

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

In the Matter of a Working Case to)
Evaluate Potential Mechanisms for)
Facilitating Installation of Electric)
Vehicle Charging Stations)

Case No. EW-2019-0229

COMMENTS OF THE MISSOURI OFFICE OF THE PUBLIC COUNSEL

COMES NOW the Office of the Public Counsel (“OPC”) and in response to the *Order Inviting Comments* filed by the Public Service Commission (“the Commission”), states as follows:

1. The Commission filed its *Order Inviting Comments* on March 22, 2019, which invited any interested stakeholder in this proceeding to provide information related to the questions posed by the staff of the Commission in its March 21, 2019 filing.

2. In response, the OPC developed a series of comments that have been set forth in the *Memorandum* prepared by the OPC’s Chief Economist: Dr. Geoff Marke. That *Memorandum* has been attached to this pleading as Appendix A, and is incorporated herein by reference.

WHEREFORE, the Office of the Public Counsel respectfully submits the comments contained herein for the consideration of the Public Service Commission.

Respectfully submitted,
OFFICE OF THE PUBLIC
COUNSEL

By: /s/ John Clizer
John Clizer (#69043)
Associate Counsel
P.O. Box 2230
Jefferson City, MO 65102
Telephone: (573) 751-5324
Facsimile: (573) 751-5562
E-mail: john.clizer@ded.mo.gov

CERTIFICATE OF SERVICE

I hereby certify that copies of the forgoing have been mailed, emailed, or hand-delivered to all counsel of record this thirtieth day of April, 2019.

_____ /s/ John Clizer

MEMORANDUM

To: Missouri Public Service Commission

From: Geoff Marke, Chief Economist
Missouri Office of the Public Counsel

Subject: Case No: EW-2019-022
In the Matter of a Working Case to Evaluate Potential Mechanisms for
Facilitating Installation of Electric Vehicle Charging Stations
Request for Additional Comments

Date: April 30th 2019

OPC appreciates the opportunity to provide written feedback based on Staff's request for additional comments following the March 21st workshop. OPC has arranged comments in two sections as directed by the Commission Staff. The first is a "catch-all" that includes a response to common themes of the workshop. OPC highlights several of those themes and expounds with information and/or policy suggestions accordingly.

The second section is a response to a series of topics listed by the Staff to help inform its Report. OPC offers feedback where applicable and would not oppose an additional workshop to explore any one of the given areas in greater detail, but would request that it be allowed to make a presentation if a similar format is adopted.

Part I: Response to common themes of the workshop

What is Missouri's transportation and fuel station breakdown?

According to data compiled from Auto Alliance Dashboard the U.S. Department of Energy, and US Census Data, as of end of calendar year 2018:^{1,2,3,4}

Estimated Missouri Population	6,126,452
Registered Battery Electric Vehicles (BEV)	3,551 (0.063%)
Registered Plug-In Electric Vehicles (PHEV)	3,125 (0.055%)
# of Publicly Available Electric Charging Stations	410
Non-BEV and Non-PHEV Registered Vehicles	5,653,741 (99.88%)
# of Publicly Available Gas Stations	3,934

¹Auto Alliance: Missouri (2019) <https://autoalliance.org/in-your-state/MO/>

² Auto Alliance: Advanced Technology Vehicle Sales Dashboard. <https://autoalliance.org/energy-environment/advanced-technology-vehicle-sales-dashboard/>

³ US DOE (2019) Alternative Fuels Data Center. <https://afdc.energy.gov/states/mo>

⁴ United States Census (2018) Annual estimates of the resident population for the United States, regions, states, and Puerto Rico

https://en.wikipedia.org/wiki/List_of_states_and_territories_of_the_United_States_by_population#cite_note-5

What is the policy goal? More EV adoption or more EV charging stations.

OPC would argue that there is a much stronger public interest argument in focusing dialogue on further EV adoption *not* further mechanisms to create more EV charging stations. The former can be designed to produce public benefits if done correctly, the latter is more likely to inhibit the free market and result in stranded assets and thus not be in the public interest.

Does building out more EV charging stations produce more EV ownership?

No, it does not. The relationship is weak at best.

