1772	240V30AJ1772	2	Free
2525 Glenn W. Hendren Dr.	Liberty	240V30AJ1772	240V30AJ1772	2	Free
2525 Glenn W. Hendren Dr.	Liberty	240V30AJ1772	240V30AJ1772	2	Free
1280 NE Coronado Dr	Blue Springs	240V30AJ1772	240V30AJ1772	2	Free
1280 NE Coronado Dr	Blue Springs	240V30AJ1772	240V30AJ1772	2	Free
1280 NE Coronado Dr	Blue Springs	240V30AJ1772	240V30AJ1772	2	Free
914 E North Ave	Belton	240V30AJ1772	240V30AJ1772	2	Free
914 E North Ave	Belton	240V30AJ1772	240V30AJ1772	2	Free
914 E North Ave	Belton	240V30AJ1772	240V30AJ1772	2	Free
125 E 31st St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
125 E 31st St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
125 E 31st St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1105 SE US Hwy 40	Blue Springs	240V30AJ1772	240V30AJ1772	2	Free

1105 SE US Hwy 40	Blue Springs	240V30AJ1772	240V30AJ1772	2	Free
8700 Hawthorne Street	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8700 Hawthorn Street	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8700 Hawthorn Street	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1331 N. Jackson Ave.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1331 N. Jackson Ave.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1331 N. Jackson Ave.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front Street	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 E Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4400 Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
613 Atchison St	Saint Joseph	240V30AJ1772	240V30AJ1772	2	Free
613 Atchison St	Saint Joseph	240V30AJ1772	240V30AJ1772	2	Free
613 Atchison St	Saint Joseph	240V30AJ1772	240V30AJ1772	2	Free
8325 N Platte Purchase Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8325 N Platte Purchase Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8325 N Platte Purchase Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
801 Charlotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
801 Charlotte Street	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
801 Charlotte St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1300 SE Hamblen Rd	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
1300 SE Hamblen Rd	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
1300 SE Hamblen Rd	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
1300 SE Hamblen Rd	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
8619 Prospect Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8619 Prospect Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8619 Prospect Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8619 Prospect Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8619 Prospect Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free

10700 E State Route 350	Raytown	240V30AJ1772	240V30AJ1772	2	Free
10700 E State Route 350	Raytown	240V30AJ1772	240V30AJ1772	2	Free
1710 Paseo Blvd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1710 Paseo Blvd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1413 SW Lower Lake Rd	Saint Joseph	240V30AJ1772	240V30AJ1772	2	Free
1413 SW Lower Lake Rd	Saint Joseph	240V30AJ1772	240V30AJ1772	2	Free
10054 Raytown Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
10054 Raytown Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
10054 Raytown Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
550 Highland Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
550 Highland Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1760 Independence Avenue	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
151 E. 13th St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
151 E. 13th St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
151 E. 13th St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
151 E 13th St,	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
106 W 10 St	Kansas City	500V125ACHAdeMO		1	Free
4101 N Mattox Rd	Riverside	240V30AJ1772	240V30AJ1772	2	Free
4101 N Mattox Rd	Riverside	240V30AJ1772	240V30AJ1772	2	Free
4101 N Mattox Rd	Riverside	240V30AJ1772	240V30AJ1772	2	Free
1001 Locust	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1001 Locust	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1001 Locust	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1001 Locust	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1001 Locust	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1001 Locust	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
301 NE Rice Rd	Lee's Summit	500V125ACHAdeMO		1	Free
201 N Belt Hwy	St Joseph	500V125ACHAdeMO		1	Free
5330 NW 64th St	Kansas City	500V125ACHAdeMO		1	Free
310 SW Ward Rd	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
310 SW Ward Rd	Lee's Summit	240V30AJ1772	240V30AJ1772	2	Free
625 S W U.S. Hwy 40	Blue Springs	240V30AJ1772	240V30AJ1772	2	Free
625 S W U.S. Hwy 40	Blue Springs	240V30AJ1772	240V30AJ1772	2	Free
8301 N St Clair Ave	Kansas City	500V125ACHAdeMO		1	Free
8301 N St Clair Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8301 N St Clair Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
7117 N Prospect Ave	Gladstone	240V30AJ1772	240V30AJ1772	2	Free
7117 N Prospect Ave	Gladstone	240V30AJ1772	240V30AJ1772	2	Free

