

EXHIBIT

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REBUTTAL TESTIMONY

OF

GEOFF MARKE

Submitted on Behalf of
the Office of the Public Counsel

**UNION ELECTRIC COMPANY D/B/A
AMEREN MISSOURI'S**

Case No. ET-2016-0246

November 29, 2016

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GEOFF MARKE
UNION ELECTRIC COMPANY
d/b/a Ameren Missouri
CASE NO. ET-2016-0246

I. INTRODUCTION

Q. Please state your name, title and business address.

A. Geoff Marke, PhD, Economist, Office of the Public Counsel (OPC or Public Counsel), P.O. Box 2230, Jefferson City, Missouri 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the OPC as a Regulatory Economist.

Q. Please describe your education and employment background.

A. I received a Bachelor of Arts Degree in English from The Citadel, a Masters of Arts Degree in English from The University of Missouri, St. Louis, and a Doctorate of Philosophy in Public Policy Analysis from Saint Louis University ("SLU"). At SLU, I served as a graduate assistant where I taught undergraduate and graduate course work in urban policy and public finance. I also conducted mixed-method research in transportation policy, economic development and emergency management.

I have been in my present position with OPC since April of 2014 where I have been responsible for economic analysis and policy research in electric, gas and water utility operations. Prior to joining OPC, I was employed by the Missouri Public Service Commission as a Utility Policy Analyst II in the Energy Resource Analysis Section, Energy Unit, Utility Operations Department, Regulatory Review Division. My primary duties were reviewing, analyzing and writing recommendations concerning integrated resource planning, renewable energy standards, and demand-side management programs for all investor-owned electric

1 utilities in Missouri. I have also worked for the Missouri Department of Natural Resources
2 (later transferred to the Department of Economic Development), Energy Division as a Planner
3 III and was the lead policy analyst on electric cases. My private sector work includes Lead
4 Researcher for Funston Advisory in Detroit, Michigan, where I did a variety of specialized
5 consulting engagements for both private and public entities.

6 **Q. Have you been a member of, or participate in, any work groups, committees, or other**
7 **groups that have addressed electric utility regulation and policy issues?**

8 A. Yes. I am currently a member of the National Association of State Consumer Advocates
9 (NASUCA) Distributed Energy Resource Committee which shares information and
10 establishes policies regarding energy efficiency, renewable generation, and distributed
11 generation, and considers best practices for the development of cost-effective programs that
12 promote fairness and value for all consumers. I am also a member of NASUCA's Electricity
13 Committee and NASCUA's Water Committee which are tasked with analyzing current issues
14 affecting residential consumers.

15 **Q. Have you testified previously before the Missouri Public Service Commission?**

16 A. Yes. A listing of the cases in which I have previously filed testimony and/or comments before
17 this commission is attached in GM-1.

18 **Q. What is the purpose of your rebuttal testimony?**

19 A. The purpose of this rebuttal testimony is to respond to the direct testimony of Ameren
20 Missouri's witness Mark J. Nealon regarding Ameren Missouri's request for approval of a
21 tariff setting a rate for electric vehicle ("EV") charging stations.

1 **Q. Please provide an overall summary of Ameren Missouri’s justification for treating this**
2 **project as a regulated service as opposed to a non-regulated affiliate.**

3 A. While not prepared to claim that long-distance EV charging is an “essential service,” Ameren
4 Missouri believes that in the absence of free market activity it has the obligation to provide
5 long-distance EV charging services as a regulated offering and that the situation is analogous
6 to public area lighting.

7 **Q. Please provide an overall summary of Ameren Missouri’s proposal.**

8 A. Ameren Missouri is seeking to build six EV “charging islands” each of which will feature
9 charging stations available to the public for a price. The proposal is for each site to include a
10 direct current fast-charging (“DCFC”) station priced at \$10.00 per hour and a standard level 2
11 alternating current (“AC”) station priced at \$1.20 per hour. The Company intends to include
12 the cost of these projects in its rate base and paid for by all ratepayers. In effect, ratepayers
13 will be subsidizing the cost of the Company’s experimental project that will benefit the small
14 group of people who have chosen to purchase electric vehicles. The stations will be deployed
15 at undetermined locations along the I-70 corridor as well as at a Jefferson City location.
16 Ameren Missouri expects to spend approximately \$10,000 in total marketing the six stations
17 during the three-year “pilot project” (or \$30,000 over the fifteen-year period).

18 Ameren Missouri lists a variety of assumed societal benefits as justification for why
19 ratepayers should subsidize the experimental program including emission reductions,
20 economic development, efficient grid utilization, and greater energy security.

21 Ameren Missouri’s main argument is articulated by Mr. Nealon as follows:

22 Put another way, in the absence of any action being taken to deploy public
23 charging means, along medium and long-distance driving routes in
24 particular, the infrastructure barriers to consumer adoption of EV will remain
25 despite the last of the vehicle barriers having been removed.

1 The longer this kind of vehicle choice is constrained, the longer the
2 associated societal benefits are forestalled. So, rather than wait for the full
3 emergence, Ameren Missouri believes we should be on the front end of the
4 EV breakthrough, with infrastructure in place not just to accommodate, but
5 to foster, its growth.¹

6 To his credit, Mr. Nealon is forthright in stating that Ameren Missouri does not believe the
7 expected revenues from the six proposed charging stations will cover the costs of the pilot
8 project, but offers that:

9 any subsidy provided by Non-Participating Customers will be very modest. .
10 . . According to the UCT ["Utility Cost Test"] model, the total non-NPV
11 ["net present value"] valuation of this subsidy accumulated over this period
12 of time is approximately \$475,000, requiring an average 11.3 cents annually
13 from each residential Non-Participating Customer for those four years.²

14 To reach the Company's cost estimates requires reliance on certain assumptions. Ameren
15 Missouri claims that these six charging stations will ease range anxiety *and* induce adoption of
16 an additional 7,050 EVs (full credit for 25% of the projected EV-modified hybrid adoption
17 curve) in its service territory as a direct result of the presence of these stations over the next
18 fifteen years. It will be the revenue generated at the six stations over the life of those assets
19 *and* the revenues captured at home, from residential charging, from the 7,050 Ameren
20 Missouri induced EV's that cost justifies the pilot program under the UCT calculations at 1.42
21 if the pilot programs assumptions are extended over a fifteen-year period. However, the same
22 project and assumptions were not deemed to be cost effective under the total resource cost
23 ("TRC") test at 0.80.

¹ Direct Testimony of Mark J. Nealon, p. 7, 6-13.

² Direct Testimony of Mark J. Nealon, p. 25, 2-3 & 17-20.

1 **Q. What are your recommendations?**

2 A. The Commission should reject Ameren Missouri's request. Both ratepayers and drivers are
3 best served by a competitive market for charging services rather than a regulated monopoly.
4 There is no reason why Missouri cannot have a competitive market in EV charging and
5 Ameren Missouri (and other investor-owned utilities "IOUs") *non-regulated* services should
6 be allowed to participate in that market.

7 OPC believes that Ameren Missouri's *regulated* services can best enable the promotion of EV
8 adoption and by offering well-formed, time-of-use (TOU) rates on an opt-in basis that
9 encourages charging during low-cost, off-peak hours. At this initial stage, this can best be
10 promoted by educating customers and vehicle dealers on the value proposition of current and
11 future rates. As it stands, Ameren Missouri's proposed costs to be recovered "above the line"
12 do not justify the espoused benefits, especially if those benefits are gained through the creation
13 of barriers to entry from competition for a non-essential service. The deployment of EV
14 charging infrastructure should be left to its non-regulated services (if Ameren Missouri elects
15 to participate) and to free market competition.

16 Both Ameren Missouri and free market EV charging stations *can* and *should* provide a
17 symbiotic force for ratepayers and consumers alike moving forward assuming vehicle choice
18 and technological advances favor this path. If Ameren Missouri is to be believed, that serious
19 penetration of EVs is just around the horizon as range anxiety is eased by longer battery life
20 and reduced automobile costs, then demand should increase and the market will respond
21 accordingly with both EV cars and EV charging stations as appropriate. Under this favorable
22 scenario, the risks of stranded assets are eliminated and consumers, Ameren Missouri, and the
23 economy as a whole benefit from fair, efficient competition.

24 Mr. Nealon's testimony addresses a number of economic, environmental and policy
25 justifications for Ameren Missouri's proposal to provide rate based treatment for its proposed

1 EV charging stations. This rebuttal testimony will address each of those points in turn as well
2 as provide additional comments for the Commission's consideration.

3 **II. ANTI-COMPETITIVE ENVIRONMENT**

4 **Q. Is Ameren Missouri's EV charging station proposal analogous to public area lighting?**

5 A. No. Public area lighting (whether owned outright by a governmental entity or Ameren
6 Missouri) is paid through public tax dollars and is generally considered a classic "public
7 good" because it is non-rivalrous and non-excludable. ExxonMobile, BP, Spire's natural gas
8 stations, ChargePoint, EVgo, etc. are all entities that are operating in a competitive market for
9 a finite amount of customers. I am unaware of any such competition for public area street
10 lighting.

11 **Q. What is Mr. Nealon's argument regarding utilities providing a single point of electric
12 service to Utility Customers' premises?**

13 A. Mr. Nealon opines that an EV functions as a modern-day mobile premise where:

14 Inhabitants are sheltered from the environment, are heated and cooled, and
15 can work, play, eat and/or sleep. Today modern technology has introduced a
16 new kind of premises—a "mobile premises"—occupied by a new kind of
17 customer—a "mobile customer"—wherein they are sheltered from the
18 environment, are heated and cooled, and can work, play, eat, and/or sleep,
19 for the period of time they are transversing the service territory. Like the
20 traditional structural premises, this new "mobile" premises also requires a
21 single point of electric service—the charging port—in order for it to serve its
22 intended purpose.³

³ Direct Testimony of Mark J. Nealon p. 13, 19-23 & p. 14, 1-3.

1 **Q. Do you agree?**

2 A. No. I would offer up the observation that the Commission has not felt the need to regulate the
3 resale of water from Anheuser Busch or Coca-Cola. Both entities repackage and resell water
4 as part of their respective products even though that water service was obtained from a single
5 point supplied through Missouri American Water—a faucet—in order for it to serve its
6 intended purpose. Certainly, the currently operating EV charging stations run by competitive
7 private firms would be adversely impacted if the Commission were to determine that charging
8 stations should function as an extension of a regulated utilities service.

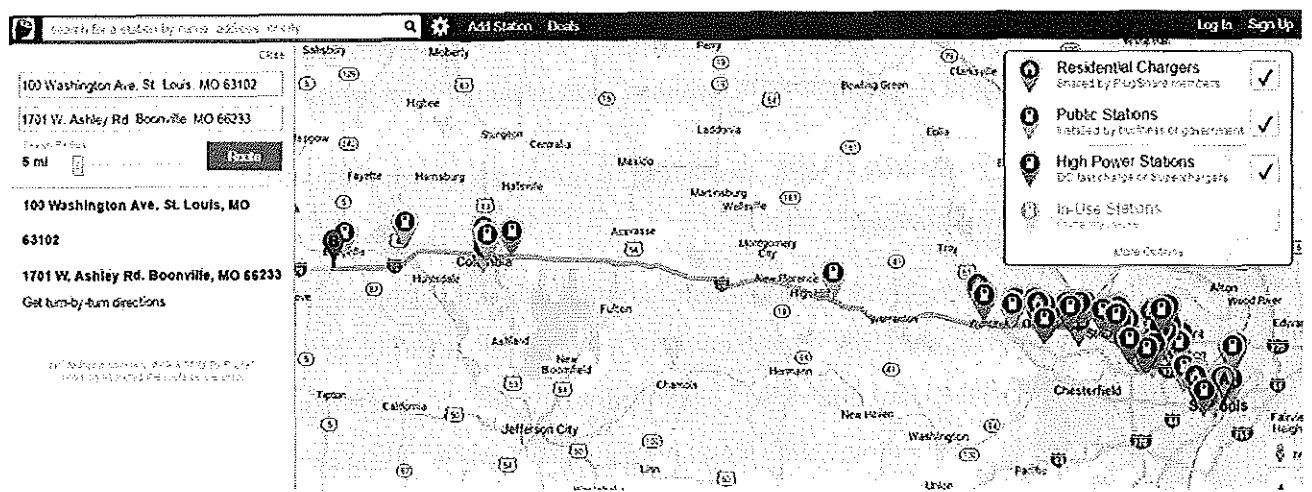
9 **Q. Is there a problem with providing a guaranteed rate of return on nonessential,
10 competitive services?**

11 A. Yes. By placing the charging stations into rate base, utilities receive a guaranteed rate of return
12 on an investment. This is problematic for services that can be considered both nonessential
13 and/or in which a competitive market already exists as it effectively creates a regulatory
14 barrier for new entries, unfairly punishes existing competition, and shifts risk from utility
15 shareholders to ratepayers. Instead of promoting growth, an insulated regulated monopoly can
16 undermine competition which may reduce efficiency.

17 Ameren Missouri is not proposing to rate base thousands of charging stations in more densely
18 populated urban and suburban areas. Instead, Ameren Missouri argues that no private entity
19 has serviced the I-70 corridor and that installing six charging islands represents a financially
20 small inequitable impact on nonparticipating ratepayers. However, regulatory treatment of a
21 nonessential, competitive service raises policy concerns. The concern with any utility treating
22 these types of assets “above the line” as opposed to “below the line” is that the shift in risk
23 from shareholder to ratepayer is not warranted and comes at the expense of market
24 efficiencies.