In ER-2018-0145 and ER-2018-0146, OPC explored this question through discovery with KCPL and KCPL-GMO. The conclusion, as put forward in my rebuttal testimony, is as follows:

According to the response to OPC DR-2032, from 2010 to 2017 there were 905,455 conventional vehicles (non-electric) registered in the KCPL-KS, KCPL-MO and KCPL-GMO service territories. During that same time span only 2,789 EVs were registered in total (or 0.3%), with only 972 in KCPL-MO and 434 in the GMO service territory.

Furthermore, according to OPC DR-2034, there have been a total of 2,092 “unique drivers” who have used the CCN through 2017. This means that, at least, more than 700 of the registered EV drivers who reside in the three KCPL service territories have never utilized the CCN. **For perspective, there are 1,862 available charging ports on the Clean Charging Network, or roughly 1 charging port for each of the 2092 unique drivers who have ever used the CCN.**

It is also important to note that up until 2018 using the CCN charging stations was entirely free. Moving forward, drivers will have to pay for charging service, at least at the 749 non-host paid sites. Equally important, the vast majority of these charging stations are also not “fast charging” but instead “Level 2” models that take 4-5 hours to fully charge an EV with a 100- mile battery. The likelihood of generating enough revenues to cover the cost of the capital (and O&M) investments will be a challenge. Thankfully, and correctly, ratepayers do not have to bear those costs.⁵

OPC believes there is a weak correlation between EV charging stations and inducement of EV ownership. Similar conclusions have been substantiated by objective, independent, third-party analysis including a three-year Idaho National Laboratory study that captured 125 million miles of driving and 6 million charging events through partnerships with states, municipalities, electric utilities, and other stakeholders across 22 regions in the United States. The study concluded:

The answer is clear: despite installation of extensive public charging infrastructure, in most project areas, the vast majority of charging was done at home and work. About half the EV Project participants charged at home almost exclusively. . . . In the end, it was apparent that exact factors that determine what makes a public charging station popular are predominately community-specific. More research is needed to

⁵ Case Nos: ER-2018-0145 and ER-2018-0146 Rebuttal Testimony of Geoff Marke p. 3 13-21 thru p. 4, 1-7

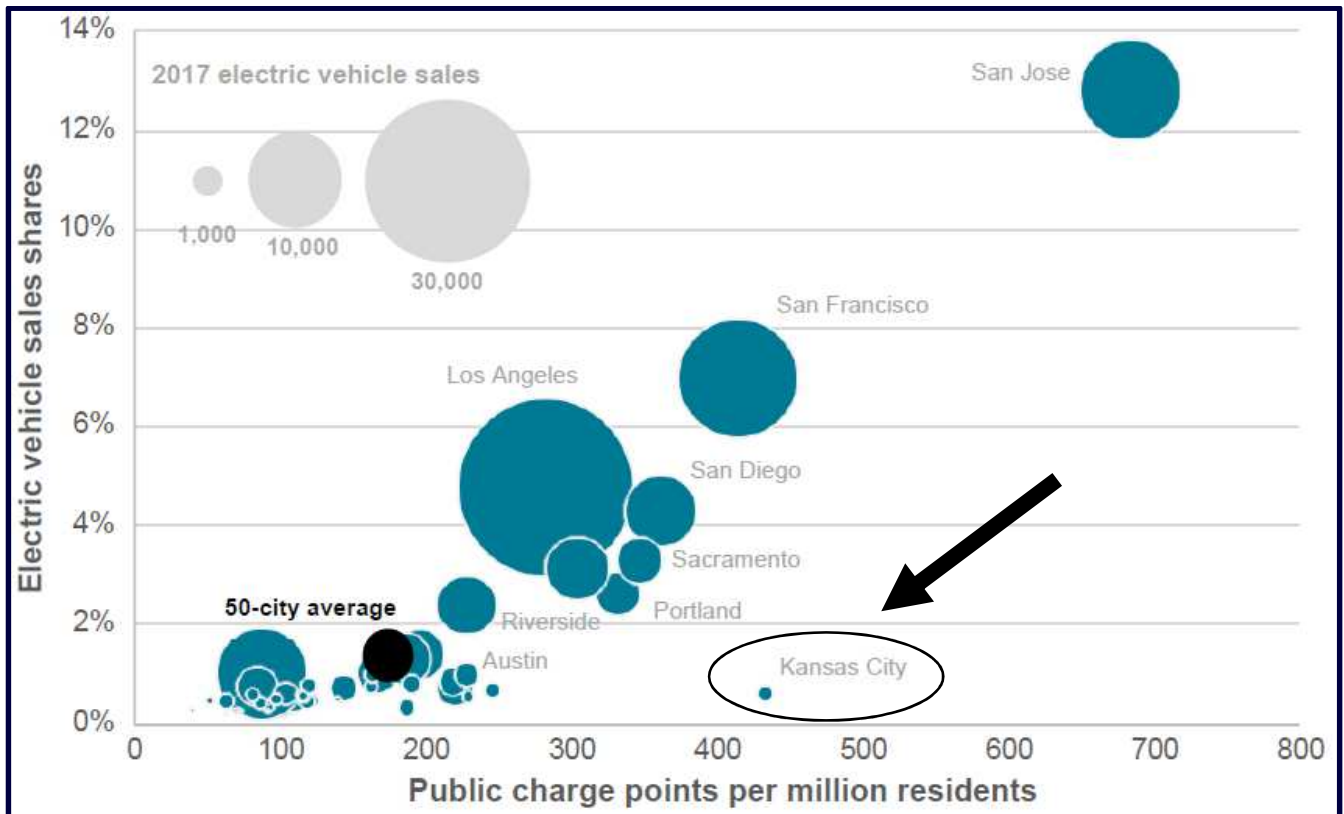
pinpoint these local factors. **Nevertheless, the projects demonstrated that a ubiquitous charging network is not needed to support PEV driving.**⁶

