

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Union)	
Electric Company d/b/a Ameren Missouri for)	<u>File No. ET-2016-0246</u>
Approval Of a Tariff Setting a Rate for)	Tariff No. YE-2017-0030
Electric Vehicle Charging Stations)	

**SIERRA CLUB RECOMMENDATION TO APPROVE PROPOSED TARIFF
WITH MODIFICATIONS**

Comes now Sierra Club and for its recommendation states as follows:

1. On August 15, 2016, Ameren Missouri filed its Application for Approval of a Tariff Authorizing a Pilot Program for Electric Vehicle Charging Stations.¹ With the application, the Company filed a proposed tariff sheet bearing an effective date of October 15, 2016.² If approved, the proposed tariff would authorize Ameren Missouri to implement a pilot program to install and operate electric vehicle charging stations at up to six sites within the Company’s service territory, with five of the sites located along Interstate 70.³

2. On August 15, 2016, the Commission issued an Order stating that any party wishing to file a recommendation regarding Ameren Missouri’s Application and associated tariff must do so no later than September 28, 2016.⁴

3. Sierra Club’s memorandum, attached hereto as Appendix A and incorporated by reference, recommends that the Commission issue an order approving the

¹ *Application for Approval of Tariff Authorizing a Pilot Program for Electric Vehicle Charging Stations*, File No. ET-2016-0246 (filed August 15, 2016). The application is supported by the direct testimony of Mark Nealon (hereafter “Nealon testimony”).

² *Id.* at Exhibit 3.

³ *Id.* at Exhibit 3, page 1.

⁴ *Notice of Tariff Filing and Order Establishing Time to File Recommendations*, File No. ET-2016-0246 (filed August 15, 2016).

proposed tariff with the following modification: in order to provide equal treatment to EV drivers, Ameren should replace the proposed time-based tariff with a volumetric rate. In the alternative, the proposed tariff should be implemented on a per-minute period of charge, rather than a quarter-hour period.

WHEREFORE, Sierra Club respectfully submits its recommendation.

Respectfully submitted,

/s/ Henry B. Robertson

Henry B. Robertson (Mo. Bar No. 29502)

Great Rivers Environmental Law Center

319 N. Fourth St, Suite 800

St. Louis, Missouri 63102

(314) 231-4181

(314) 231-4184

hrobertson@greatriverslaw.org

Attorney for Sierra Club

CERTIFICATE OF SERVICE

I hereby certify that a true and correct PDF version of the foregoing was filed on EFIS and sent by email on this 28th day of September, 2016, to all counsel of record.

/s/ Henry B. Robertson

Henry B. Robertson

MEMORANDUM

TO: Missouri Public Service Commission Official Case File No. ET-2016-0246

FROM: Joseph Halso, Associate Attorney, Sierra Club

SUBJECT: Sierra Club Recommendations for Ameren Missouri's Proposed Tariff Authorizing a Pilot Program for Electric Vehicle Charging Stations

DATE: September 28, 2016

Introduction

Sierra Club appreciates the opportunity to provide recommendations on Ameren's proposed tariff and application for an electric vehicle ("EV") pilot program filed *In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Approval Of a Tariff Setting a Rate for Electric Vehicle Charging Stations*.

Sierra Club is the nation's oldest and largest grassroots environmental organization with more than 2.4 million members and supporters. In Missouri, Sierra Club has over 8,500 members. Sierra Club works to move America beyond the use of fossil fuels and toward renewable energy and clean transportation solutions. Sierra Club has been a leading voice on policies and programs for clean vehicles, from defending vehicle efficiency standards to promoting vehicle electrification through public and policy engagement on the benefits of electric cars, trucks, and buses.⁵

In Missouri and elsewhere, Sierra Club has engaged with the complex issues related to transportation electrification and the role for electric utilities. Before this Commission, Sierra Club briefed the Kansas City Power & Light Clean Charge Network issue in the general rate case that gave rise to the *Working Case Regarding Electric Charging Facilities*.⁶ In the working docket, Sierra Club provided extensive comments on the legal, technical, and policy issues related to electric vehicle ("EV") charging,⁷ and also submitted letters from over four hundred Missouri residents supportive of Commission action to advance vehicle electrification.⁸ At the Commission workshop on EV charging facilities held on May 25, 2016, Sierra Club delivered