- 1 **Q. Are there any EV charging stations throughout the I-70 corridor?**
- 2 **A. Most of the EV charging stations are presently concentrated in St. Louis and St. Charles**
3 **counties with several stations listed in the Columbia, Missouri area. Figure 1 shows a**
4 **screenshot of known charging stations according to the website Plugshare.com that are within**
5 **a five mile radius along I-70 between Boonville and St. Louis.**

6 **Figure 1: Location of the 68 EV charging stations on I-70⁴**



- 7
- 8 **Q. Is there reason to believe a market could develop absent Ameren Missouri's proposal?**
- 9 **A. Absolutely. The stations listed on Figure 1 are evidence of that sentiment as they are a direct**
10 **result of the modest uptick in EV growth in the St. Louis region. Demand for EVs will likely**
11 **continue to increase if battery capacity increases and if the upfront cost of EVs decreases.**
12 **Consequently, the supply of necessary charging station infrastructure will adjust accordingly.**
- 13 **Q. Will permitting Ameren Missouri to install and own EV charging stations impact other**
14 **market participants?**
- 15 **A. Yes. Regulated utilities operate in a system that is designed, in part, to provide a level of**
16 **certainty to investors based on the large sums of capital needed to finance long-term**

⁴ PlugShare (2016) EV Charging Station Map, St Louis to Booneville, November 26. <https://www.plugshare.com/#>

1 generation, transmission and distribution projects. EVs and the current and future state of the
2 transportation market is one shrouded in uncertainty and outstanding questions leading to a
3 greater level of investment risk. Investors in private EV charging stations expect to be
4 rewarded for bearing these risks and by operating in a market in which the return on
5 investments are not guaranteed. Introducing a regulated entity, a protective incumbent, into a
6 competitive market creates the potential for inefficiencies as the negative consequences of any
7 given risk are merely shifted to captive ratepayers.⁵ Because risk and reward is distorted,
8 innovation is less likely to proliferate at the local level. For example, this could be especially
9 problematic if Missouri elects to regulate EV charging stations but surrounding states do not
10 (e.g., Kansas). In that scenario, non-regulated EV charging station states let the free market
11 effectively determine the appropriate demand, while Missouri is relegated to a quasi-
12 command-and-control model that increases the likelihood of stranded assets.

13 **Q. What do you mean by stranded assets?**

14 **A.** Stranded assets are assets that have suffered from unanticipated or premature write-downs,
15 devaluations, or conversion to liabilities. Assets can become stranded in a dynamic system
16 when new technologies are introduced and new companies out-compete incumbents.
17 Regulated electric utilities are also exposed to the risk of having stranded assets on their
18 books.^{6,7,8} A project that is cost-effective (from one vantage point) should also account for
19 future cost and market considerations. Failure to account for this may result in ratepayers
20 funding an asset that no longer operates the way it was designed to or is poorly supported by
21 the utility because it is operating and maintaining version 2.0 while the retail market is
22 working on version 4.0.

⁵ See also, "Moral Hazard." <http://www.rpieurope.org/Beesley/2010/Lecture%205%20Clare%20Spottiswoode.pdf>

⁶ Boyd, J. (1998). The "Regulatory Compact" and Implicit Contracts: should stranded costs be recoverable? *The Energy Journal*, 19(3), 69-83. http://www.bcuc.com/Documents/Proceedings/2012/DOC_30551_A2-12-1998%20Energy%20Journal%20Article%20%E2%80%93%20The%20Regulatory%20Compact.pdf

⁷ Brennan T. & James B. (1996) Stranded costs, takings, and the law and economics of implicit contracts. *Journal of Regulatory Economics*, 11(1), 41-54.

http://www.economics.jku.at/members/Buchegger/files/Juristen/brennan_1997_implicit%20contracts.pdf

⁸ Baumol, W. & J. G. Sidak (1995) Stranded Costs. *Harvard Journal of Law & Public Policy*, 18, 835-849. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=283232

1 Q. Could you provide examples of the potential risks Ameren Missouri's EV charging
2 stations could be exposed to?

3 A. Yes. First, it should be recognized that there is no guarantee that EVs will materialize at the
4 levels predicted or displace the incumbent technology—internal combustion engines.
5 Consumers no doubt will respond to price signals if gasoline fuel decreases, or conversely, if
6 electric prices increase. It is also possible that new business models such as ride-sharing
7 services like Uber or Lyft will depress overall new vehicle sales in densely populated areas.
8 Even if everything aligns for a seamless transition into an electrified transportation sector, it is
9 not entirely clear that “plug-in” charging stations will be the preferred venue for charging cars
10 in the future. For example, earlier this year, plug-less (or wireless) charging was demonstrated
11 at 20-kilowatts by the Oak Ridge National Laboratory, which is three times the rate of the
12 plug-in systems commonly used for EVs today.^{9,10}

13 Putting aside the potential risk that Ameren Missouri's deployed infrastructure becomes
14 obsolete over its lifetime, it is important to consider that the very fear of “range anxiety” may
15 already be overstated based on research published since Ameren Missouri's initially filed
16 testimony.

17 For example, this past September, Idaho National Laboratory released the results of a three-
18 year study which captured the profiles for 125 million miles of driving and 6 million charging
19 events through partnerships with states, municipalities, electric utilities, and other stakeholders
20 across 22 regions in the United States. The study reached the following conclusions:

21 **The answer is clear: despite installation of extensive public charging**
22 **infrastructure, in most of the project areas, the vast majority of**
23 **charging was done at home and work.** About half the EV Project

⁹ Walli, R. (2016) ORNL surges forward with 20-kilowatt wireless charging for vehicles. Oak Ridge National Laboratory. <https://www.ornl.gov/news/ornl-surges-forward-20-kilowatt-wireless-charging-vehicles>

¹⁰ Qtd in. Roberts, D. (2016) Wireless charging: the key to unlocking an electric vehicle revolution. Vox. <http://www.vox.com/2016/5/24/11677684/wireless-charging-electric-vehicles>

1 participants charged at home almost exclusively. Of those who charged away
2 from home, the vast majority favored three or fewer away-from-home
3 charging locations, with one or more of these locations being at work for
4 some drivers. . . . In the end, it was apparent that exact factors that determine
5 what makes a public charging station popular are predominantly community-
6 specific. More research is needed to pinpoint these local factors.
7 Nevertheless, the projects demonstrated that a ubiquitous charging
8 network is not needed to support PEV driving. Instead, charging
9 infrastructure should be focused at home, workplaces, and in public “hot
10 spots,” where demand for AC Level 2 EVSE or DCFC stations is high
11 (emphasis added).¹¹

12 In another study released in *Nature Energy*, a team of researchers from the Massachusetts
13 Institute of Technology (“MIT”) and the Santa Fe Institute modeled variation in vehicle trips
14 to determine whether or not current EV battery capacity could achieve the desired trip length
15 outcomes of U.S. drivers. That is, whether or not “range anxiety” is real or largely imagined.

16 The results showed that 87 percent of vehicles on the road could be replaced by a low cost EV
17 with current battery size (assuming a 2013 Nissan Leaf battery at 19.2 kWh) even if there is
18 no possibility to recharge during the day. The authors also concluded that if useful battery
19 capacity were increased to 55 kWh, then 98 percent of all daily trips would be covered.¹² To
20 offer some perspective, the 2017 Chevy Bolt is expected to have a 60 kWh battery system.¹³

21 Such analysis, not available when Ameren Missouri filed their proposed project, goes a long
22 way in explaining why EV charging stations have struggled even in regions where EV

¹¹ Idaho National Laboratory (2016). Plug-in electric vehicle and infrastructure

analysis. <https://avt.inl.gov/sites/default/files/pdf/arra/ARRAPEVnInfrastructureFinalReport-IqItySept2015.pdf>

¹² Needel, Z.A. et al. (2016) Potential for widespread electrification of personal vehicle travel in the United States.
Nature Energy. (1) 1- 7. <http://www.nature.com/articles/nenergy2016112>

¹³ Chevrolet. (2016) Drive unit and battery at the heart of Chevrolet Bolt EV

<http://media.chevrolet.com/media/us/en/chevrolet/news.detail.html/content/Pages/news/us/en/2016/Jan/naia/chevy/0111-bolt-du.html>

1 adoption has accelerated like the Pacific Northwest. For example, in Eugene-Springfield,
2 Oregon the taxpayer-funded EV fast charging stations deployed throughout the city sit idle
3 most of the time and run the risk of becoming a stranded asset. According to the *Seattle Times*:

4 In the city of Eugene's public parking garages, for example, each charging
5 unit is used an average of once every two weeks. Springfield officials
6 want seven charging units removed from downtown because some are
7 little used and others are broken.

8 In 2013, the last year that data were collected for the federal government,
9 electric vehicles throughout Oregon were plugged into public chargers
10 installed through The EV Project just 4 percent of the time, compared with
11 42 percent of the time at home-charging units.

12 The same pattern is true in the eight other states and District of Columbia
13 where the devices also were installed by the federal government, at a total
14 cost to the taxpayer of about \$100 million.¹⁴

15 **III. Cost-Benefit Tests**

16 **Q. What are the California cost effectiveness tests?**

17 A. A standardized procedure developed by the California Public Utility Commission ("CPUC")
18 to analyze demand-side management programs cost-effectiveness from a variety of
19 perspectives including: the participant, the ratepayer, the utility, the total service territory, and
20 society as a whole. The tests are designed to ensure that ratepayer dollars are prudently spent
21 and to help prioritize amongst future resource options.

¹⁴ Russo. E. (2015) Public electric-car charging stations sit idle most of time. *Seattle Times*.
<http://www.seattletimes.com/seattle-news/public-electric-car-charging-stations-sit-idle-most-of-time/>

1 **Q. Is it appropriate to use the UCT test as the primary perspective threshold for a proposed**
2 **EV charging station project?**

3 A. No. It is unclear why Ameren Missouri has elected to apply any demand-side management
4 cost-effective test to a non-demand-side management program. To be clear, promotion of EVs
5 will result in increased load not a decrease in load. In instances where load is increased as a
6 result of a program the only test that merits consideration is the ratepayer impact measure test
7 (“RIM”). According to the California Standard Practice Manual:

8 It should be noted that for some types of demand-side management
9 programs, meaningful cost-effectiveness analyses cannot be performed
10 using the tests in this manual. The following guidelines are offered to
11 clarify the appropriated "match" of different types of programs and tests: . . .

12 3. For load building programs, only the RIM tests are expected to be
13 applied. The Total Resource Cost and Program Administrator Cost tests are
14 intended to identify cost-effectiveness relative to other resource options. It is
15 inappropriate to consider increased load as an alternative to other supply
16 options.¹⁵

17 It should be noted that Mr. Nealon references the UCT cost effective ratio throughout his
18 testimony but a review of his workpapers list both the UCT and RIM with the same ratio and
19 cost calculations. Further clarification on this topic is warranted.

20 **Q. Should a cost-effective test be applied to this program?**

21 A. As it stands, there is no basis for applying the UCT test results as a cost justification for a load
22 building program. The RIM test may be a more appropriate analysis as it measures what
23 happens to customer bills or rates due to changes in utility revenues and operating costs by a

¹⁵ California Standard Practice Manual: Economic analysis of demand-side programs and projects. (2001)
<http://webcache.googleusercontent.com/search?q=cache:OtrOQtNlbBUJ:www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx%3Fid%3D7741+%&cd=2&hl=en&ct=clnk&gl=us>

1 given program. Historically, this test has been applied to energy efficiency programs to
2 measure equity considerations. If an energy efficiency program causes a larger increase in
3 utility revenues than utility costs, rates will decrease. If a program results in a larger increase
4 in utility costs than revenues, rates will increase. That is, the RIM test maximizes economic
5 efficiency but at the expense of total future costs (i.e., increased costs for future load growth).
6 This is why the test has largely been abandoned as a threshold perspective by states
7 determining the cost-effectiveness of its DSM programs. Results of the RIM test are probably
8 less certain than those of the other California tests because the RIM is sensitive to the
9 differences between long-term projections of marginal costs and long-term projections of
10 rates, two costs streams that are difficult to quantify with certainty.

11 **Q. What does this mean from a ratepayer perspective?**

12 A. Again, EV adoption or the cost-effectiveness of an EV charging station should not be
13 confused with an energy efficiency program. Promotion of EVs will increase load. Promotion
14 of energy efficiency will decrease load. More importantly, it is difficult to definitively state the
15 full impact and potential outcomes of effectively pursuing a load building program in light of
16 the many uncertainties in place in the energy and transportation policy arena. Any informed
17 response to that question is beyond the scope of this testimony which is centered on the
18 inappropriateness of Ameren Missouri offering a nonessential, competitive service as a
19 regulated, rate based expense.

20 **Q. Putting aside the appropriateness of a ratepayer-funded load building program, was the**
21 **UCT/RIM test calculated correctly in your opinion?**

22 A. I do not believe so. The key input into Ameren Missouri's calculation is the 25% incremental
23 increase in EV adoption and subsequent residential revenue collection due to the deployment
24 of Ameren Missouri's EV pilot program. Stated differently, the program would not be cost-
25 effective during the three-year pilot period under *any* scenario. Extending the time frame to
26 fifteen years *and* including the residential revenues generated from the induced adoption of
27 7,050 additional cars in Ameren Missouri's service territory as a result of the six charging

1 islands existence allows the program to be cost-effective under the RIM (and possibly the
2 UCT) analysis.