Moreover, The National Academies of Science, National Research Council in reviewing how to best overcome barriers to the deployment of plug-in electric vehicles specifically did not recommend further federal subsidies of public charging infrastructure. Stating:

Equally important to recognize is a recommendation that the committee does not make. **The committee does not at this point recommend additional direct federal investment in the installation of public charging infrastructure until the relationship between infrastructure availability and PEV adoption and use is assessed.**⁷

Again, OPC believes there is a weak correlation between EV charging stations and inducement of EV ownership. This can be seen, in part, by looking at EV uptake and charging infrastructure in major US cities as seen in Figure 1.

Figure 1: EV Uptake and Charging Infrastructure in US ‘EV Capitals’⁸



⁶ Idaho National Laboratory (2016) Plug-in electric vehicle and infrastructure analysis. <https://inldigitallibrary.inl.gov/sites/sti/sti/6799570.pdf>

⁷ The National Academies Press (2015) Overcoming barriers to deployment of plug-in electric vehicles. <https://www.nap.edu/catalog/21725/overcoming-barriers-to-deployment-of-plug-in-electric-vehicles>.

⁸ The Oxford Institute for Energy Studies (2019) Electricity, Electric Vehicles, and Public Policy: Eight Key Takeaways. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/02/Electricity-Electric-Vehicles-and-Public-Policy-8-Key-Takeaways.pdf> emphasis added.

There are at least three observations to draw from Figure 1:

- 1.) Of the 50 cities examined, Kansas City appears to have the second most public charging stations with only San Jose exceeding on a per capita basis.
- 2.) Despite having the second most available public charging stations per resident of US cities, Kansas City's electric vehicle sales (less than a 1,000) and EV sales share of the market (less than 1%) are well below the 50-city average.
- 3.) EV sales are overwhelmingly occurring in California as seen by the shares in: San Jose, San Francisco, San Diego, Sacramento, Los Angeles and Riverside.

There are many different tools electric companies and regulators can utilize to help enable further EV adoption that do not require substantial captive ratepayer capital. Bill transparency and education being chief among them.

Today, most people have an idea what a gallon of gasoline costs and what it would take to fill up their vehicle. The same cannot be said about the make-up of the charges on a utility bill as it pertains to adding on the costs associated with an electric vehicle. Utilities have long benefited from designing opaque billing to mask how their service is being priced. It is equally (or more likely) that this historical practice has had as much of an impact on the low EV adoption rates as the perceived lack of charging infrastructure.