⁵ For two recent examples, see Sierra Club, *Rev Up EVs: A Multi-State Study of the Electric Vehicle Shopping Experience* (August 2016), a first ever multi-state study on the EV shopping experience; and Sierra Club & Vermont Energy Investment Corporation, *Fully Charged: How Utilities Can Help Realize Benefits of EVs in the Northeast* (September 2016), a report detailing the benefits of electric vehicles for Northeast states and outlining a role for the region's electric utilities to support charging infrastructure.

⁶ See, e.g., *Initial Post-Hearing Brief of Sierra Club*, File No. ER-2014-0370, In the Matter of Kansas City Power & Light Company's Request for Authority to Implement a General Rate Increase for Electric Service (filed July 22, 2015).

⁷ See *Comments of Sierra Club on Electric Vehicle Charging Facilities*, File No. EW-2016-0123, In the Matter of a Working Case Regarding Electric Vehicle Charging Facilities (filed March 7, 2016).

⁸ See *Sierra Club Letters of Support for Commission Action on Transportation Electrification*, File No. EW-2016-0123, In the Matter of a Working Case Regarding Electric Vehicle Charging Facilities (filed June 10, 2016).

presentations on the electricity grid benefits and environmental benefits of EVs.

Sierra Club strongly supports the electrification of our nation's vehicle fleets. Transportation electrification is a vital strategy to reduce oil dependence, improve public health, and achieve federal air quality and carbon emissions reductions goals. Moreover, new EV load can be served by existing, and often underutilized, infrastructure, putting downward pressure on electricity rates to the benefit of all customers.⁹ Similarly, EV load can be shifted to facilitate the integration of variable generation from renewable sources.¹⁰

For Ameren Missouri customers, a complete realization of EV benefits will require greater commitments by the Company to provide renewable energy¹¹ and, as acknowledged in testimony,¹² additional load management programs to leverage EV loads. At the same time, driving an EV in Ameren territory today has marked benefits as compared to driving a conventional vehicle, and growing EV use will unlock the benefits described above. We appreciate the Company's efforts to further EV adoption by improving access to EV charging, and respectfully request that the Commission approve Ameren's proposed tariff, with the tariff modifications detailed below.

In weighing the Company's proposal, we urge the Commission to consider the following:

- a. Transportation electrification can deliver numerous economic, public health and environmental benefits to electricity customers and residents in Ameren Missouri's territory, including grid benefits resulting in cheaper and cleaner electricity.**

Transportation plays a significant role in Missouri's economy. Transportation is the single largest energy use sector in the state, and as such, it is a large capital drain on the economic system.¹³ In 2012, statewide expenditures on transportation fuels totaled \$15 billion, the vast majority of which flowed out of the state.¹⁴ Fueling EVs with electricity generated in-state can reverse this trend. Moreover, numerous studies indicate that the fuel and maintenance cost savings experienced by EV drivers translate into real local economic benefits, in stark contrast to the petroleum sector.¹⁵

⁹ See, e.g., ICF International and Energy+Environmental Economics, *California Transportation Electrification Assessment, Phase I* at 38 (2014); ICF International and Energy+Environmental Economics, *California Transportation Electrification Assessment, Phase II* at 17.

¹⁰ Regulatory Assistance Project, *In the Drivers Seat: How Utilities and Consumers Can Benefit From the Shift to Electric Vehicles* at 5, 13 (April 2015); CAISO, *California Vehicle-Grid Integration (VGI) Roadmap: Enabling Vehicle-Based Grid Services* at 5. (2014); CalTEA II at 68.