3 Although I understand how Ameren Missouri came to this conclusion, projections that far into
4 the future are burdened with uncertainty especially in light of aforementioned data on EV
5 charging habits and expected increase in battery size. Reasonable minds have already differed
6 over the appropriateness of solely crediting Ameren Missouri a 25% increase for future EV
7 adoption; ultimately it is an academic exercise in uncertainty with many potential confounding
8 variables that can distort the outcome.

9 **IV. ENVIRONMENTAL CONSIDERATIONS**

10 **Ameren Missouri's Generation**

11 **Q. Will increased use of EVs reduce Ameren Missouri's carbon emissions?**

12 **A.** No. Ameren Missouri is largely dependent on coal and natural gas/oil fossil fuel mix to supply
13 its generation needs. This means that electric vehicles will require Ameren Missouri to
14 continue burning carbon intense fossil fuels. Table 1 breaks down Ameren Missouri's
15 resource mix by source, capacity and fuel type based on the Company's expected 2015
16 summer peak demand as found currently on Ameren Missouri's homepage.

1 Table 1: Ameren Missouri Electric Generation Source and Capacity based on expected 2015 peak
 2 summer electric demand¹⁶

Energy Center	Type of Fuel	Capacity (MW)	Fuel Mix Average
Labadie	Coal	2,372	
Rush Island	Coal	1,180	
Sioux	Coal	970	
Meramec	Coal	831	5,353 MW of Coal = 53.0%
Audrain	Gas/Oil	600	
Venice	Gas/Oil	487	
Goose Creek	Gas/Oil	432	
Raccoon Creek	Gas/Oil	300	
Kinmundy	Gas/Oil	206	
Peno	Gas/Oil	188	
Pickneyville	Gas/Oil	188	
Other CTG	Gas/Oil	315	2,716 MW of Gas/Oil = 26.9%
Callaway	Nuclear	1,193	1,193 MW of Nuclear = 11.8%
Taum Sauk	Hydro	440	
Osage	Hydro	240	
Keokuk	Hydro	140	820 MW of Hydro = 8.1%
Maryland Heights	Renewable	8	
O'Fallon	Renewable	3	11 MW of Renewable = 0.1%
	Total	10,093	

3 It seems a foregone conclusion, both in policy and media representations, that EVs are a
 4 climate change solution. A look at Ameren Missouri's current fuel mix should give all parties
 5 pause over the soundness of ramping up load building activities. Coal accounts for more than
 6 50% of Ameren Missouri's generation and is the most greenhouse gas intensive ("GHG")
 7 electricity fuels according to the U.S. Energy Information Administration ("EIA") seen in
 8 Table 2:

¹⁶ Ameren Missouri (2015) Ameren Missouri fact sheet. <https://www.ameren.com/-/media/missouri-site/files/aboutus/amerenmissourifactsheet.pdf>

1 Table 2: Pounds of CO₂ emitted per million British thermal units (Btu) of energy for various fuels¹⁷

Fuel Source	Pounds of CO ₂ emitted per million British thermal units (Btu)
Coal (anthracite)	228.6
Coal (bituminous)	205.7
Coal (lignite)	215.4
Coal (subbituminous)	214.3
Diesel fuel and heating oil	161.3
Gasoline	157.2
Propane	139.0
Natural Gas	117.0

2
3 Moreover, many of the arguments used in favor of promoting the deployment of EVs and EV
4 enabling subsidies centers on the vision of the grid being comprised of substantially less coal
5 and substantially more renewable energy sources. Based on Ameren Missouri's integrated
6 resource planning this will neither be a quick nor an inexpensive process. The uncertainty
7 surrounding the Clean Power Plan only magnifies this point.

8 **Q. Mr. Nealon claims that a 2011 internal analysis showed carbon dioxide ("CO₂")**
9 **emissions were 35% less than CO₂ tailpipe emissions. Do you agree?**

10 **A. No. I have reviewed the report Mr. Nealon references and it appears as though the analysis**
11 **examined the "average" carbon intensity factor of Ameren Missouri's fuel mix. This can be a**
12 **misleading input as GHGs from power generation have large spatial (location) and temporal**

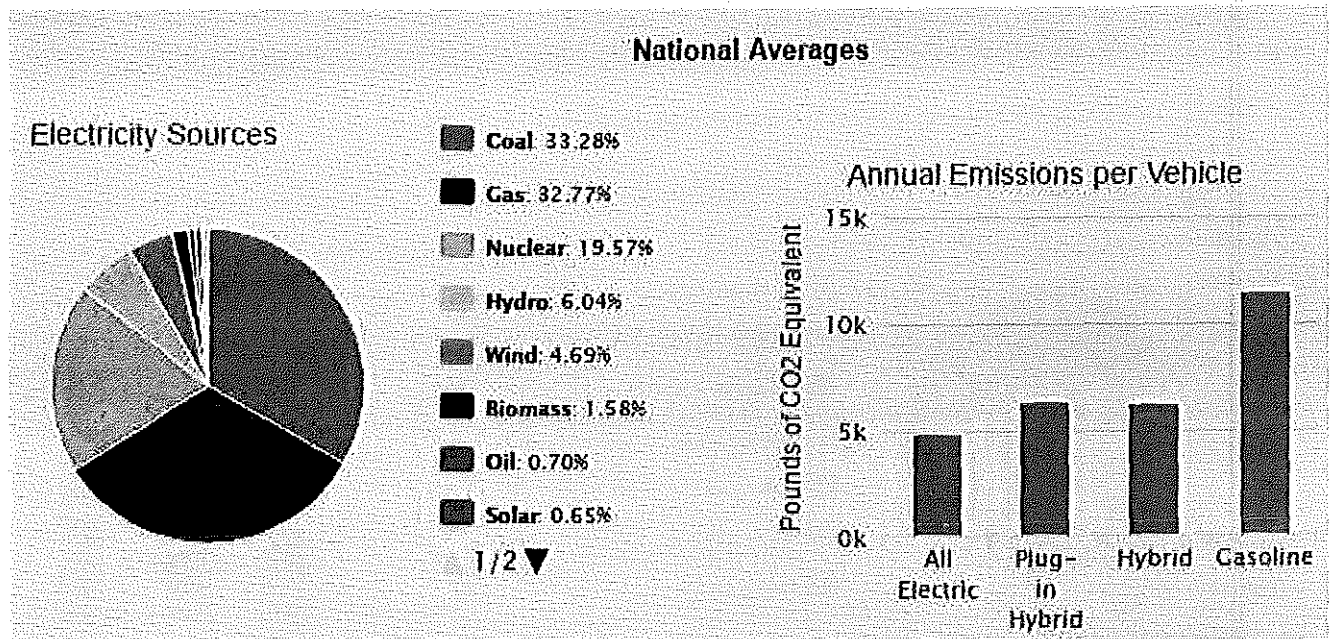
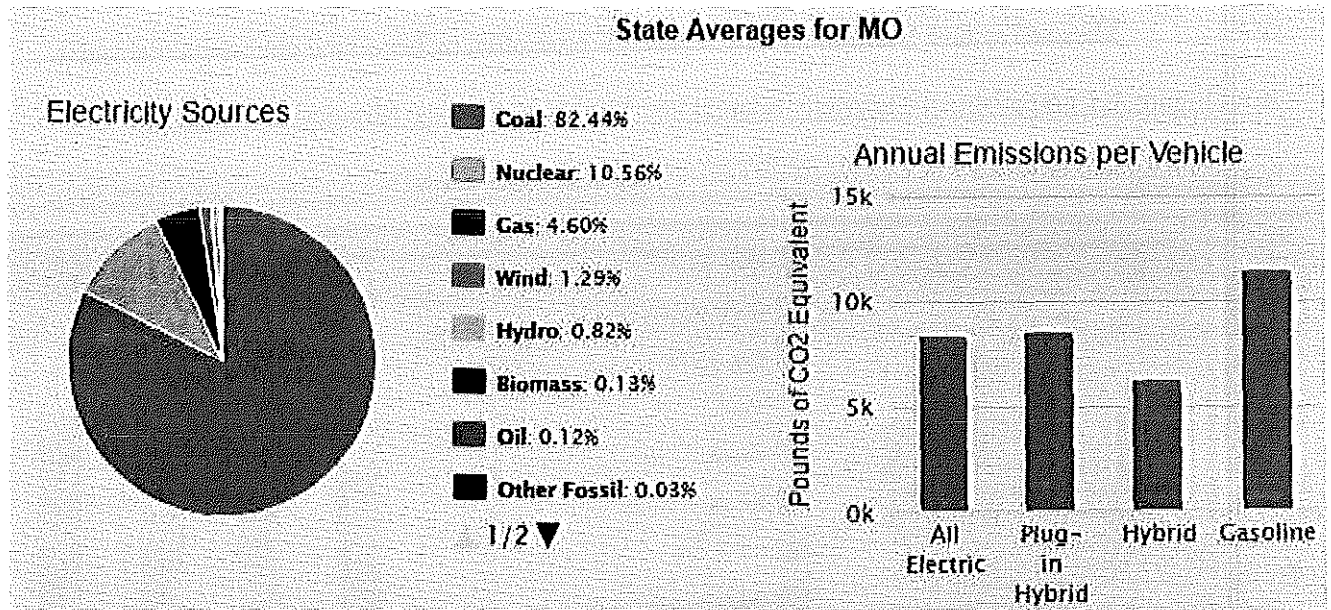
¹⁷ Energy Information Agency (2016) Frequently Asked Questions: How much carbon dioxide is produced when different fuels are burned?. <https://www.eia.gov/tools/faqs/faq.cfm?id=73&t=11>

1 (timing) heterogeneity which means it is more accurate to factor in the marginal emissions
2 released when an EV owner charges the battery, not the average emissions on a system.¹⁸ In
3 other words, the analysis needs to identify which power plants would produce slightly less or
4 would not otherwise be called to meet peak production in a world without that particular EV
5 demanding power at that moment. Credibly modeling a way to estimate the dispatch order of
6 an electric system that does not exist is no doubt a challenge. Nevertheless, at a high level, the
7 benefits of EVs vary based on the price of electricity, the source of electricity, grid congestion,
8 and other substantial factors. I fail to see those considerations in Ameren Missouri's 2011
9 analysis, which calls into question the soundness of the environmental conclusions that were
10 reached.

11 Given the current generation fuel mix, Missouri is far from an ideal setting to aggressively
12 promote first-mover policy in the pursuit of EV adoption. This is illustrated in Figure 2 which
13 shows the US DOE estimated annual "averages" of electricity and vehicle emissions for
14 Missouri compared to U.S. averages.

¹⁸ Archsmit, J. et al. (2015) From cradle to junkyard: assessing the life cycle greenhouse gas benefits of electric vehicles. *Research in Transportation Economics* 52 (2015): 72-90.
<https://ej.haas.berkeley.edu/research/papers/WP263.pdf>

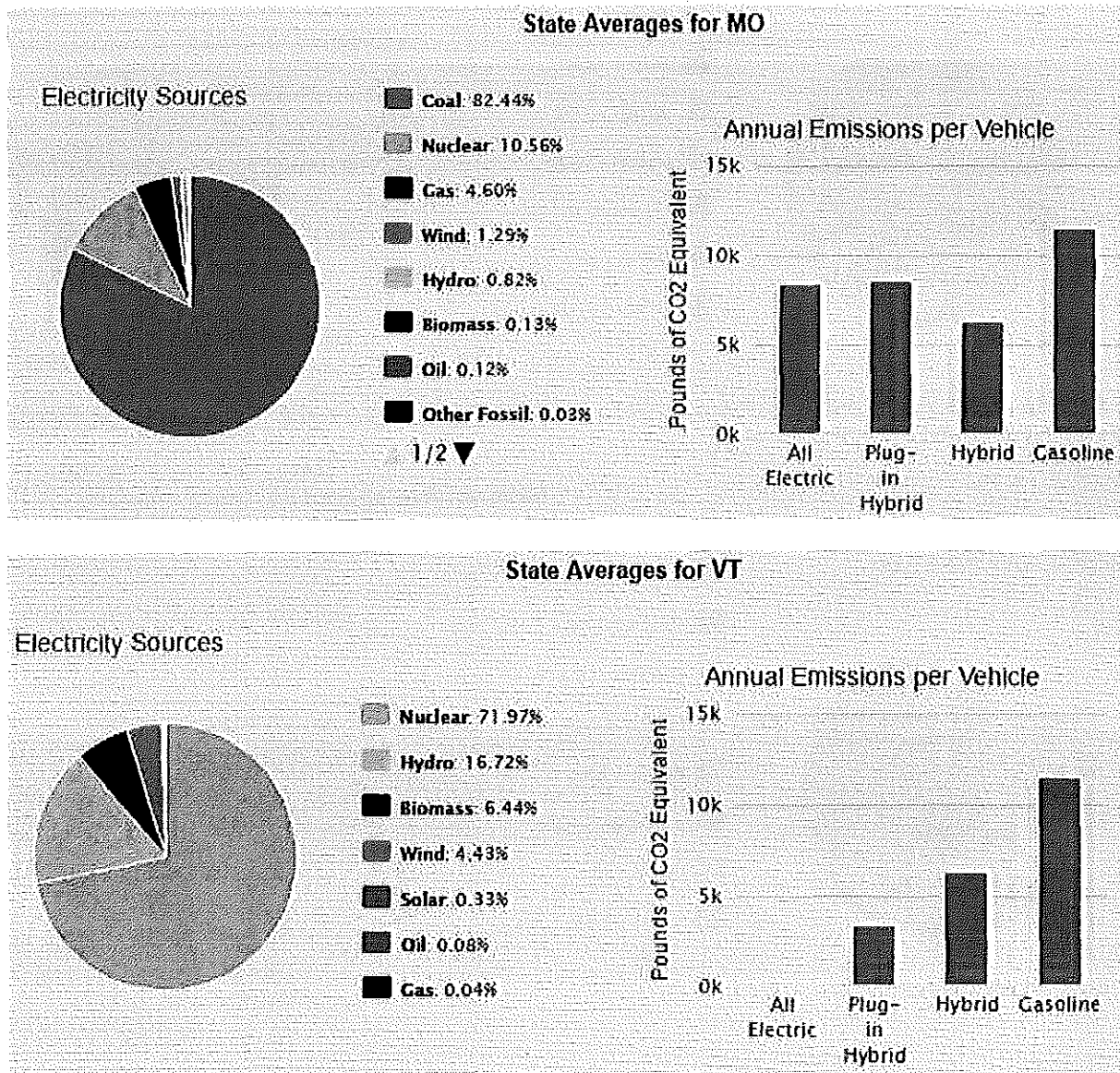
1 **Figure 2: Comparison of Electricity Sources and Vehicle Emissions: Missouri and the U.S. Average**¹⁹



¹⁹US DOE (2016) Alternative Fuels Data Center. Emissions from hybrid and plug-in electric vehicles
http://www.afdc.energy.gov/vehicles/electric_emissions.php

Clearly, location matters in terms of the relative environmental benefits that can be achieved from the promotion of EVs. To provide another illustrative example, Figure 3 compares Missouri against Vermont; a state where EV promotion makes sound environmental sense.