Unfortunately, the discussions to date have centered almost exclusively on EV charging stations at the expense of any other possible tool. This should not be entirely surprising as utilities have a clear financial incentive to increase their rate base regardless of the outcome. Stated differently, "if all you have is a hammer, everything looks like a nail."

Even if reasonable minds can agree to disagree over OPC's general position on the correlation between EV infrastructure and EV adoption, it bears having a dialogue about lessons that can be learned from the Clean Charge Network before further deployment of EV infrastructure is pursued. Is it possible that other factors and actions lead to greater EV adoption? It seems eminently rational and appropriate to look to see what has worked and why. And to challenge ourselves to be both honest and critical where we have failed.

Are there environmental benefits?

It depends.

As the Commission is well aware, our investor-owned utilities and the markets they participate in are still largely made-up of fossil fuel generation for power. To the extent that EV adoption results in increased load—this activity will ensure that fossil fuel generating plants remain in service and will offset gains made in previous investments associated with MEEIA.

Assumed environmental benefits should also be wary of arguments centered on "average" carbon intensity factors. Annual averages are a misleading input as Green House Gases (GHGs) from power generation have large spatial (location) and temporal (timing) heterogeneity which means it is more accurate to factor in the marginal emissions released when an EV owner charges the vehicle, not the average emissions on a system over a year. In other words, the

analysis would need to identify which power plants have to produce slightly more to meet the additional EV demand. At a high level, the environmental benefits associated with EVs will vary considerably based on the price of electricity, the source of electricity, grid congestion, and other substantial factors.

Additional environmental considerations should also consider the progression of more fuel efficient internal combustion vehicles (the counter-factual option) as well as the environmental life cycle analysis of the production of the EV and its component parts including the energy intensity of the manufacturing of the battery. In addition to the emissions associated with the production and procurement of those parts, International NGO, Amnesty International recently raised objections to those issues and human rights violations as reported by Reuters:

Amnesty International attacked the electric vehicle (EV) industry on Thursday for selling itself as environmentally friendly while producing many of its batteries using polluting fossil fuels and unethically sourced minerals.

Manufacturing batteries can be carbon intensive, while the extraction of minerals used in them has been linked to human rights violations such as child labor, a statement from the rights group said.

Production of lithium-ion batteries for EVs is power intensive, and factories are concentrated in China, South Korea and Japan, where power generation is largely dependent on coal or other fossil fuels, Amnesty said. . . .

Amnesty demanded the EV industry come up with an ethical and clean battery within five years and in the meantime that carbon footprints be disclosed and supply chains of key minerals identified.

Last month, a letter seen by Reuters showed that 14 non-governmental organizations including Amnesty and Global Witness had opposed plans by the London Metal Exchange to ban cobalt tainted by human rights abuses.⁹

OPC believes environmental benefits can be gained through greater EV adoption, but the details matter, and if not considered, will be overstated and potentially counterproductive.

Are there grid benefits?

It depends.

This is a difficult question to answer as there could just as easily be greater costs imposed on the grid if the principles of cost causation are abandoned. Proper customer education and pricing should mitigate suboptimal outcomes.

⁹ Onstad, E. (2019) Amnesty faults electric vehicle batteries as carbon intensive. *Reuters*. <https://www.reuters.com/article/us-electric-batteries-amnesty/amnesty-faults-electric-vehicle-batteries-as-carbon-intensive-idUSKCN1R200B>

Are there cost savings to customers?

It depends.

This is a difficult question to answer as it is dependent on the assumptions utilized and whether “customers” denotes participants, non-participants or both. Proper customer education and pricing should mitigate suboptimal outcomes for all customers.

Are there cross subsidies? And, if yes, is that ok?

Cross subsidization is the practice of charging higher prices to one type of consumers to artificially lower prices for another group. It can be illustrated as follows:

Suppose “high-income” goes to dinner with two of her friends, “medium-income” and “low-income.” High-income’s meal costs \$35, medium-income’s meal costs \$20, and low-income’s meal costs \$5. The total bill is then \$60, and everyone decides to split the bill evenly, for \$20 each. High-income’s meal is underpriced. Low-income cross-subsidizes high-income for \$15 and is made worse off. And medium-income is neither cross-subsidized nor cross-subsidizes anyone else.

Is this ok?