¹¹ See Sierra Club, *A Bright Future: Moving from Coal to Clean Energy in the St. Louis Region* at 2 (April 2016) (finding that: Ameren Missouri generates 71 percent of electricity by burning coal and only 1 percent from clean, renewable sources; the Company has made only modest strides toward adding renewable sources over the last year; over-reliance on coal is costing ratepayers money; and other Missouri utilities are able to customers money through investments in wind and energy efficiency).

¹² *Direct Testimony of Mark Nealon* at 32, File No. ET-2016-0246 (filed August 15, 2016) ("Therefore, home charging will likely be an area of focus for load management programs Ameren Missouri considers").

¹³ Missouri Comprehensive State Energy Plan (2015) Department of Economic Development, Division of Energy, p.99. <https://energy.mo.gov/energy/docs/MCSEP.pdf>

¹⁴ *Id.* at 101.

¹⁵ J Todd et al, *Creating the Clean Energy Economy: Analysis of Electric Vehicle Industry* (2013); California

Transportation also plays an outsized role in degrading Missouri’s environment and undermining the public health of its residents. Missouri is currently violating the 2008 and 2015 National Ambient Air Quality Standards (“NAAQS”) for ozone—also known as smog.¹⁶ Ozone is a corrosive gas that inflames the lungs, constricts breathing, and is increasingly understood to cause premature death.¹⁷ Strikingly, nearly 50 percent of Missouri’s nitrogen oxides emissions—a primary precursor of smog—come from its transportation sector.¹⁸

In addition to ozone precursors, gas and diesel vehicles emit a host of pollutants and toxins, including known carcinogens. For example, fine particulate matter, another pollutant for which St. Louis is in nonattainment,¹⁹ can result in harms ranging from reproductive and developmental harms to cardiovascular damage and early death.

A 2013 MIT study found that, of all sectors, the transportation sector was the greatest contributor to premature emissions-related deaths in the U.S., resulting in 53,000 early deaths per year from vehicle tailpipe emissions.²⁰ In Missouri alone, researchers estimate that 1,192 premature deaths occur each year due to fine particulate matter and ozone from tailpipe emissions. In St. Louis, this amounts to 235 premature deaths each year.

Similarly, transportation plays a tremendous role in Missouri’s emission of carbon dioxide. In 2013, the transportation sector accounted for 27 percent of the state’s carbon dioxide emissions.²¹ Studies and forecasts consistently find that transportation electrification is a critical component in reducing pollutants to safe levels, improving public health and mitigating impacts on climate.²²

EVs not only offer significant economic, public health and environmental benefits to Missourians, but also can also place downward pressure on rates to the benefit of all Ameren Missouri utility customers. EV load, where properly managed, can increase utility sales without incurring significant infrastructure costs, thereby spreading fixed costs across greater sales. In addition, the flexible and manageable load provided by EVs can smooth out fluctuations from

Electric Transportation Coaliton, *Plug in Electric Vehicle Development in California: An Economic Jobs Assessment* (2012).

¹⁶ St. Louis, in particular, has struggled to meet the 2008 and 2015 ozone standards. In the St. Louis area, the “design value” for ozone levels from 2012-2014 was 78 parts per billion (“ppb”), and from 2013-2015 was 71 ppb, compared to 75 ppb for the 2008 standard and 70 ppb for the 2015 standard, respectively.

¹⁷ See *Am. Trucking Ass’ns v. EPA*, 283 F.3d 355, 359 (D.C. Cir. 2002) (“ATA”); 80 Fed. Reg. 65,308/3-09/1.

¹⁸ EPA, National Emissions Inventory, 2011 data, <https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data>

¹⁹ U.S. EPA. (2015). Current Nonattainment Counties for All Criteria Pollutants.

<http://www.epa.gov/airquality/greenbook/ancl.html>

²⁰ Massachusetts Institute of Technology Laboratory for Aviation and the Environment (2013) Air Pollution Causes 200,000 early deaths each year in the U.S. <http://lae.mit.edu/air-pollution-causes-200000-early-deaths-each-year-in-the-u-s/>

²¹ U.S. Energy Information Administration. (2015). State Carbon Dioxide Emissions.