Figure 3: Comparison of Electricity Sources and Vehicle Emissions: Missouri and Vermont²⁰



²⁰ Ibid.

1 **CAFÉ Standards, Biofuels, and Power Laws**

2 **Q. Should we assume that gasoline vehicles will produce the same amount of average**
3 **emissions into the future?**

4 A. No. Multiple streams of policy and technological changes are converging in response to the air
5 quality threats facing our environment. Changes in electric vehicle technology are clearly
6 taking place and may very well produce overall net benefits in many important policy arenas.
7 However, even absent nation-wide electrification of the transportation system, the U.S.
8 Corporate Average Fuel Economy (“CAFÉ”) Standards mandate that the average fuel
9 economy of new passenger cars increase from 30 mpg in 2013 to 54 mpg by 2040, this would
10 yield a 44 percent reduction in combustion-related GHG emissions from ICEs.

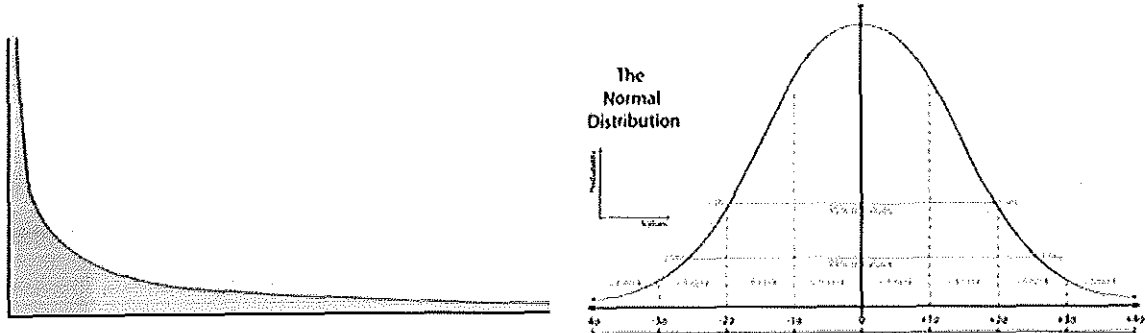
11 Furthermore, the U.S. Environmental Protection Agency (“EPA”) recently issued a statement
12 that the federal government would be requiring energy companies to use a record amount of
13 biofuel in 2017 setting a total target for renewable fuel at 19.28 billion gallons which is 6%
14 higher than the 18.8 billion gallons the EPA had initially proposed in May. The EPA also set
15 the advanced biofuels mandate (fuels that are more environmentally friendly than ethanol) at
16 4.28 billion gallons for 2017.²¹

17 Finally, it would be incorrect to assume that emissions from vehicles follow a normal
18 distribution. Most cars, especially new ones, are extraordinarily clean. In contrast, a polluting
19 car in need of repair can stay on the road for quite awhile before it requires inspection. In fact,
20 it is largely believed that emissions from vehicles follow a power law distribution where a
21 relatively small but extremely dense concentration of offenders produces most of the
22 emissions.²² An illustrative difference between a normal (“bell-curve”) and power law
23 distribution can be seen in Figure 4.

²¹ US EPA (2016) EPA finalizes increase in renewable fuel volumes <https://www.epa.gov/newsreleases/epa-finalizes-increase-renewable-fuel-volumes>

²² Gladwell, M. (2006) Million-Dollar Murray. *The New Yorker*. <http://gladwell.com/million-dollar-murray/>

1 Figure 4: Power Law “Long Tail” and Bell-Shaped Curve Distribution

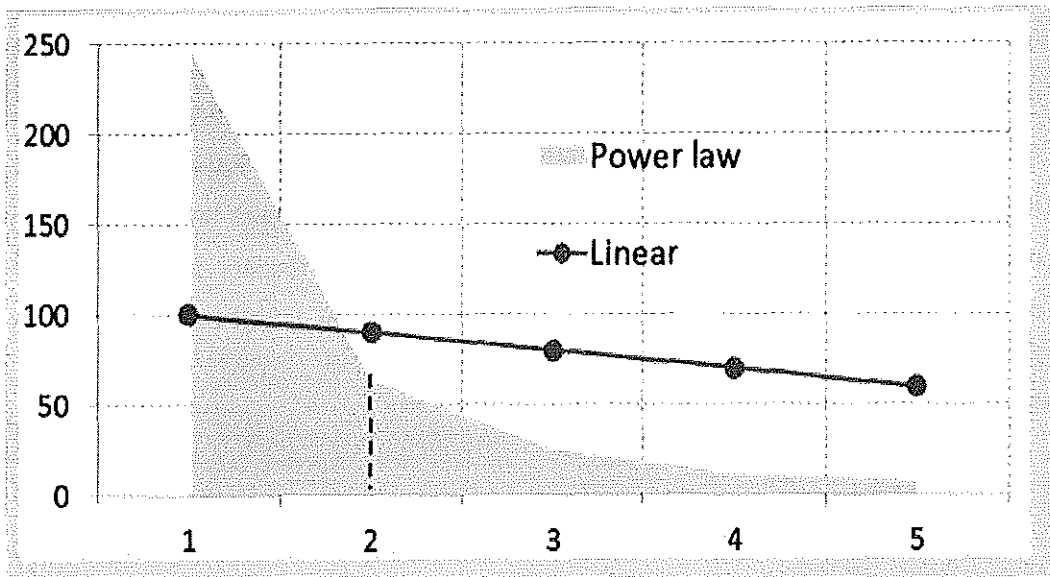


2 **Power Law**
3 **Distribution**

4 **Normal**
5 **Distribution**

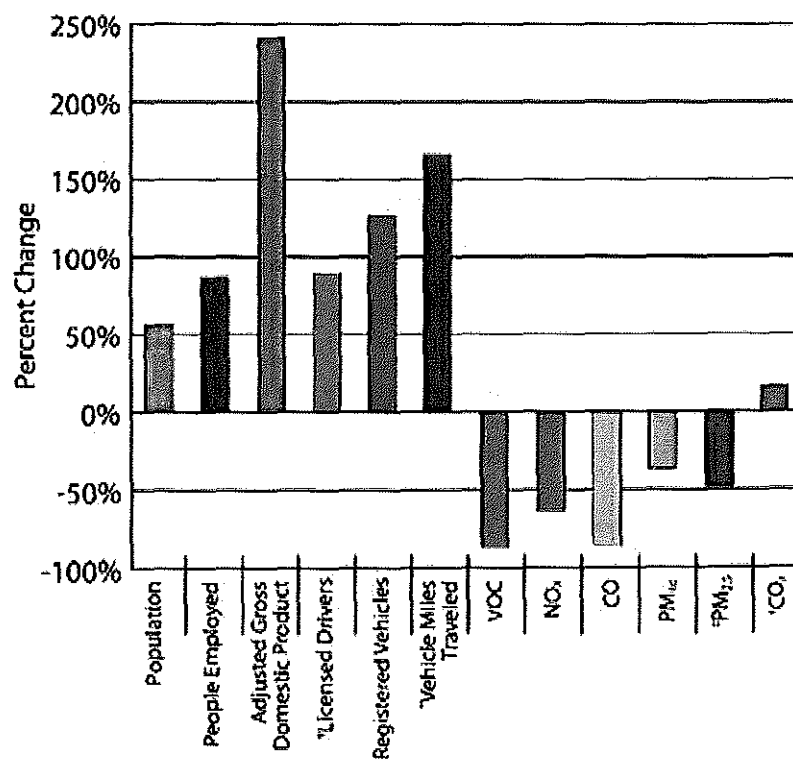
6 Power law distribution occurs when one quantity varies as a power of another. This would be
7 graphed exponentially, not linearly. An illustrative example of this can be seen in Figure 5
8 which shows how much pollution cars 1,2,3,4, and 5 emit. Under a power law distribution, car
9 #1 had emissions of 250, while car #2 emits fewer than 100. If this data were graphed
linearly, the first car would show emissions of 100 and the second car at emissions at 90.

10 Figure 5: Example of exponential vs. linear graphing of emissions.



1 This suggests that curbing vehicle emissions isn't so much a policy problem as it is an
2 enforcement or compliance issue. That being said, there has been a long and steady progress
3 in emission reductions in the United States despite overall increases in population,
4 employment, and adjusted gross domestic product as illustrated in Figure 6 from the U.S.
5 Department of Transportation, Federal Highway Administration's data fact book.

6 Figure 6: Percent change in motor vehicle emissions, demographics, and travel (1970-2013)²³



7
8 If the goal is to reduce greenhouse emissions, policy ought to seek out the cheapest reductions
9 first, which would (ideally) be administered through a price-based instrument and/or targeting
10 specific outlier emission offenders. More to the point, if carbon emission reductions are to be
11 met on par with what many environmentalists cite, the least-cost societal solution revolves less
12 around promoting EVs and more on public transit and/or less driving overall.

²³ US Department of Transportation, Federal Highway Administration (2016) Transportation Air Quality Selected Facts and Figures. Have we made progress in reducing motor vehicle emissions?
https://www.fhwa.dot.gov/environment/air_quality/publications/fact_book/page07.cfm

1 **V. EQUITY CONSIDERATIONS**

2 **Q. Does OPC have any equity concerns regarding rate based treatment of the EV charging**
3 **stations?**

4 A. Yes, there is a concern that the long-term benefits purported by Ameren Missouri for all
5 ratepayers are highly speculative, will not materialize until well into the future, and are
6 contingent on multiple moving policy objectives coming to fruition. In the near-term, only EV
7 drivers and Ameren shareholders would reap the financial rewards with non-participants
8 bearing most of the risk and cost. Equally troubling, at least for the immediate future given the
9 current tax code, is that only a small subset of largely affluent Ameren Missouri's ratepayers
10 are likely to benefit from this service. It is difficult to justify raising rates on households that
11 struggle to make ends meet to enable higher income households a more convenient lifestyle,
12 especially in light of the rising electric bills regardless of this proposal.

13 **Q. Is there any data to substantiate your claim that affluent ratepayers would likely reap**
14 **most of the benefits?**

15 A. Yes. The University of California, Berkeley Energy Institute at Haas examined the
16 distributional effects of all U.S. Clean Energy Tax Credits since 2006 to get a sense of what
17 type of households were benefiting from these subsidies. Since 2006, U.S. households have
18 received more than \$18 billion in federal income tax credits to promote clean energy such as
19 rooftop solar and energy efficiency. An analysis of federal tax return data over the past decade
20 showed that:

21 Taxpayers with AGI [adjusted gross income] in excess of \$75,000 have
22 received about 60% of all credit dollars aimed at energy-efficiency,
23 residential solar, and hybrid vehicles, and about 90% of all credit dollars
24 aimed at electric cars. Thus while there may well be political or other

rationales to prefer this approach to first-best policies, it would seem to be difficult to argue for these policies on distributional grounds.²⁴

The socio-economic disparity is most pronounced for affluent households when the *Qualified Plug-in Electric Drive Motor Vehicle Credit* is analyzed. The size of that credit ranges from \$2,500 to \$7,500 depending on the battery capacity of the vehicle. Table 3 provides an overview of the distribution of tax credits across income groups for select clean energy and other major tax credits.

Table 3: The Distributional Outcomes of Selected Tax Credits²⁵

	Percent of Credit Received by Income Category (in thousands)						Concentration Index
	\$0- \$10	\$10- \$20	\$20- \$40	\$40- \$75	\$75- \$200	\$200 +	
Panel A. Clean Energy Tax Credits							
Residential Energy Credits	0%	1%	10%	28%	48%	14%	0.606
Alternative Motor Vehicle Credit	0%	1%	9%	32%	47%	11%	0.584
Plug-in Electric Drive Vehicle Credit	0%	0%	1%	10%	54%	35%	0.801
Panel B. Other Major Tax Credits							
Earned Income Tax Credit	18%	49%	32%	1%	0%	0%	-0.415
Making Work Pay Credit	7%	14%	25%	28%	26%	0%	0.163
Child Tax Credit	2%	13%	31%	31%	23%	0%	0.185
First-time Home Buyer Credit	7%	6%	23%	40%	24%	1%	0.222
Foreign Tax Credit	0%	0%	1%	2%	9%	88%	0.954

Each of three selected Clean Energy Tax Credits listed above are largely concentrated within the top two quintile income categories; the Plug-in Electric Drive Vehicle Credit is most pronounced in high income earning households and most closely aligned with the Foreign Tax Credit in terms of high-income concentrated distribution.