OPC does not believe so. The aforementioned scenario is what is referred to as a regressive policy as opposed to a progressive policy. It is also the scenario at play in this case. It is difficult to argue for the merits of a policy that “may” have an impact on producing system-wide benefits ten years (or more) from now when the margins of living day-to-day are razor thin in the present for so many ratepayers.

In anticipation of potential stakeholder comments who argue that merely deploying EV charging station infrastructure into low income communities alleviates equity considerations, OPC respectfully disagrees. Regulatory public policy considerations regarding low income ratepayers should focus on trying to ensure low income customers have and maintain essential services not prioritizing the deployment of non-essential services for high income ratepayers. Stated differently, close proximity to an EV charging station has very little value if power cannot be maintained at a household due to income constraints.

The fact that cross-subsidies exist and can be identified in other policies or rate design considerations is not an argument to perpetuate regressive policy.

Part II: Response to specific Staff questions

Pilot Programs

There is no need for further regulatory action.

To date, there have been four separate contested cases (Case Nos: ET-2016-0246, ER-2016-0285, ER-2018-0145/0146, and ET-2018-0132) and multiple workshop dockets (Case Nos: EW-2015-0184, EW-2016-0123, EW-2017-0245 and EW-2019-0229) in which the issue of electric vehicle charging stations have either fully or in part been brought before the Commission.

Current programs should be allowed to produce reliable results first before further action is taken.

If Empire District Electric Company elects to explore EV charging stations for its customers there are two regulatory models in which it can draw guidelines from with the KCPL and Ameren Missouri models.

Data Gathering

The issue of data gathering and proper regulatory oversight will vary according to the ownership models associated with EV charging stations. Considerable more dialogue and regulatory/legislative guidance is necessary on this topic as the complexity and liability associated with data gathering extends beyond EV charging stations.

As it pertains to electric investor owned utilities, at a minimum, a utility should not disclose or sell private consumer information with or to its affiliates, subsidiaries, or any third party for the purposes of marketing services or product offerings to a customer who does not already subscribe to that service or product, unless the utility has first obtained the customer's written or electronic permission to do so.

See also OPC comments in Case No: AW-2018-0393 as well as the Direct Testimony of Geoff Marke in Case No. ER-2018-0145 & ER-2018-0146.

Customer Education

Customer education should be the primary focus of regulated activities by electric IOUs. OPC recommends a utility-specific Frequently Asked Question ("FAQ") page on each IOU's website and subsequent brochures/education to area car dealers regarding proper charging time and associated costs.

OPC would note that appropriate customer education related to billing and pricing of energy service should happen regardless of this docket as a matter of sound regulatory policy.

Cost/Benefit Analysis

A method of reaching economic decisions by comparing the costs of doing something with its benefits sounds simple, but, in practice, has proven anything but. It is OPC's position that the careful selection of the assumptions used in a cost-benefit analysis can be made to support, or oppose, almost anything. OPC is doubtful that an appropriate cost-benefit framework can be created that would satisfy stakeholders. To date, attempts at a cost-benefit analysis related to EV Charging Stations have proven to be problematic and inconclusive.

OPC spent a considerable amount of time taking issue with the assumptions surrounding both Ameren Missouri's and KCPL's cost benefit analysis surrounding their EV charging dockets. However, in Case No. ET-2018-0132, OPC abandoned the cost-benefit analysis argument in its entirety and instead proposed a middle-ground through the adoption of a performance base metric tied to cost recovery consistent with Ameren Missouri's projected forecasts.

That is, OPC supported cost recovery if benefits actually materialized as proposed.

Unfortunately, this method was rejected by Ameren Missouri and absent from comment in the Commission's Report and Order.

OPC echoed its support for symmetry in risk sharing in the EV Charging Station Workshop (Case No. EW-2019-0229) and found it ironic that the more workshop participants espoused certainty in the future EV adoption forecasts, the more said participants revolted from the idea of shareholders having skin in the cost recovery outcome.

Adoption Rates/Needs of Customers at Present

OPC believes in an evidence-based approach that keeps policy dialogue intellectually honest.