<http://www.eia.gov/environment/emissions/state/>

²² See, e.g., *Vision for Clean Air: A Framework for Air Quality and Climate Planning* (June 2012. (finding that transportation electrification was the only path to attaining compliance with the 2008 ozone NAAQS); Williams et al., (2012) *The Technology Path to Deep Greenhouse Gas Emission Cuts by 2050: The Pivotal Role of Electricity*, Science at 54 (January 2012) (finding that “there was no alternative to widespread switching of direct fuel uses (e.g. gasoline in cars) to electricity” in order to achieve California’s goal of reducing greenhouse gas emissions 80 percent from 1990 levels by 2050—the same long-term goal underlying the United States’ recent climate commitments in Paris);

variable renewable generation. By increasing usage of standing assets, smoothing and shifting loads, and improving reliability, EV-charging can lower the marginal cost of electricity for all customers.

b. Access to Direct Current (“DC”) fast charging stations is critical for EV drivers, and public utilities are well-positioned to address the unique barriers associated with the development of these stations.

EVs are gaining traction in automotive markets, but numerous obstacles remain for would-be buyers. One major impediment is the lack of access to charging infrastructure.²³ While access to home charging is commonly understood as foundational for EV ownership (i.e. drivers are very unlikely to purchase an EV if they cannot charge at home²⁴), access to direct current (“DC”) fast charging likewise influences consumer’s choices and is therefore an important part of a comprehensive charging network.

One critical benefit of DC fast charging is that it enables inter-city and long-distance travel that is otherwise impossible or impractical for all-electric vehicle drivers.²⁵ As Mr. Nealon notes in his testimony, trips between St. Louis and Kansas City are not currently possible for most EV drivers. In addition to inhibiting distance travel and exacerbating range anxiety, consumer research indicates that a “lack of robust DC fast charging infrastructure is seriously inhibiting the value, utility, and sales potential” of typical pure-battery electric vehicles.²⁶ Consequently, increased access to DC fast charging stations must be achieved in order to build an effective EV infrastructure that will drive EV adoption.

As with many network industries, the development of DC fast charging networks suffers from a “chicken-or-the-egg” market coordination problem. Prospective EV owners are reluctant to purchase an electric car in the face of limited access to charging infrastructure because the EV’s range and use would be limited. Likewise, prospective hosts and private funders of EV charging infrastructure cannot see a business case for EV charging station investment where too few EVs are in use to provide a return on investment. The market coordination problem is acute for DC fast charging stations, which have “high upfront costs” and “require significant revenues for the owner-operator to achieve profitability.”²⁷ However, quantitative research on this “chicken-or-the-egg” problem in the EV context not only indicates that the increased supply of more EVs would drive the deployment of more public charging and vice-versa, but that a financial subsidy given to infrastructure investment will increase EV sales by more than twice the amount of the

²³ See, e.g., US Department of Energy, *Transportation Energy Futures Series: Non-Cost Barriers to Consumer Adoption of New Light Duty Vehicle Technologies* (March 2013) (finding that “the inability to conveniently find fuel for a dedicated alternative fuel vehicle is a significant barrier to purchasing such vehicles.”).

²⁴ See Adam Langton and Noel Crisotomo, *Vehicle-Grid Integration*, California Public Utilities Commission at 5 (October 2013); National Research Council of the National Academies of Sciences, *Overcoming Barriers to the Deployment of Plug-in Electric Vehicles*, the National Academies Press at 9 (2015) (The National Research Council of the National Academy of Sciences characterizes home charging as a “virtual necessity” for all potential EV drivers, and finds that residences without access to electric vehicle charging “clearly [have] challenges to overcome to make PEV ownership practical.”).

²⁵ Nick Nigro et al. *Strategic Planning to Implement Publicly Available EV Charging Stations: A Guide for Businesses and Policymakers* (2015) at 11.

²⁶ PlugShare, *New Survey Data: BEV Drivers and the Desire for DC Fast Charging* (March 2014).