²⁴ Borenstein S. & L. Davis (2016) The Distributional Effects of U.S. Clean Energy Tax Credits. Chapter in the National Bureau of Economic Research book Tax Policy and the Economy. Volume 30. U. of Chicago press. <http://www.nber.org/chapters/c13692> see also, NBER working paper 21437 <http://www.nber.org/papers/w21437>

²⁵ Ibid.

1 It is worth noting that much of the explanation for the disparity in the distribution of these
2 clean tax credits centers on its non-refundable provision. In short, the tax credits can be used
3 to offset a filer's tax bill, but a filer cannot go negative and receive a net payment from the
4 IRS like a filer can from the Earned Income Tax Credit and many other tax credits. This
5 becomes problematic from a distributional standpoint because roughly one-third of U.S. tax
6 returns had zero tax liability and thus were not eligible for any clean energy tax credit return.
7 Additional eligibility issues are present with energy efficiency and solar PV for filers who are
8 renters. This is known as the "split-incentive" problem and has been addressed at length in
9 multiple MEEIA proceedings in front of this Commission.

10 **VI. OTHER CONSIDERATIONS**

11 **Economic Impact**

12 **Q. Please summarize the economic development benefits Mr. Nealon claims Ameren**
13 **Missouri's pilot project may produce.**

14 **A. Although not discussed in any detail, Mr. Nealon states that:**

15 Macroeconomic studies indicate that money saved annually by EV owners
16 on fuel costs and vehicle maintenance will ultimately be spent as disposable
17 income in other sectors of the local economy. The combination of fuel and
18 maintenance savings together can approach thousands of dollars annually per
19 EV owner that would be re-directed into the communities served in Ameren
20 Missouri's service territory, creating more local jobs and economic
21 activity.²⁶

22 OPC has requested a copy of the macroeconomic studies Mr. Nealon references and reserves
23 the right to comment further on the economic impact of EV deployment in future testimony.

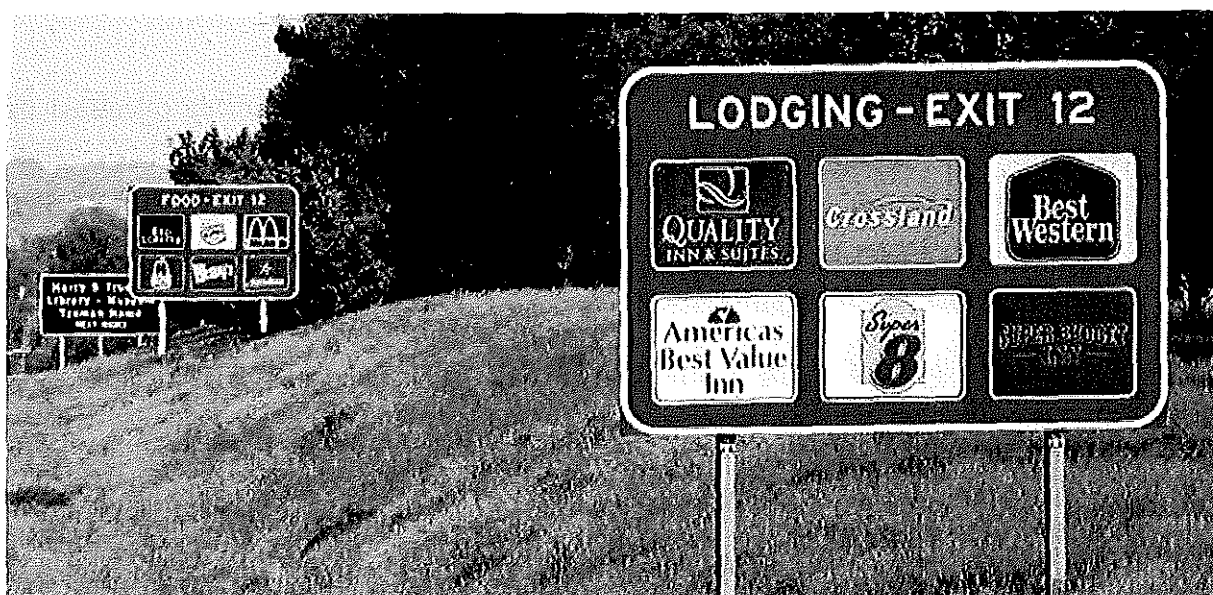
²⁶ Direct Testimony of Mark J. Nealon p. 31, 5-10.

1 **Marketing Considerations**

2 **Q. Ameren Missouri is proposing to spend \$10,000 on marketing and awareness over the**
3 **three-year pilot period and up to \$30,000 over the fifteen-year life of the assets. Is this**
4 **an appropriate amount?**

5 **A. I do not believe so. To provide an illustrative marketing expense, The Missouri Department of**
6 **Transportation (“MoDOT”) provides food, lodging, and gas “logo” signage at applicable exits**
7 **throughout Missouri’s highways as seen in Figure 7:**

8 Figure 7: MoDOT signage example



9
10 Currently, MoDOT charges \$1,000 and \$1,500 annually for standard²⁷ and high volume²⁸
11 interchanges respectively.²⁹ At a minimum, if Ameren Missouri were to utilize MoDOT
12 signage for each of its six charging stations on “average” interchanges it would cost the
13 Company \$12,000 annually. That would amount to \$2,000 a piece in advertising for each

²⁷ 0-29,999 average daily traffic count.

²⁸ 30,000 average daily traffic count

²⁹ Missouri Department of Transportation (2016) Missouri logos participation fees.

<http://www.missouri.interstatelogos.com/state/participationFees.aspx?programId=465>

1 charging station to account for traffic going east *and* west on I-70 at any given exit. Under this
2 minimalist approach, the Company would be exceeding its three-year marketing budget each
3 year and its fifteen-year budget within two-and-half years. Even then, it is not clear whether or
4 not the EV charging stations would even be eligible to participate in this advertising offering
5 as the criteria for participation includes the following items for “gas” locations:

- 6 • Continuous operation at least 12 hours per day, 7 days a week
- 7 • Provide fuel, oil, water and free air
- 8 • Provide restroom facilities
- 9 • Provide public telephone
- 10 • Provide drinking water
- 11 • Maximum distance of service: 6 miles³⁰

12 As it stands, it does not appear as though Ameren Missouri has correctly calculated the
13 potential costs necessary to market its proposed service.

14 Maintenance of Roads

15 **Q. Are there other potential equity issues to consider?**

16 A. Yes. EV drivers would not be paying their fair share of the transportation infrastructure in
17 Missouri.

18 **Q. How are Missouri roads funded?**

19 A. Highway construction and road maintenance is primarily supported through a combination of
20 revenues collected at the gas pump from federal and state taxes. Both the federal and state fuel
21 taxes/fees are based on gallons sold, which means as the price of gas goes up and down the
22 taxes/fee remain constant, regardless of whether or not you are paying \$4.02 per gallon (US
23 average monthly high in July 2008)³¹ or \$0.90 per gallon (US average monthly low in

³⁰Missouri Department of Transportation (2016) Missouri logos eligibility criteria.
<http://www.missouri.interstatelogos.com/state/eligibilityCriteria.aspx?programId=465>

³¹ Federal Reserve Bank of St. Louis. (2016) US Regular Conventional Gas Price
<https://fred.stlouisfed.org/series/GASREGCOVM>

1 February 1999).³² The federal gas tax has not been raised since 1993 and Missouri has not
2 raised its gas tax since 1992. Neither revenue stream has kept pace with inflation as the costs
3 of this infrastructure do not scale with the consumption of these fuels.^{33,34} Consequently,
4 funding for the nation's transportation infrastructure and Missouri's roads in particular are
5 constantly at risk of becoming insolvent.^{35,36}

6 Missouri's Department of Transportation ("MoDOT") had been operating with a capital
7 program budget of \$1.4 billion in 2009 but has since seen that budget shrink to around \$325 in
8 recent years until its road reserve balance funds were tapped into earlier this year bringing its
9 capital budget to approximately \$800 million annually over the next five years. However, this
10 amount still falls well short of the estimated \$125 billion needed to replace the 34,000-mile
11 MoDOT managed system. According to MoDOT Director, Patrick McKenna, "If you were
12 putting the same percentage into your own homes, your house would depreciate in value.
13 That's the situation we're in. We know we can't take care of this entire system with that level
14 of funding, even in its current condition, even if that condition is not satisfactory."³⁷

15 Table 4 magnifies the difference in gasoline taxes a driver in Missouri pays compared to the
16 US average based on amounts compiled by the American Petroleum Institute.

³² Ibid.

³³ US Department of Transportation. Federal Highway Administration. Highway History (2016)
<https://www.fhwa.dot.gov/infrastructure/gastax.cfm>

³⁴ Missouri Department of Transportation: Funding History (2016)
<http://www.modot.org/about/funding/fundinghistory.htm>

³⁵ Baker P. & J. Weisman (2014) House passes interim fix for highway trust fund. *The New York Times*.
http://www.nytimes.com/2014/07/16/us/politics/house-passes-interim-fix-for-highway-trust-fund.html?_r=0

³⁶ CBS St. Louis (2016). MoDOT cites dwindling funds for State's poor infrastructure.

<http://stlouis.cbslocal.com/2016/11/07/modot-cites-dwindling-funds-for-states-poor-infrastructure/>

³⁷ Hunsicker J. (2016) Kirksville Daily Express. MoDOT director: Transportation funding issues must be addressed for Missouri to move forward <http://www.kirksvilledailyexpress.com/news/20160720/modot-director-transportation-funding-issues-must-be-addressed-for-missouri-to-move-forward>

1 Table 4: Comparison of US and Missouri average gasoline taxes³⁸

	US Average	Missouri (47 th)	Difference
State Excise Tax	20.76¢/gal	17.00¢/gal	-18%
Other State Taxes/Fees	9.71¢/gal	0.30¢/gal	-96.9%
Total State Taxes/Fees	30.46¢/gal	17.30¢/gal	-43.2%
Total State and Federal Taxes	48.86¢/gal	35.70¢/gal	-26.9%

2
3 **Q. What should the Commission note from this table?**

4 **A.** That it is relatively inexpensive to drive an internal combustion engine vehicle in Missouri
5 compared to the US average. The low price of gas at the pump in Missouri relative to the rest
6 of the country serves as a large barrier towards the full adoption of EVs and diminishes the
7 likelihood that nonparticipant ratepayers will realize the benefits that Mr. Nealon champions.
8 It is also important to note that Missouri has no sales tax tied to the cost of gasoline. For
9 example, in Illinois, where the per gallon tax is just one cent higher than Missouri, there is
10 also a 6.25 percent sales tax. Consequently, St. Louis drivers can enjoy anywhere from a 0.10
11 to 0.15¢ lower cost per gallon than their counterparts across that border. Given current and
12 historical prices (as well as the current fossil-fuel intensive generation fuel mix of the
13 incumbent utilities), from a policy, economic and environmental perspective, almost any other
14 state would be a more attractive alternative as a “first mover” for the deployment of EV
15 charging stations than Missouri.

16 Moreover, the low cost of fuel means that our State’s roads are largely dependent on
17 inefficient cars and/or more miles traveled by the average driver relative to the rest of the
18 nation (all else being equal). The emergence of more fuel efficient cars or cars that are
19 gasoline independent (EVs) will shift those road maintenance costs to those nonparticipants.

³⁸ American Petroleum Institute. Gasoline Tax (2016) <http://www.api.org/oil-and-natural-gas/consumer-information/motor-fuel-taxes/gasoline-tax>

1 For example, a Ford Escort may tear up the same pavement as a Tesla Model S, but only the
2 former is going to be paying for those repairs.

3 Similar to an influx of rooftop solar panels on the electric grid, the emergence of EV cars
4 creates a situation where individual consumers (heavily subsidized through federal tax
5 incentives) make choices, in part, driven by opportunities to shift costs onto others. Far from
6 an equitable solution, as pointed out earlier, the data suggests that these subsidies are largely
7 regressive with only the affluent most likely to benefit. Although federal subsidies *may* be
8 justified in moving emerging technology for a brief period, it is important to not dismiss the
9 spirit of the free market or fail to recognize the unintended consequences a top-down policy
10 “solution” can create. Clearly, promoting vehicles that do not use gasoline that drive on
11 roads maintained largely through the purchase of gasoline exacerbates one policy problem
12 (funding of roads) at the expense of trying to solve for others (load growth, curbing carbon
13 emissions).

14 **Safety Considerations**

15 **Q. Are there additional considerations the Commission should consider?**

16 A. There are a host of outstanding safety and security issues that were not discussed in Mr.
17 Nealon’s testimony that merit further inquiry. Issues such as vandalism, copper theft, frayed
18 cables or accidents involving the charging devices all pose potential liabilities with this
19 business model. OPC is not aware of any statutes in place requiring periodic inspections of
20 EV charging stations or any requirements for homeowners to utilize an electrician to safely
21 install a charging unit at home. OPC would offer that additional dialogue with first responders,
22 road-side assistance technicians, and even the insurance industry may be prudent endeavors
23 that should be explored if the Commission elects to move forward with regulating this
24 extended service.

