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.	)))	**File No. EW-2019-0229**

SUPPLEMENTARY COMMENTS OF
NATURAL RESOURCES DEFENSE COUNCIL & SIERRA CLUB

I. Introduction

NRDC and Sierra Club participated in the Workshop convened on March 21, 2019. These supplementary comments are intended to complement the statements made on the record on that date, in response to questions from the Missouri Public Service Commission ("Commission") issued in its March 22, 2019 *Order Inviting Comments.*

II. Responses to Commission Questions

1. What policies will promote deployment of EV charging stations?

- There are three primary barriers to electric vehicle ("EV") adoption: 1) incremental vehicle cost; 2) the lack of charging infrastructure; and 3) the lack of consumer awareness. Utilities are uniquely positioned to address infrastructure, education and outreach, and vehicle-grid integration issues, particularly for undeserved but critical market segments, like multi-unit dwellings, where would-be EV drivers face unique challenges. We submit that Commission guidance on the scope of the utility role and the process for regulatory review is a critical policy step toward solving those infrastructure, outreach and integration challenges, and we hope that this process will result in such action (that is, concrete guidance from this Commission on what information should be included in a utility application to support transportation electrification, as well as the process and standard by which the Commission would rule on such an application).

- The successful implementation of these programs and rate options can both accelerate transportation electrification and lower the cost of integrating renewable energy by leveraging the energy storage inherent in EV batteries to manage an increasingly dynamic grid. Done right, widespread transportation electrification will benefit all utility customers and Missouri generally.

2. What type of technology/charging equipment needs to be utilized? / 3. What is the interoperability of the EV charging station?

- With respect to charging station technology (i.e., the hardware, software and networking components), the Commission should provide the utilities with guidance as to the desired end result, but should generally allow utilities to determine which technologies or practices will best achieve that result. For example, the Commission could determine that: charging stations should be smart, "networked" stations capable of receiving demand response signals and collecting utilization data; or that anyone should be able to use any public charging station deployed pursuant to a utility program and easily know what it will cost to charge without the need to enroll in a proprietary network or use proprietary smart phone applications; or, finally, the Commission could indicate that utility investments should use open standards and protocols for interoperability, but direct the utility to determine what standards and protocols meet those requirements.

4. Energy Storage with EV charging stations for mitigation of demand charges.

- Because demand charges often fail to reflect actual distribution system costs, and because energy costs are better reflected in time-varying volumetric rates, reforming demand charges in general is good policy.[1]

- Non-coincident demand charges do not reflect the actual cost of service; a customer's peak demand that occurs at 3AM when the grid is significantly underutilized is not equivalent to a peak demand that coincides with system-wide peak demand. Moreover, such charges do not accurately reflect the costs associated with transportation electrification use cases[2] and frustrate or erase the fuel cost savings upon which the economics of transportation electrification depend[3], thereby limiting infrastructure investments to support light, medium, and heavy-duty vehicles, particularly where utilization is likely to be low in the near-term (e.g., DC Fast Charging stations that are necessary to enable distance travel and will influence EV purchase decisions, but are located on more remote stretches of highway).[4]

- On-site energy storage (and, potentially, on-site generation in the form of solar) of one of several technology strategies that can be employed to limit the negative impact of demand charges (e.g., careful load management within charging depots for electric fleet vehicles), but should not be understood to remove the need for careful review of existing commercial and industrial rates to understand their suitability for transportation electrification charging uses cases.

5. What are the anticipated system impacts of EV charging on-peak on the grid? / 6. What are the potential impacts on the local distribution system?

- EVs do not pose a danger to the stability of Missouri's electric grid and costs associated with integrating EV load will likely be insignificant in the short term. Even in California, which now has over 474,000 EVs on the road,[5] often clustered on specific distribution circuits, adverse grid impacts have been *de minimis*; only 0.17 percent of EVs have triggered the need for a distribution system upgrade.[6] In fact, costs associated with

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[1] *See Borenstein, Severin, The Economics of Fixed Cost Recovery by Utilities*, Energy Institute at Haas Working Paper 272R (July 2016).

[2] Examples of "use cases" might include (1) at-home charging of passenger EVs; (2) public charging at Level 2 or Direct Current Fast Charging stations; (3) charging of medium- and heavy-duty fleets that are publicly or privately owned, among others.