²⁷ Nick Nigro et al. (2015) *Strategic Planning to Implement Publicly Available EV Charging Stations: A Guide for Businesses and Policymakers* (2015).

increase if the financial incentive is provided for EV purchase.²⁸

Based on the foregoing, it is clear that the development of DC fast charging, and therefore the development of a comprehensive network for EV charging, faces unique challenges. For several reasons, public utilities are uniquely situated to address these issues. Public utilities are uniquely positioned to help manage EV demand on the grid and to engage in large-scale, strategic and equitable siting of EV charging infrastructure. Utilities also have direct, ongoing contact with EV owners and operators, enabling effective provide outreach and education.

Sierra Club has previously argued before this Commission that utilities should be permitted to address market gaps in EV infrastructure under certain circumstances, namely where a program includes an explicit consideration of electricity grid and ratepayer impacts, utilizes strategic siting for infrastructure deployment, supports new business models, and incorporates stakeholder feedback. As proposed, this program appears to meet these criteria, and Sierra Club recommends that it be considered for cost recovery by the Commission in Ameren's general rate case.²⁹

Comment & Recommendations on Ameren's Proposed Tariff

Ameren Missouri has proposed tariff consists of a flat, time-based fee for EV charging, to be assessed on per-quarter hour.³⁰ For DC fast charging, EV drivers will be charged \$2.50 per quarter hour; for Level 2 charging, drivers will pay \$.30 per quarter hour.³¹ The rate is the same "regardless of the amount of energy dispensed or the length of time necessary to dispense it."³² The price points are set with regard to three primary determinants: (1) the results of a traffic study conducted for the I-70 and Highway 54 corridors; (2) net revenues from "corridor charging" over the 15-year useful life of the equipment; and (3) the equivalent prices of gasoline relative to the charging rates.³³

- a. In proposing a tariff, Ameren's consideration of equivalent gasoline prices and EV driver price tolerance aligns with the overall program goals and is consistent with the judgment of utility regulators.**

In proposing a tariff, Sierra Club supports Ameren's consideration of both equivalent gasoline prices and EV driver price tolerance because these considerations take into account EV driver motivations and reflect the judgment of utility regulators.

Survey data compiled by the Center for Sustainable Energy indicates that fuel cost savings are

²⁸ Li S et al, *The Market for Electric Vehicles: Indirect Networks Effects and Policy Design*.

²⁹ Sierra Club makes this recommendation on condition that the EV Pilot Program proposed in the instant matter is not intended to fulfill the Company's obligation to invest at least \$1 million in environmentally beneficial projects, which may include electric buses and charging stations, pursuant to the settlement reached pertaining to the Company's alleged violations of the Clean Air Act.

³⁰ Nealon Testimony at 16.

³¹ *Id.*

³² *Id.* at 6.

³³ *Id.* at 16.

the single most important factor driving EV adoption.³⁴ Providing drivers with a rate that is less than the cost of gasoline at both DC fast charging and Level 2 stations, therefore, supports Ameren’s goal to drive greater EV adoption in its service territory and across Missouri.³⁵

In the specific context of DC fast charging tariff design, the consideration of gasoline cost equivalency is consistent with the approach taken by Avista Corporation to develop a DC fast charging tariff, which was approved in April 2016 by the Washington Utilities and Transportation Council (“WUTC”). In approving Avista’s EV Charging Infrastructure Pilot and proposed tariff, the WUTC found it “reasonable to adopt a market-based rate for DC fast chargers” given that “unknown utilization” is a “barrier to designing cost-based rates.”³⁶ Similarly, Hawaii Electric Company has a DC fast charging tariff that allows the utility to set prices within a specified range in order to “assess the market price appropriate for this service.”³⁷

b. To avoid unequal treatment of EV drivers, Ameren should replace the proposed time-based electricity rate with a volumetric rate.

Ameren has proposed a time-based electricity rate for the EV pilot. As described in testimony, this “flat rate” will be charged per 15-minute ‘plug time’ interval, “regardless of the amount of energy dispensed or the length of time necessary to dispense it.”³⁸ This approach is likely to result in unequal treatment among EV drivers, and will disadvantage those with lower capacity on-board chargers (also referred to as AC/DC convertors).