1 **Rate Design**

2 **Q. What is Ameren Missouri's proposed EV charging rates?**

3 A. Ameren Missouri is proposing a \$10.00 an hour charge rate for its DCFS station and a \$1.20
4 an hour rate for its level 2 station.

5 **Q. Has that been a common rate design for EV stations?**

6 A. No. It is my understanding that historically many EV stations have provided free electricity to
7 further promote the adoption of EVs. In those cases, the electricity has largely been paid for
8 by a host facility or even by the car manufacturer itself (e.g., Nissan or Tesla). Absent having
9 free electricity provided to the driver, host sites have priced their services according to the
10 market demand of their product.

11 **Q. Is Ameren Missouri proposing an EV charging rate for off-peak hours at home?**

12 A. No. Ratepayers would be utilizing rates available on the Company's tariff as they do today.

13 **Q. Has Ameren Missouri proposed an EV rate in its upcoming rate case?**

14 A. No.

15 **Q. Is this a concern?**

16 A. Yes. Today, electricity prices do not adjust to reflect the volatile cost of providing energy at
17 different times. Because electricity is not storable, the wholesale cost can change by a factor of
18 five or more within a single day, but the price to most end-use customers remains constant. It
19 is the equivalent of the price at the gas pump being held fixed while the world oil price ranges
20 between \$20 and \$140 a barrel, only compressed in time. Absent any price signal, EV drivers
21 may raise peak demand of electricity and collectively raise the costs for everyone. Such a
22 scenario would also negate the emission reductions gained from moving to EV to begin with.

23 Time-of-Use electricity pricing offers benefits both now and in the future. The immediate
24 benefit is that raising prices at peak times (when producing each extra kilowatt-hour is most

1 expensive) and lowering them at off-peak times would move some consumption off the peak
2 and reduce the need to build future “peaking” power plants. In the long run, sending such
3 time-varying price signals would allow Ameren Missouri to better synchronize consumption
4 with electricity production from intermittent resources, such as solar and wind as they come
5 on line in the future.

6 **Q. What does OPC recommend?**

7 **A.** It is OPC’s opinion that Ameren Missouri and its ratepayers would be better served by having
8 the regulated utility promote regulated activity such as educating and attracting potential EV
9 drivers through proper rate design and leave competitive entities to determine the appropriate
10 demand for EV charging stations. If one the primary goals are the reduction of greenhouse gas
11 emissions, policy ought to seek out the cheapest reductions first which would be administered
12 in a price-based instrument such as rate design. Offering a favorable, easily understood rate
13 design for potential drivers will likely have more of an impact on adoption rates of EVs than
14 Ameren Missouri’s current proposal.

15 Consistent with the rest of this testimony, OPC would recommend that the EV charging
16 stations resale of electricity be left to the market to decide as far as most efficient pricing.
17 Second, OPC would recommend that an opt-in TOU tariff be considered in the near future if
18 EV adoption increases. Although not proposed, OPC would be categorically against providing
19 free electricity service to EV drivers.

20 The federal government has deemed it appropriate to allocate tax dollars to spur clean
21 investment and promote disruptive market forces. Ratepayers should not be confused as
22 taxpayers. They represent an entirely different classification by virtue of their captive status.
23 As proposed, Ameren Missouri’s “pilot” project blurs and distorts that distinction by
24 undermining the market element that tax dollars were designed, in part, to promote, and will
25 ultimately inhibit the promotion of the desired policy outcomes. Ratepayers (especially non-
26 EV participating ratepayers) should not shoulder the risk of a regressive, command-and-

1 control hypothetical when opportunity costs dictate that utility resources would be better
2 allocated towards endeavors focusing on cost-effective regulated services benefitting all
3 ratepayers.

4 Similar conclusions were reached by the Kansas Corporation Commission recently in its
5 Order Denying KCP&L's Application of its Clean Charge Network Project and Electric
6 Vehicle Charging Station Tariff (see GM-2).

7 **Q. Does this conclude your testimony?**

8 **A. Yes.**

CASE PARTICIPATION OF
GEOFF MARKE, PH.D.

Company Name	Employed Agency	Case Number	Issues
Union Electric Company d/b/a Ameren Missouri	Office of Public Counsel (OPC)	ET-2016-0246	Rebuttal: EV Charging Station Policy
KCP&L Greater Missouri Operations Company	OPC	ER-2016-0156	Direct: Consumer Disclaimer Rebuttal: Regulatory Policy / Customer Experience / Historical & Projected Customer Usage / Rate Design / Low-Income Programs Surrebuttal: Rate Design / MEEIA Annualization / Customer Disclaimer / Greenwood Solar Facility / RESRAM / Low-Income Programs
Empire District Electric Company, Empire District Gas Company, Liberty Utilities (Central) Company, Liberty Sub-Corp.	OPC	EM-2016-0213	Rebuttal: Response to Merger Impact Surrebuttal: Resource Portfolio / Transition Plan
Working Case: Polices to Improve Electric Regulation	OPC	EW-2016-0313	Comments on Performance-Based and Formula Rate Design
Working Case: Electric Vehicle Charging Facilities	OPC	EW-2016-0123	Comments on Policy Considerations of EV stations in rate base
Empire District Electric Company	OPC	ER-2016-0023	Rebuttal: Rate Design, Demand-Side Management, Low-Income Weatherization Surrebuttal: Demand-Side Management, Low-Income Weatherization, Monthly Bill Average
Missouri American Water	OPC	WR-2015-0301	Direct: Consolidated Tariff Pricing / Rate Design Study Rebuttal: District Consolidation/Rate Design/Residential Usage/Decoupling Rebuttal: Demand-Side

			Management (DSM)/ Supply-Side Management (SSM) Surrebuttal: District Consolidation/Decoupling Mechanism/Residential Usage/SSM/DSM/Special Contracts
Working Case: Decoupling Mechanism	OPC	AW-2015-0282	Memorandum: Response to Comments
Rule Making	OPC	EW-2015-0105	Missouri Energy Efficiency Investment Act Rule Revisions, Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0084	Triennial Integrated Resource Planning Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0055	Rebuttal: Demand-Side Investment Mechanism / MEEIA Cycle II Application
The Empire District Electric Company	OPC	EO-2015-0042	Integrated Resource Planning: Special Contemporary Topics Comments
KCP&L Greater Missouri Operations Company	OPC	EO-2015-0041	Integrated Resource Planning: Special Contemporary Topics Comments
Kansas City Power & Light	OPC	EO-2015-0040	Integrated Resource Planning: Special Contemporary Topics Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0039	Integrated Resource Planning: Special Contemporary Topics Comments
Union Electric Company d/b/a Ameren Missouri	OPC	EO-2015-0029	Ameren MEEIA Cycle I Prudence Review Comments
Kansas City Power & Light	OPC	ER-2014-0370	Direct (Revenue Requirement): Solar Rebates
Rule Making	OPC	EX-2014-0352	Net Metering and Renewable Energy Standard Rule Revisions, Comments
The Empire District Electric Company	OPC	ER-2014-0351	Rebuttal: Rate Design/Energy Efficiency and Low-Income Considerations
Rule Making	OPC	AW-2014-0329	Utility Pay Stations and Loan Companies, Rule Drafting,

			Comments
Union Electric Company d/b/a Ameren Missouri	OPC	ER-2014-0258	Direct: Rate Design/Cost of Service Study/Economic Development Rider Rebuttal: Rate Design/ Cost of Service/ Low Income Considerations Surrebuttal: Rate Design/ Cost-of-Service/ Economic Development Rider
KCP&L Greater Missouri Operations Company	OPC	EO-2014-0189	Rebuttal: Sufficiency of Filing Surrebuttal: Sufficiency of Filing
KCP&L Greater Missouri Operations Company	OPC	EO-2014-0151	Renewable Energy Standard Rate Adjustment Mechanism (RESRAM) Comments
Liberty Natural Gas	OPC	GR-2014-0152	Surrebuttal: Energy Efficiency
Summit Natural Gas	OPC	GR-2014-0086	Rebuttal: Energy Efficiency Surrebuttal: Energy Efficiency
Union Electric Company d/b/a Ameren Missouri	OPC	ER-2012-0142	Direct: PY2013 EM&V results / Rebound Effect Rebuttal: PY2013 EM&V results Surrebuttal: PY2013 EM&V results Direct: Cycle I Performance Incentive
Kansas City Power & Light	Missouri Public Service Commission Staff	EO-2014-0095	Rebuttal: MEEIA Cycle I Application <u>testimony adopted</u>
KCP&L Greater Missouri Operations Company	Missouri Division of Energy (DE)	EO-2014-0065	Integrated Resource Planning: Special Contemporary Topics Comments
Kansas City Power & Light	DE	EO-2014-0064	Integrated Resource Planning: Special Contemporary Topics Comments
The Empire District Electric Company	DE	EO-2014-0063	Integrated Resource Planning: Special Contemporary Topics Comments
Union Electric Company d/b/a Ameren Missouri	DE	EO-2014-0062	Integrated Resource Planning: Special Contemporary Topics Comments
The Empire District Electric Company	DE	EO-2013-0547	Triennial Integrated Resource Planning Comments

**THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS**

Before Commissioners: Jay Scott Emler, Chairman
Shari Feist Albrecht
Pat Apple

In the Matter of Kansas City Power & Light's Application to Deploy and Operate its Proposed Clean Charge Network.)
) Docket No. 16-KCPE-160-MIS
)

ORDER DENYING KCP&L'S APPLICATION FOR APPROVAL OF ITS CLEAN CHARGE NETWORK PROJECT AND ELECTRIC VEHICLE CHARGING STATION TARIFF

This matter comes before the State Corporation Commission of the State of Kansas (Commission) for consideration and decision. Having reviewed the pleadings and record, the Commission makes the following findings:

1. On January 26, 2015, Kansas City Power & Light Company (KCP&L) announced its planned Clean Charge Network (CCN) to install and operate more than 1,000 electric vehicle (EV) charging stations capable of supporting more than 10,000 EVs in KCP&L's service territories. On June 17, 2015, in Docket No. 15-KCPE-116-RTS, the Parties filed a Joint Motion for Approval of Unanimous Partial Settlement Agreement on Revenue Requirement (Settlement),¹ which included an agreement to jointly petition the Commission to investigate and evaluate the issue of EV charging stations. Accordingly, on September 24, 2015, KCP&L, Commission Staff (Staff), and the Citizens' Utility Ratepayer Board (CURB) filed a Joint Petition to Open a General Investigation Docket (Petition) requesting the Commission open a docket to investigate issues related to EV charging stations.

2. On February 2, 2016, the Commission issued an Order Opening Docket to address KCP&L's proposed CCN and EV charging station tariff. While KCP&L requested a general

¹ The Settlement was approved by the Commission on September 10, 2015.

investigation, since the Commission was presented with a specific program proposed by KCP&L, the Commission limited the scope of this Docket to evaluating the CCN proposed by KCP&L.² On February 16, 2016, KCP&L filed its Application for Approval of its Clean Charge Network Project and Electric Vehicle Charging Station Tariff. KCP&L intends the tariff to take effect January 1, 2017.³ The CCN will consist of EV charging stations manufactured by ChargePoint, Inc. (ChargePoint), and which will be part of ChargePoint's network of more than 20,000 charging spots in North America.⁴ Through partnerships with companies at host locations and with Nissan Motor Company, KCP&L plans to offer free charging on every station in its CCN to all drivers for the first two years or until a tariff is in place.⁵

3. The CCN is expected to cost approximately \$16.6 million, of which approximately \$5.6 million would be borne by Kansas jurisdictional customers.⁶ KCP&L is requesting Kansas ratepayers pay for the appropriately \$5.6 million in capital costs, along with the depreciation and approximately \$250,000 in annual operations and maintenance costs.⁷ Currently 230 of the planned 315 stations are in service,⁸ with the CCN expected to be completed by the end of the third quarter of this year.⁹ According to Charles A. Caisley, Vice President – Marketing and Public Affairs for KCP&L, based on customer research and national studies, there is “significant customer interest in electric vehicles.”¹⁰ KCP&L claims its proposed CCN is in the public interest “because it places Kansas in the forefront of

² Order Opening Docket, Feb. 2, 2016, ¶ 4.

³ Application of Kansas City Power & Light Company for Approval of Its Clean Charge Network Project and Electric Vehicle Charging Station Tariff (Application), Feb. 16, 2016, ¶ 10.

⁴ Attachment A to Application, Feb. 16, 2016, p. 1.

⁵ *Id.*

⁶ Direct Testimony of Charles A. Caisley (Caisley Direct), Feb. 16, 2016, p. 8.

⁷ Direct Testimony of Darrin Ives (Ives Direct), Feb. 16, 2016, p. 15.

⁸ Rebuttal Testimony of Darrin R. Ives (Ives Rebuttal), June 16, 2016, p. 18.

⁹ Direct Testimony of Kristin L. Riggins, Feb. 16, 2016, p. 11.