At present, Kansas City can arguably claim to have more EV charging stations per capita than any other major metropolitan area. However, Kansas City's EV adoption is nowhere near the top. This would seem to suggest that EV adoption is not strongly correlated to EV charging station infrastructure. Perhaps the Commission and stakeholders would be better served by directing dialogue towards other policy levers (e.g., customer education) as a means to induce EV market adoption as opposed to further utility build-out of EV charging stations which may only serve to crowd out third-party market actors.

Cost Recovery/Rate Design/Incentives

With respect to costs, it is important that regulators ensure there is differentiation between "essential" and "value-added" electric service and appropriately assign the costs of the two; otherwise, the costs will be assessed against all consumers, not just those utilizing the services.

This differentiation is recognized in the KCPL Clean Charge Network model by creating a separate customer class. Likewise, for the Ameren Missouri model, financial incentives related to corridor charging are limited and are not tied to assets to be included in rate base.

No doubt, rate design will evolve as customer usage and demographics change. As such, OPC does not currently have specific recommendations regarding rate design other than that we generally favor a time-of-use rate that encourages off-peak demand.

Flexibility and Choice

The Commission can best ensure both flexibility and choice by letting the free market work.

What is the "Make Ready Model" – what should be included in the "Make Ready?"

Presently, OPC takes no formal position on this question, but reserves the right to comment on this model based on respondent's feedback if warranted.

Line extension for EV Charging Station

OPC does not support additional modifications to line extension tariffs beyond what is currently authorized for each utility.

Option to waive line extension charges for separately metered EV charging stations that meet specific public policy considerations

OPC does not support such a blanket provision.

What public policy considerations must be met for an EV charging station to receive the incentive?

OPC does not support ratepayer-funded financial incentives for EV charging stations beyond what the Commission approved in Case No. ET-2018-0132 for Ameren Missouri.

Ownership Models

Ownership Models: Third Party Actors

Whenever competition is feasible it is, for all its imperfections, superior to regulation as a means of serving the public interest.

Ownership Models: Investor-Owned Utilities

OPC supports both KCPL and Ameren Missouri's current ownership models.

For KCPL, that is a rate based asset that is only recoverable from cost causers (i.e., a separate rate class for EV charging station users).

For Ameren Missouri, it includes ratepayer-funded EV charging station incentives directed at strategically optimal locations (highway corridors), on a limited basis, at a capped budget and not included in rate base.

Both methods, when exercised sparsely and prudently, minimize government intervention in the free market, may spur further EV adoption and should serve as interesting contrasts in which data should be created to help inform stakeholders.

Ownership Models: Investor-Owned Utility EV Charging Station Ownership With and Without Ratepayer-Funded Subsidies

Regarding IOU EV charging station ownership with ratepayer-funded subsidies: Such activity should be done within the parameters authorized by the Commission in the aforementioned cases.

Regarding IOU EV charging station ownership without ratepayer-funded subsidies: Assuming there is appropriate compliance and enforcement of the Commission's affiliate transaction and promotional practice rules, IOUs should be allowed to participate in the EV charging station market as an unregulated affiliate. This would include reaping the financial rewards and bearing the financial risks associated with those investments. Just like literally every other market actor.

Potential Policies for EV Charging Infrastructure implementation that provides the most benefit to the Grid

What policies will promote deployment of EV charging stations?

Affordable, cost-causative electric rates and basic customer billing/pricing education should be the primary policy focus for Missouri utilities, regulators and advocates.

Additional policies, above and beyond those currently authorized by the Commission raise prudence, equity, and regulatory concerns and are best left to the free market without government intervention.

Further regulatory oversight should focus on ensuring bulk system issues are minimized if future demands materialize.

What type of technology/charging equipment needs to be utilized?

Whichever technology ultimately prevails under the free market.

Consider for a moment that multiple models are currently competing for market share. This includes but is not limited to:

- Plug-in Level 1 (120V AC) 16 hours = 80 miles
- Plug-in Level 2 (240V AC) 8 hours = 80 miles
- Plug in Level 3 (480V DC Fast Charge) 30 minutes = 80 miles
- Tesla (480V DC) 15 minutes = 80 miles
- Wireless (see Momentum Dynamics, Oslo, Norway)
- Battery Swapping Stations (see BJEV, China)
- RideSharing (see HourCar, Uber and Lyft)
- Mobile Charging (see ChargeWheel)

State regulators are not in the best position to pick winners and losers in competitive markets.