In the context of Level 2 charging, the kilowatt (kW) power rating of an electric vehicle charging station *does not* reflect the rate at which each and every vehicle will charge; instead, it reflects the maximum power output for the station itself. The actual rate at which the vehicle will charge is determined by the power rating of its own on-board charger, which varies by vehicle model and model year. Put another way, the charging station is only the energy supplier, and it is the on-board charger that determines the rate of charge.

The power ratings of on-board chargers range widely, from 3.3 kW to about 10 kW.³⁹ To illustrate the problem, take two cars with fairly common power ratings: Car 1 has a charging capability of 3.3 kW and Car 2 is rated for 6.6 kW. Assuming all else is equal, including battery capacity, Car 1 will take twice as long to charge up as Car 2. Although both drivers will have consumed an equal amount of electricity, the driver of Car 1 will pay twice as much under Ameren’s proposed rate.

Additional factors affecting charge speed may also result in electricity price distortions under

³⁴ Center for Sustainable Energy, *California Air Resources Board Clean Vehicle Rebate Project, EV Consumer Survey Dashboard* (last visited Sep. 28, 2016) (available at <http://cleanvehiclerebate.org/survey-dashboard/ev>).

³⁵ See Nealon Testimony at 10

³⁶ *Washington Utilities and Transportation Commission v. Avista Corporation*, Docket UE-160082, Order 01 (Apr. 28, 2016).

³⁷ *In the Matter of the Application of: Hawaiian Electric Company, Inc. Hawaii Electric Light Company, Inc., Maui Electric Company, Ltd.*, Transmittals No. 13-07 and 13-08, Decision and Order No. 31338 at 19 (July 1, 2013).

³⁸ See Nealon testimony at 11.

³⁹ Shahan, Z. (2015) Electric Car Charging Capabilities – Comparison of 27 Models. <http://evobsession.com/electric-car-charging-capabilities-comparison-of-27-models/>

Ameren's proposed rate. At each site, Ameren plans to deploy two DC fast charging stations that can charge at up to 50 kW power. Assuming a situation where both fast charging stations are in use at the same time, it is not clear from testimony that the grid connection will be sufficient for the charger to operate at full power. The amount of energy delivered to a vehicle also varies over the course of the charging session, based on the "state of charge" of the battery. Particularly for DC fast charging, the rate is fast at the outset when the battery is depleted, and drops off dramatically between 80-90 percent state of charge.

To remedy these potential issues, Sierra Club recommends that Ameren replace the proposed time-based electricity rate with a volumetric, per kWh rate. To support the program goal of incentivizing EV adoption and ensuring the equipment is used and useful, Sierra Club further recommends that the per kWh charges for Level 2 and DC fast charging be comparable to the original time-based charges and designed according to the same principles, inclusive of equivalent gasoline costs. As noted in testimony, the program is designed in part to "mirror the kind of liquid fueling experience with which consumers are familiar."⁴⁰ Sierra Club submits that a per kWh rate, a fueling experience that is based on actual delivered electricity rather than time spent plugged in, better approximates the liquid fueling experience with which drivers are familiar and more fairly charges consumers.

- a. Alternatively, the Commission should approve Ameren's time-based tariff on a per-minute basis, rather than a per-quarter hour basis as proposed.**

In the event the Commission does not accept Sierra Club's recommendation for Ameren to replace its proposed time-based rate with a volumetric rate, Sierra Club recommends that the tariff be approved for application on a per-minute basis, rather than a quarter-hour basis. This is a minimum step that the Commission should take to provide fair treatment for EV drivers. For the reasons set forth above, time-based rates do not provide an accurate measure of the amount of energy delivered to a vehicle during a charging session; however, in this instance, a per-minute rate will better approximate the value of the time spent plugged than the proposed quarter-hour.

Conclusion

For the foregoing reasons, Sierra Club respectfully requests that the Commission approve the proposed pilot program with the recommended changes.

⁴⁰ See Nealon testimony at 5.