¹⁰ Caisley Direct, p. 10.

accommodating and promoting development of an industry that is expected to advance quickly in the near future.”¹¹ Specifically, Caisley explains:

The [EV] industry can only advance if there are adequate charging stations throughout the country, similar to what we now have for gasoline-powered vehicles. The lack of EV charging station infrastructure presents a barrier to market penetration at scale in the industry and the lack of a standardized financial transaction infrastructure also inhibits the industry’s growth. KCP&L can help alleviate those barriers in its service territory.¹²

4. As part of its Application, KCP&L filed a brief addressing the legal issues presented in this Docket. The first issue that KCP&L raises is whether providing EV charging services qualifies as a public utility function under Kansas law. After explaining offering EV charging services is a legitimate public utility function under Kansas law under K.S.A. 66-104 and K.S.A. 66-101a,¹³ KCP&L noted:

should the Commission determine that promoting and provisioning electric service for transportation purposes is necessary for carrying out Kansas public policy with regard to promoting and expanding the use of EVs in the state, then it would become part of the services and activities a public utility should make available to Kansas customers in order to meet the legal standard of providing “efficient and sufficient service and facilities” at just and reasonable rates, as required by K.S.A. 66-101b.¹⁴

5. In essence, K.S.A. 66-101b requires every electric public utility to furnish reasonably efficient and sufficient service.

6. On June 6, 2016, Commission Staff filed their Brief on Legal Issues, explaining while “EV charging service is a public utility function, the Kansas statutes do not answer important questions pertaining to the necessity or scale of such service.”¹⁵ Staff characterized the crux of this Docket as “what, if any, CCN property and operating expenses are reasonably

¹¹ Application, ¶ 14.

¹² Caisley Direct, pp. 10-11.

¹³ Brief of Kansas City Power & Light Company on Legal Issues, Feb. 16, 2016, p. 2.

¹⁴ *Id.*, p. 3.

¹⁵ Commission Staff’s Brief on Legal Issues, June 6, 2016, ¶ 4.

necessary to maintain reasonably sufficient and efficient electric service.”¹⁶ CURB did not brief the legal issues.

7. On June 6, 2016, Joshua P. Frantz and Robert H. Glass, Ph.D. filed direct testimony on behalf of Staff and Andrea Crane filed direct testimony on behalf of CURB. All three testified against the proposed program. Staff’s main critique of the proposed program is KCP&L has not demonstrated a demand for charging stations.¹⁷ Frantz characterized the proposed CCN program as a speculative investment to create demand for EVs.¹⁸ Furthermore, Frantz opined that KCP&L is already providing reasonably sufficient and efficient service to its EV customers without the CCN.¹⁹ Frantz concluded EV drivers typically charge their EVs at home²⁰ based on: (1) the testimony of KCP&L witness Daniel Bowermaster,²¹ (2) Tesla recommending home charging for its vehicles, and (3) studies of EV drivers’ charging habits conducted by Idaho National Laboratory. He explained EVs can easily be charged at home with a proper cord and ordinary three-prong 120-volt outlet.²² Frantz also questioned whether the CCN stations would be used or useful throughout the expected lifespan of the project based on technological advances.²³ With improved battery life and the possibility that wireless charging could become the dominant charging method, Frantz cautions the CCN could be obsolete before 2025.²⁴

¹⁶ *Id.*, ¶ 6.

¹⁷ Direct Testimony of Robert H. Glass Ph.D. (Glass Direct), June 6, 2016, p. 7.

¹⁸ Direct Testimony of Joshua P. Frantz (Frantz Direct), June 6, 2016, p. 5.

¹⁹ *Id.*, p. 6.

²⁰ *Id.*, pp. 6-7.

²¹ *Id.*

²² *Id.*, p. 6.

²³ *Id.*, p. 9.

²⁴ *Id.*, pp. 11, 13.

8. Dr. Glass explained Staff opposed the proposed network as a highly speculative, ratepayer-funded program to expand rate base, customer load, and customer demand.²⁵ According to Glass, “KCP&L does not present any statistical evidence of correlation between interest in EVs and a demand for commercial charging stations.”²⁶ As an alternative, Glass suggested recommending the legislature amend K.S.A. 66-104 to grant an exemption to private charging stations akin to the one given to private natural gas providers, and establishing a time of use rate for home charging of EVs.²⁷

9. Crane also urged the Commission to reject the proposed CCN program because: (1) KCP&L has not demonstrated a need for the program; (2) the program is potentially anti-competitive; and (3) the program would result in all Kansas customers cross-subsidizing EV owners.²⁸

10. On June 16, 2016, Darrin R. Ives and Charles A. Caisley filed rebuttal testimony on behalf of KCP&L. Ives reiterated that customers have requested and are utilizing the EV stations installed as part of the CCN.²⁹ In doing so, Ives admits, “it is true that KCP&L does not have a specific forecast for the growth in EV purchases within the KCP&L service territory, the fact is that customers are demonstrating firsthand that there is a need and a demand for the charging stations.”³⁰ Ives also appears to acknowledge the speculative aspect of the CCN proposal by expressing a willingness to share the costs of the program between customers and shareholders “to be reassessed at the time of KCP&L’s next full general rate case, when additional information and analysis will be available.”³¹

²⁵ Direct Testimony of Robert H. Glass, Ph.D., June 6, 2016, p. 3.

²⁶ *Id.*, p. 6.

²⁷ *Id.*, p. 26.

²⁸ Direct Testimony of Andrea C. Crane, June 6, 2016, p. 5.

²⁹ Ives Rebuttal, p. 2.

³⁰ *Id.*, p. 12.

³¹ *Id.*, p. 25.

11. Caisley disputes Frantz's assertion that home charging is adequate for the majority of KCP&L customers who own or are considering purchasing EVs.³² He cites four factors to argue home charging is not sufficient: (1) drivers sometimes travel more miles than their average daily use; (2) EVs lose some functionality as battery life diminishes; (3) fully recharging a nearly depleted battery at home could take twelve to sixteen hours; and (4) range anxiety is more pronounced for EV drivers.³³ Caisley also explained that 52% of households cannot park a car within 20 feet of an electrical outlet, and thus cannot charge at home.³⁴ In addressing Frantz's concerns that CCN stations will not be useful throughout their lifetime, Caisley testified "KCP&L is unaware of any automaker, especially U.S. automakers, that has provided commercially available EVs with built-in wireless charging as Navigant predicted in early 2014. Nor is the Company aware of any U.S. automaker that plans to introduce this technology in their commercial product line within the immediate future."³⁵ But wireless charging is only one example of a technological advancement that Frantz identified that might render the CCN obsolete.³⁶ Another possibility is improved battery life. Caisley ignored his own testimony on the potential for improved battery life ("[i]n just a few, short years, we have seen the second generation of EVs nearly double their battery life and range").³⁷ As Frantz points out, with continued improvements to battery life, there is less need for public charging stations, as EVs can remain charged on one night's worth of home charging.³⁸ Caisley did not rebut Frantz's testimony that improved battery life would decrease the demand for public charging stations.

³² Rebuttal Testimony of Charles A. Caisley, June 16, 2016, p. 2.

³³ *Id.*, pp. 4-5.

³⁴ *Id.*, p. 5.

³⁵ *Id.*, p. 18.

³⁶ Transcript of Evidentiary Hearing (Tr.), p. 298.

³⁷ Caisley Direct, p. 21.

³⁸ Frantz Direct, p. 13.

12. An evidentiary hearing was held on June 28 and June 29, 2016. KCP&L, Staff, CURB, and ChargePoint appeared by counsel, with KCP&L, Staff, and CURB having submitted prefiled testimony. The Commission heard live testimony from a total of eight witnesses, including four on behalf of KCP&L, two on behalf of Staff, one each on behalf of CURB and ChargePoint. The parties had the opportunity to cross-examine the witnesses at the evidentiary hearing as well as the opportunity to redirect their own witnesses. Following the evidentiary hearing, all of the parties submitted posthearing briefs.

13. The issue facing the Commission is not whether KCP&L can or should build and operate the CCN, but whether KCP&L should be able to recover the costs of building and operating the CCN from all of its customers, rather than its shareholders and EV owners.³⁹

14. The threshold issue is whether the CCN network is necessary to provide sufficient and efficient service.⁴⁰ The Commission concludes it is not.

15. As the Applicant, KCP&L bears the burden of proof. It failed to meet its burden. As the Commission will explain in greater detail below, based on the evidence presented, the Commission finds KCP&L has failed to demonstrate a legitimate demand for the CCN. Admittedly, KCP&L's CCN is designed to promote EV adoption.⁴¹ At the hearing, Caisley testified, "one of the benefits of the Clean Charge Network is to create the platform to discuss these things [cost of EVs] as part of being an enabler and catalyst for this industry."⁴² While stimulating EV ownership and usage may be a laudable goal, it is not within the scope of KCP&L providing sufficient and efficient service. Promoting EV ownership and usage is better left to the automobile industry.

³⁹ See Initial Post-Hearing Brief of Kansas City Power & Light Company, July 15, 2016, p. 13; see also Tr., pp. 25-26.

⁴⁰ See Tr., p. 26.

⁴¹ Tr., p. 52 (Caisley Cross).

⁴² *Id.*, p. 81.

16. Similarly, Caisley acknowledges that under KCP&L's proposal, KCP&L's ratepayers, rather than retail businesses will bear the cost of the CCN.⁴³ Caisley explained businesses "want to do something that will attract customers and be valuable to their customers that they don't have to outlay capital for."⁴⁴ The Commission does not agree that ratepayers should be subsidizing the cost of the CCN for the benefit of businesses. Businesses have already demonstrated that they are willing to install stations to attract and retain employees, customers, or tenants.⁴⁵ As Anne Smart, Director of Government Relations and Regulatory Affairs for ChargePoint, testified 92 charging ports have already been sold outside KCP&L's program to private entities in Kansas, such as universities, cities, and Sprint.⁴⁶ Even more to the point, Ives cited to his colleague Caisley's testimony that, "our hosts...have been signing up to participate in this. And we probably will have a waiting list when we run out of capacity for the network. And none of them are charging us for the space".⁴⁷ Therefore, the evidence suggests that rather than add a costly program to rate base, it is best left to private businesses and landlords to install stations as incentives to attract customers. Accordingly, it is not necessary for ratepayers to fund the CCN. The private sector appears willing to finance an effective EV charging network.

17. KCP&L views the CCN as part of its regulated distribution network necessary to provide efficient and sufficient service.⁴⁸ It follows that KCP&L believes that EV owners currently lack efficient electric service in KCP&L's service territory.⁴⁹ Yet the evidence does not suggest there is a legitimate demand for the CCN.

⁴³ *Id.*, p. 120.

⁴⁴ *Id.*, p. 121.

⁴⁵ Tr., p. 161 (Riggins Cross).

⁴⁶ Tr., p. 256-257, 271 (Smart Cross).

⁴⁷ Tr., p. 247 (Ives Redirect).

⁴⁸ *Id.*

⁴⁹ *Id.*

18. When presented with a California Transportation Electrification study from his direct testimony, which concluded most drivers of battery/electric vehicles do not need a charge outside their home on most days, Caisley acknowledged “[w]e do believe that 70, 80 percent of the charging occurs at home.”⁵⁰

19. When challenged on his claim that 52% of households cannot park a car within 20 feet of an electrical outlet, and thus cannot charge at home, Caisley admitted he had no statistics on EV adoption levels by residents of multi-dwelling units and that since he presumed that such residents did their due diligence, he was not making a demand claim.⁵¹ Accordingly, the Commission does not believe Caisley’s testimony offers any reason to believe a significant number of KCP&L customers need the CCN.

20. In evaluating the credibility of the witnesses on the question of the necessity of the CCN program, the Commission finds KCP&L sorely lacking. KCP&L resorts to character assassination, questioning the seriousness of Glass’s analysis, which KCP&L alleges arises to a lack of sincerity;⁵² and questioning the expertise of both Frantz and Crane. Frantz is criticized for relying on online research.⁵³ Yet, KCP&L fails to support its conclusions with any studies or data. For example, during KCP&L’s cross-examination of Frantz on whether the CCN is necessary for an EV driver who does not have a garage or access to an electrical outlet, Frantz testified that KCP&L did not provide any data to show any EV drivers were unable to charge their vehicles or that the vehicles were underused.⁵⁴ While neither KCP&L nor Staff performed any primary research or provided any data on the question of whether such customers exist or

⁵⁰ *Id.*, p. 58.

⁵¹ *Id.*, pp. 63-63.

⁵² Post-Hearing Reply Brief of Kansas City Power & Light Company, Aug. 5, 2016, ¶ 7.

⁵³ *Id.*, ¶ 4.

⁵⁴ Tr., p. 292 (Frantz Cross).

have experienced difficulty in charging their EVs,⁵⁵ KCP&L bears the burden of proving the necessity of the program. Therefore, the lack of supporting studies or data is fatal to their claim.

21. KCP&L relies on Crane's admitted lack of familiarity with the EV network in her home state of Connecticut to question her expertise.⁵⁶ But the Commission does not see the relevance in this line of attack. There is no evidence that Crane has consulted on Connecticut's network. Likewise, the record is devoid of any evidence on whether Connecticut has similar legislation to K.S.A. 66-101b. KCP&L tries to undermine Crane's ability to testify on the EV charging network as being outside the scope of her knowledge.⁵⁷ Yet her testimony deals with possible rate base treatment of the CCN.⁵⁸ Based on her numerous appearances before the Commission, where she has offered expert testimony on rate base treatment of programs, the Commission finds Crane qualified to offer her opinion on whether the CCN should be incorporated in rate base. The Commission agrees with Crane's recommendation that KCP&L's shareholders should absorb the CCN program costs since KCP&L took it upon itself to make the investment and the sheer size of the program.⁵⁹

22. In evaluating the evidence presented, the Commission finds KCP&L did not introduce credible evidence supporting the need for the CCN. First, KCP&L fails to provide support for its claims that there is demand for such a large EV network. As envisioned, the CCN could support 12,000 EVs with no wait time for users, and as many as 25,000 EVs with moderate wait time.⁶⁰ But under the Electric Power Research Institute (EPRI)'s most optimistic estimate, there would still be less than 12,000 EVs in KCP&L's service territory by 2020.⁶¹ KCP&L relies

⁵⁵ *Id.*

⁵⁶ Post-Hearing Reply Brief of Kansas City Power & Light Company, ¶ 8.