Energy Star Certified EV Charging Station Requirements

OPC is not in a position to have a meaningful opinion on this issue due to the unknown costs and assumed savings associated with the Energy Star label for charging infrastructure. It may be good policy, it may not be. To be clear, if deployment conditions are required of EV charging stations this will in turn drive up costs and will result in trade-offs. Namely, that there will be fewer charging stations that will be deployed as a result of a finite amount of capital to expend (e.g., you could have 10 EV stations or 5 Energy Star EV stations). Whether or not that is prudent investment will be dependent on the details of the case at hand.

To the extent that ratepayer subsidies are associated with load building programs, the Commission and stakeholders need to reconcile that policy directive with the load reduction policy directives tied to MEEIA programs.

Network Communications for EV Charging Stations

It is not clear what Staff is seeking with this statement. OPC believes such investments should be at the discretion of the private investors.

Commercial – Level 2 and DC Fast Charging

Whether or not commercial level 2 or DCFC EV stations proliferate in Missouri should be at the discretion of private investors not public regulators. To the extent that regulated utility operations

engage in this deployment it should be done within the parameters authorized by the Commission in the aforementioned cases.

Residential – Level 2 Charging Stations

Whether or not residential level 2 charging stations proliferate in Missouri should be at the discretion of private investors not public regulators. To the extent that a regulated utility operations engage in this deployment it should be done within the parameters authorized by the Commission in the aforementioned cases.

What is the interoperability of the EV charging station?

This is beyond the scope of state utility regulation and merely underscores the uncertainty surrounding this topic and why ratepayers should not be financially backing technology highly susceptible to obsolescence.

Energy Storage with EV charging stations for mitigation of demand charges

Energy storage would appear to be a premature topic given the present state of both technology and adoption. The issue of demand charges is an issue that will no doubt necessitate greater dialogue moving forward. Speaking in broad, general terms, OPC supports cost-causative rate structures. We are aware that privately-funded EVgo has announced adding limited number of battery storage systems at some of its fast charging stations to mitigate demand charges and gain further market share. No doubt further experimentation and innovation will continue if the free market is allowed to function.

What are the anticipated system impacts of EV charging on-peak on the grid?

This is a difficult question to answer as it is largely dependent on actions beyond the scope of this Commission. It would seem premature to speculate one way or the other on this topic as there are many confounding variables that will no doubt influence the impact. Proper customer education and pricing should mitigate suboptimal outcomes.

What are the potential impacts on the local distribution system?

This is a difficult question to answer as it is largely dependent on actions beyond the scope of this Commission. It would seem premature to speculate one way or the other on this topic as there are many confounding variables that will no doubt influence the impact. Proper customer education and pricing should mitigate suboptimal outcomes.

Distribution System Upgrade Requirements

OPC has no specific recommendations regarding distribution system upgrade investments/requirements at this point given the current EV adoption rate. As a general statement, it is our understanding that the distribution system can accommodate the near term, projected load forecasts based on discussions with the IOUs'.

Smart Meter Requirements

OPC does not presently take a position regarding Smart Meter requirements.

Ratemaking Policies – What will facilitate the most benefit for the grid?

Enforcing the principles of cost-causation.

Time of Use Rates Specific to EV Charging

In general, OPC supports time of use rates; however, further dialogue is necessary before OPC could provide meaningful input.

The need for a rulemaking to address electric vehicle charging and infrastructure to support it.

There is no present need for such regulatory oversight. Additional layers of bureaucratic oversight will just as likely inhibit EV adoption as it would induce it.

Stakeholders may also submit exemplar rules from other jurisdictions.

OPC offers no exemplar rules from other jurisdictions for consideration.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI


AFFIDAVIT OF GEOFF MARKE

STATE OF MISSOURI)
) SS.

COUNTY OF COLE)

COMES NOW GEOFF MARKE and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *COMMENTS OF THE MISSOURI OFFICE OF THE PUBLIC COUNSEL* and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.



Geoff Marke
Chief Economist

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 30 day April, 2019.



JERENE A. BUCKMAN
My Commission Expires
August 23, 2021
Cole County
Commission #13754037



Jerene A. Buckman
Notary Public

My Commission expires August 23, 2021.