109 N Blue Jay Dr	Liberty	240V30AJ1772	240V30AJ1772	2	Free
109 N Blue Jay Dr	Liberty	240V30AJ1772	240V30AJ1772	2	Free
11728 NW Ambassador Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
11728 NW Ambassador Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
11728 NW Ambassador Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
11728 NW Ambassador Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
One Memorial Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
One Memorial Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1740 Paseo Blvd.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1025 W. 8th St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1025 W. 8th St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1025 W. 8th St.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1220 Walnut St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1220 Walnut St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1220 Walnut St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1004 E Sedalia Ave	Clinton	240V30AJ1772	240V30AJ1772	2	Free
1004 E Sedalia Ave	Clinton	240V30AJ1772	240V30AJ1772	2	Free
1004 E Sedalia Ave	Clinton	240V30AJ1772	240V30AJ1772	2	Free
711 Main St	Grain Valley	240V30AJ1772	240V30AJ1772	2	Free
711 Main St.	Grain Valley	240V30AJ1772	240V30AJ1772	2	Free
711 Main St.	Grain Valley	240V30AJ1772	240V30AJ1772	2	Free
105 E Ohio St	Clinton	240V30AJ1772	240V30AJ1772	2	Free
105 E Ohio St	Clinton	240V30AJ1772	240V30AJ1772	2	Free
105 E Ohio St	Clinton	240V30AJ1772	240V30AJ1772	2	Free
100 Wyoming Street	Pleasant Hill	240V30AJ1772	240V30AJ1772	2	Free
100 Wyoming Street	Pleasant Hill	240V30AJ1772	240V30AJ1772	2	Free
100 Wyoming Street	Pleasant Hill	240V30AJ1772	240V30AJ1772	2	Free
9400 Ward Pkwy.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
9400 Ward Pkwy.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
17065 S. US 71 Hwy,	Belton	240V30AJ1772	240V30AJ1772	2	Free
17065 S. US 71 Hwy,	Belton	240V30AJ1772	240V30AJ1772	2	Free
17065 S. US 71 Hwy	Belton	240V30AJ1772	240V30AJ1772	2	Free
105 W 12th Ave	North Kansas City	240V30AJ1772	240V30AJ1772	2	Free
105 W 12th Ave	North Kansas City	240V30AJ1772	240V30AJ1772	2	Free
6001 Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
6001 Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
6001 Front St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8400 Hawthorne Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8400 Hawthorne Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free

8400 Hawthorne Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8400 Hawthorne Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8400 Hawthorne Rd.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8400 Hawthorne Rd.	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
95 Design Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
95 Design Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
95 Design Dr	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
4802 Mitchell Ave	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4802 Mitchell Ave	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4802 Mitchell Ave	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
4802 Mitchell Ave	St Joseph	240V30AJ1772	240V30AJ1772	2	Free
1220 Walnut St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1220 Walnut St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1200 Main St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1200 Main St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
1200 Main St	Kansas City	240V30AJ1772	240V30AJ1772	2	Free
8342 Delcrest Dr	St. Louis	240V30AJ1772	240V30AJ1772	2	Free
213-291 N Lynn St	Independence	120V16ANEMA 5-20R	240V30AJ1772	2	Free
700 Clark Ave	St. Louis	120V16ANEMA 5-20R	240V30AJ1772	2	Free
301-399 Bennett Springs Dr	Columbia	240V30AJ1772	240V30AJ1772	2	Free
300 Tanger Blvd	Branson	240V30AJ1772	240V30AJ1772	2	Free
300 Tanger Blvd	Branson	240V30AJ1772	240V30AJ1772	2	Free
2501 Southwest Boulevard	Kansas City	120V16ANEMA 5-20R	240V30AJ1772	2	Free
661 Dunn Rd		500V125ACHAdeMO		1	Free
14747 Manchester Rd	Ballwin	500V125ACHAdeMO		1	Free
1200 W 104 St	Kansas City	240V30AJ1772		1	Free
10421-10499 Indian Creek Rd	Kansas City	240V30AJ1772		1	Free
10499 Indian Creek Rd	Kansas City	240V30AJ1772		1	Free
10421-10499 Indian Creek Rd	Kansas City	460V62ACombo		1	Free
1200 W 104 St	Kansas City	460V62ACombo		1	Free
499 Sovereign Ct	Ballwin	240V30AJ1772	240V30AJ1772	2	Free
4929Forest Park Ave	St. Louis	240V30AJ1772	240V30AJ1772	2	Free
4929 Forest Park Ave	St. Louis	240V30AJ1772	240V30AJ1772	2	Free
4929 Forest Park Ave	St. Louis	240V30AJ1772	240V30AJ1772	2	Free
4336 Clayton Ave	St. Louis	120V16ANEMA 5-20R	240V30AJ1772	2	Free
8702-8798 Chemagro Rd	Kansas City	240V30AJ1772	240V30AJ1772	2	Free

3365 Tree Court Industrial Blvd	St Louis	240V30AJ1772	240V30AJ1772	2	Free
3015 S Hanley Rd	Maplewood	240V30AJ1772		1	Free
3015 S Hanley Rd	Maplewood	240V30AJ1772		1	Free
3015 S Hanley Rd	Maplewood	240V30AJ1772	240V30AJ1772	2	Staff Free, others $1.50/hour minimum $1.50
1001 Lynch St	St Louis	240V30AJ1772	240V30AJ1772	2	Preferred Drivers Free, others $1.50/hour minimum $1
1500 North Westwood Blvd.	Poplar Bluff	240V30AJ1772		1	Free
1700 North Westwood Blvd.	Poplar Bluff	240V30AJ1772		1	Free
4541 Pennsylvania Ave	Kansas City	240V30AJ1772	240V30AJ1772	2	Free

Total Public Ports in Missouri*	677

*Note: This list does not include private or restricted access charging stations.