⁵⁷ *Id.*, ¶ 8.

⁵⁸ Tr. p., 285 (Crane Cross).

⁵⁹ Tr., p. 285 (Crane Cross).

⁶⁰ Tr., p. 157 (Riggins Cross).

⁶¹ Tr., p. 159 (Riggins Cross).

on EPRI to demonstrate demand for the EV network. EPRI also presents a more pessimistic estimate of 2,954 EVs by 2020, and an intermediate estimate of 8,245 by 2020.⁶² Through February 2016, an estimated 969 EVs were sold in KCP&L's service territory.⁶³ Based on the few EVs sold thus far and the wildly varying estimates of future sales presented by EPRI, the Commission appreciates how speculative any demand for a charging station is and questions why ratepayers should fund a CCN scaled to EPRI's most optimistic projections.

23. Despite KCP&L's repeated claims of strong interest for the CCN from its customers, Caisley admits KCP&L did not keep track of residential customers who called his Marketing and Public Affairs Department about charging stations.⁶⁴ So, KCP&L has no evidentiary support for its claims of strong consumer interest. Instead, they are forced to extrapolate territory-wide demand based on a survey of 1,169 members of their Customer Advisory Online Panel.⁶⁵ In that survey, one-third of the respondents would consider purchasing an EV.⁶⁶ KCP&L attempts to use the survey of 1,169 to argue that one-third of its overall Kansas customer base would consider purchasing an EV.⁶⁷ It stretches credibility to think 70,000 KCP&L customers would consider purchasing an EV based on an online advisory panel survey of less than 1,200 customers. Not only is the Commission troubled that KCP&L is attempting to extrapolate system-wide demand based on its survey of its online advisory panel, the Commission notes the survey simply asks if they would "consider" purchasing an EV, not whether they were likely to purchase an EV. The distinction is critical. The same survey reveals

⁶² *Id.*

⁶³ *Id.*, pp. 159-160.

⁶⁴ Tr. p. 105 (Caisley Cross).

⁶⁵ Tr., pp. 162-163 (Riggins Cross).

⁶⁶ Tr., p. 166 (Riggins Cross).

⁶⁷ Tr., pp. 168-169.

that 64% of KCP&L's customer advisory panel would not consider buying an EV even if KCP&L located a station in their area.⁶⁸

24. If anything, the survey KCP&L relies on indicates there is little demand for the CCN. Darrin Ives, KCP&L's Vice President of Regulatory Affairs, acknowledged KCP&L could not demonstrate customer demand for the CCN when he testified, "while it is true that KCP&L does not have a specific forecast for the growth in EV purchases within the KCP&L service territory, the fact is that customers are demonstrating firsthand that there is a need and demand for the charging station."⁶⁹ KCP&L offers no measurable evidence of customer demand for the CCN. Therefore, the Commission cannot in good conscience ask ratepayers to finance the CCN based on mere conjecture.

25. If anything, KCP&L's own witnesses make the case for home charging of EVs or allowing private businesses and landlords to install their own stations, rather than building the CCN. As Caisley testified, "obviously overnight is when a lot of charging is going to occur or when you get to your place of employment, if you can charge there."⁷⁰ Since a significant amount of charging will take place overnight or at work, it is difficult to articulate a reason to have ratepayers fund the CCN. Caisley inadvertently advocated for in-home charging by analogizing the CCN to the internet. In his testimony, Caisley recalled going to his college library to access his email and wondering why anyone would ever go to the trouble of going to a computer lab to use email.⁷¹ One of the reasons internet use is so widespread is it can be and is typically accessed on smart phones or on personal computers. People no longer need to go to computer labs or public libraries to use the internet. In other words, people use the internet

⁶⁸ Tr. p. 166 (Riggins Cross).

⁶⁹ Tr., p. 210 (Ives Cross).

⁷⁰ Tr., pp. 129-130 (Caisley).

⁷¹ Tr., pp. 93-94 (Caisley Cross).

because it is convenient. It follows that people are more likely to purchase EVs if they can charge at home, rather than go to an EV station where there may be a wait or they have to leave their EV unattended for a lengthy period of time as the EV charges. It is far more convenient to charge a vehicle in the security of one's own garage or office parking lot. The EV industry is more likely to develop through home charging.

26. KCP&L has given the Commission no reason to believe the stations installed prior to the CCN are inadequate to meet the needs of current and future EV owners. As Smart testified, there are already 92 stations installed at universities, municipalities, and private businesses. Those entities have demonstrated a willingness to finance those stations as an incentive for customers to use their business or rent at their apartment buildings. Similarly, Ives testified that several employers in the Kansas City metropolitan area have installed EV charging stations as a benefit to their employees, guests and customers.⁷² In testifying that a number of entities have advised KCP&L that they are never going to charge drivers to use their stations because the entities believe it incentivizes customers to come to their locations, Caisley leads the Commission to believe the best approach is to let private industry install stations as they will be the beneficiaries of increased business.⁷³ In other words, let the private sector invest in the EV market, rather than have ratepayers finance the speculative venture.

27. Another reason to conclude that the CCN is not necessary to provide service is that KCP&L has no plans on how to proceed if the Commission denies its Application.⁷⁴ If the CCN were truly necessary, KCP&L would commit to building the network and having its shareholders finance the project. If KCP&L is as confident in EPRI's projections as it claims to

⁷² Ives Rebuttal, p. 17.

⁷³ Tr., p. 92 (Caisley Cross).

⁷⁴ Tr., p. 132 (Caisley Cross).

be, KCP&L should be willing to invest its own money in the CCN as it stands to make a handsome profit if EV usage increases tenfold.

28. Since KCP&L fails to demonstrate the necessity of the CCN, the Commission must reject its Application. Besides there being no showing of necessity, the Commission is also troubled that the CCN might be technologically obsolete before the program expires. Frantz raised concerns that the CCN would not be “used and required to be used” throughout its expected lifespan due to wireless charging, Level 3 DC charging, and improved battery life.⁷⁵ Rather than provide facts to support why the CCN will remain used and useful throughout its expected ten-year lifespan, KCP&L engages in pure speculation. Caisley testified, “even if there is inductive charging that is not widespread and useable at that point, we fully expect from our conversations with auto manufacturers, we expect that the Level 2 and Level 3 plugs will still be on every vehicle and not obsolete”.⁷⁶ Again, in contrast to Frantz’s research and reference to studies, KCP&L refers to its expectations, without providing any sources to support those expectations.

29. Even if the Commission were to have found there is a need for the CCN and that the program would be used and useful throughout its lifespan, there is still the issue of cross-subsidization. “One class of consumers should not be burdened with costs created by another class.”⁷⁷ KCP&L’s proposal presents three cross-subsidization concerns: (1) KCP&L customers in Leavenworth, Miami, Wyandotte, and Linn Counties may be subsidizing Johnson County EV owners since all of the stations are deployed in Johnson County;⁷⁸ (2) the 275,000-300,000

⁷⁵ Frantz Direct, pp . 9, 11-13.

⁷⁶ Tr., p. 127 (Caisley Cross).

⁷⁷ *Jones v. Kansas Gas & Elec.*, 222 Kan. 390, 401 (1977).

⁷⁸ Post-Hearing Brief of the Citizens’ Utility Ratepayer Board (CURB Brief), July 29, 2016, p. 25.

Kansas jurisdictional customers⁷⁹ will be subsidizing the approximately 1,000 EV owners in KCP&L's service territory; and (3) the EV owners that will benefit are generally high income earners, who will be subsidized by lower income individuals unable to afford EVs.⁸⁰ KCP&L's response to concerns over cross-subsidization is essentially all consumers will benefit through cleaner air and increased load, which will spread the overall fixed costs of its system over more kilowatts.⁸¹

30. The Commission is not convinced that there are benefits to non-EV owners that outweigh its concerns over cross-subsidization. Daniel Bowermaster, a Program Manager at EPRI, who testified on behalf of KCP&L, explained charging an average EV using KCP&L's generation fleet results in power plant emissions equivalent to emissions produced by a gasoline powered vehicle with a 35 mpg fuel economy rating.⁸² To conclude there is an environmental benefit, Bowermaster compared that fuel economy to a 25.3 mpg average for new vehicles.⁸³ On cross-examination, Bowermaster refused to hypothesize whether EVs would replace smaller sedans with higher fuel economies or larger vehicles with lower fuel economies.⁸⁴ Based on Bowermaster's testimony, it is far from certain the CCN would produce environmental benefits sufficient to overcome cross-subsidization concerns. Even if KCP&L could demonstrate environmental benefits from the CCN, the Commission has previously rejected societal tests, recognizing that it is too difficult to quantify indirect societal environmental and health benefits.⁸⁵

⁷⁹ Tr., p. 104 (Caisley Cross).

⁸⁰ CURB Brief, p. 23.

⁸¹ Ives Rebuttal, p. 20.

⁸² Tr., p. 150 (Bowermaster Cross).

⁸³ *Id.*

⁸⁴ *Id.*, pp. 150-152 (Bowermaster Cross).

⁸⁵ Order, Docket No. 12-GIMX-337-GIV, March 6, 2013, ¶ 15.

31. The Commission also questions whether additional off-peak electricity sales will occur. As Ives admits, KCP&L has not conducted statistical modeling or forecasting to support its assumptions of future EV load.⁸⁶ More importantly, KCP&L's argument of additional off-peak sales is based on nighttime home charging.⁸⁷ If anything, the CCN would compete with nighttime home charging. If the CCN deterred nighttime home charging, it might actually impair off-peak sales and cause more electricity sales during peak hours. Again, the supposed benefit of additional load does not overcome concerns related to cross-subsidization.

32. At the time of its announcement, the CCN would have been the largest EV charging network in the country. While KCP&L repeatedly characterizes the CCN as a pilot plan, its scale exceeds that of a typical pilot program. KCP&L downplays its earlier pilot program, a partnership with the United States Department of Energy (DOE), which began around 2012 with approximately 50 stations.⁸⁸ The Commission questioned why KCP&L seeks to expand the scale of stations from 50 to 1,000.⁸⁹ Essentially, KCP&L explained the pilot program was too small in scope and not supported with enough advertising to affect customer behavior.⁹⁰ The lesson KCP&L apparently learned from its pilot program with DOE was not that there was insufficient demand for charging stations, but that the program was not large enough to stimulate demand. The Commission reaches a far different conclusion -- the results of the pilot program do not justify rapid expansion of the build out of charging stations at the ratepayers' expense.

33. Frantz raised an additional reason to discount the utilization data -- it did not account for how customers would react if they were asked to pay for the electricity at the EV

⁸⁶ Tr., p. 194.

⁸⁷ Post-Hearing Brief of Commission Staff, July 29, 2016, ¶ 57.

⁸⁸ Tr., p. 109 (Caisley Cross).

⁸⁹ Tr., p. 111.

⁹⁰ Tr., p. 112-113 (Caisley Cross).

stations.⁹¹ Currently, EV drivers are using the charging stations without having to pay for their electricity. Frantz testified that by providing free electricity at the EV stations, KCP&L's already sparse demand data is skewed, and that once customers are required to pay for the electricity, demand for charging outside the home will decline.⁹² The Commission finds Frantz's reasoning compelling. It is a matter of common sense that individuals may be very willing to accept something free, but scoff at having to purchase that same item. Until KCP&L actually charges its customers for using the EV stations, the data collected from its EV charging stations is suspect.

34. KCP&L claims it will take several years to gather sufficient data to draw reasonable conclusions from the CCN.⁹³ Based on that timeframe, the Commission questions the timing of KCP&L's Application. Adding to the Commission's consternation is Caisley's testimony that it takes upwards of one year to plan and install a station.⁹⁴ The Commission believes KCP&L would have been better served to gradually expand its EV network and seek approval of the CCN after it had sufficient data to establish actual demand for the program.

35. The Commission denies KCP&L's request to have ratepayers finance the CCN. The evidence demonstrates the CCN is not necessary. To the contrary, private businesses are already installing stations to incentivize customers, employees, and guests. Rather than burden the ratepayers, the Commission believes either KCP&L shareholders or private businesses should bear the costs of building and operating EV charging stations, as they are the beneficiaries of increased EV ownership. Relying on the private sector to finance an EV network also eliminates concerns of cross-subsidization.

⁹¹ Frantz Direct, p. 8.

⁹² *Id.*

⁹³ *Id.*

⁹⁴ Caisley Rebuttal., p. 8.

THEREFORE, THE COMMISSION ORDERS:

A. KCP&L's Application for approval of its Clean Charge Network project and electric vehicle charging station tariff is denied.


B. The parties have 15 days from the date of electronic service of this Order to petition for reconsideration.⁹⁵

C. The Commission retains jurisdiction over the subject matter and parties for the purpose of entering such further orders as it deems necessary.

BY THE COMMISSION IT IS SO ORDERED.

Emler, Chairman; Albrecht, Commissioner; Apple, Commissioner

Dated: SEP 13 2016



Amy L. Gilbert
Secretary to the Commission

BGF

EMAILED

SEP 13 2016

⁹⁵ K.S.A. 66-118b; K.S.A. 77-529(a)(1).

CERTIFICATE OF SERVICE

16-KCPE-160-MIS

I, the undersigned, certify that the true copy of the attached Order has been served to the following parties by means of

Electronic Service on SEP 13 2016.

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