[3] *See, e.g.*, ICF, California Transportation Electrification Assessment – Phase 3-Part A: Commerical and Non-Road Grid Impacts – Final Report," at 47 (Jan. 2016) (finding that "[u]tility rate structures are one of several key decision factors for potential [transportation electrification] consumers, and can represent the difference between a consumer accruing a return on their investment or realizing a net loss.").

[4] *See, e.g.,* NYSERDA, *Electricity Rate Tariff Options for Minimizing Direct Current Fast Charger Demand Charges*.

[5] Veloz, *Sales Dashboard,* October 5, 2018 (available at http://www.veloz.org/sales-dashboard/).

[6] Synapse Economics, *Electric Vehicles Still Not Crashing the Grid: Updates from California*, March 2018 (available athttp://www.synapse-energy.com/sites/default/files/EV-Not-Crashing-Grid-17-025.pdf, visited Sept. 6, 2018).

accommodating EV charging account for less than one hundredth of one percent of total distribution capital expenditures.[7]

- This is not to say, however, that the Commission and the utilities under its jurisdiction should not begin working now to ensure that the benefits of widespread EV charging are maximized and any costs are minimized. A foundational step for maximizing grid benefits is the use of time-of-use (TOU) rates, a basic strategy upon which more advanced forms of load management can be built. The Commission should consider the costs associated with utility programs to accelerate transportation electrification as investments to maximize and to ensure utility customers realize those potential net benefits sooner rather than later.

- The Commission could require the utilities to track impacts to the distribution grid associated with EV load, as, for example, the California Public Utilities Commission requires the utilities under its jurisdiction to do. However, the Commission should be aware that, even in California, those impacts have been *de minimis*.

8. Distribution System Upgrade Requirements

- The Commission should encourage smart charging that takes advantage of the storage and flexibility inherent in EV batteries, but should be agnostic as to the technological pathway to achieve the result. Accordingly, the Commission and the utilities under its jurisdiction should look to leverage the "smarts" embedded in EVSE and/or EVs, allowing for the most cost-effective solutions to emerge that maximize the rewards returned to customers.

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

Time-of-use (TOU) rates are a foundational tool to manage EV load. When properly designed, TOU rates create effective and efficient price signals for energy consumers.[8] EVs on TOU rates in California consume less than five percent of their total kilowatt-hours (kWh) during system peak hours.[9] Ensuring EVs charge on TOU rates is critical to minimize long-term distribution system impacts. Additionally, by encouraging EV drivers to charge in off-peak times when energy production costs are lower, well-designed TOU rates maximize the immediate fuel cost savings, which a survey of nearly 20,000 EV drivers reveals are the single biggest motivator of EV purchase decisions.[10]

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[7] *Id.*

[8] See, for example, The Department of Energy's EV Project, which has tracked the charging behavior of thousands of EVs since 2011, has shown that in areas with time-of-use ("TOU") rates and effective utility education and outreach, the majority of EV charging occurs during off-peak hours. This was not the case in areas without TOU rates, where EV demand generally peaked in the early evening, exacerbating early-evening system-wide peak demand. See Schey, et al., *A First Look at the Impact of Electric Vehicle Charging on the Electric Grid, The EV Project at EVS26* (May 2012).

[9] *Id*.

[10] California Clean Vehicle Rebate Project, EV Consumer Survey Dashboard (available at

The "smarts" that exist in EVs and charging stations can enable real-time adjustments to charging power rates (thereby decreasing or increasing system demand). This is commonly referred to as "managed charging." Managed charging typically requires an EV driver to cede some level of control over their charging to a third party. That third party could be a utility or a third-party aggregator. Charging rates can be remotely ramped up or down based on a variety of factors such as real-time output from wind or solar installations, time-of-use pricing, and overall grid demand, among others. By flattening peaks and filling in valleys of load shape, smart charging enables increased adoption of EVs without new grid infrastructure and promotes grid reliability by allowing a central operator to curtail EV charging during peak demand. The Commission should examine potential program offerings that utilities or third parties could offer to pilot managed charging, and to examine potential challenges, including communications between cars, charging stations, third parties and utilities.

III. Make Ready - What constitutes "Make Ready?"

In prior submitted comments in the Working Case EW-2017-0245, Sierra Club and NRDC explained that, in the prototypical "make-ready program,"

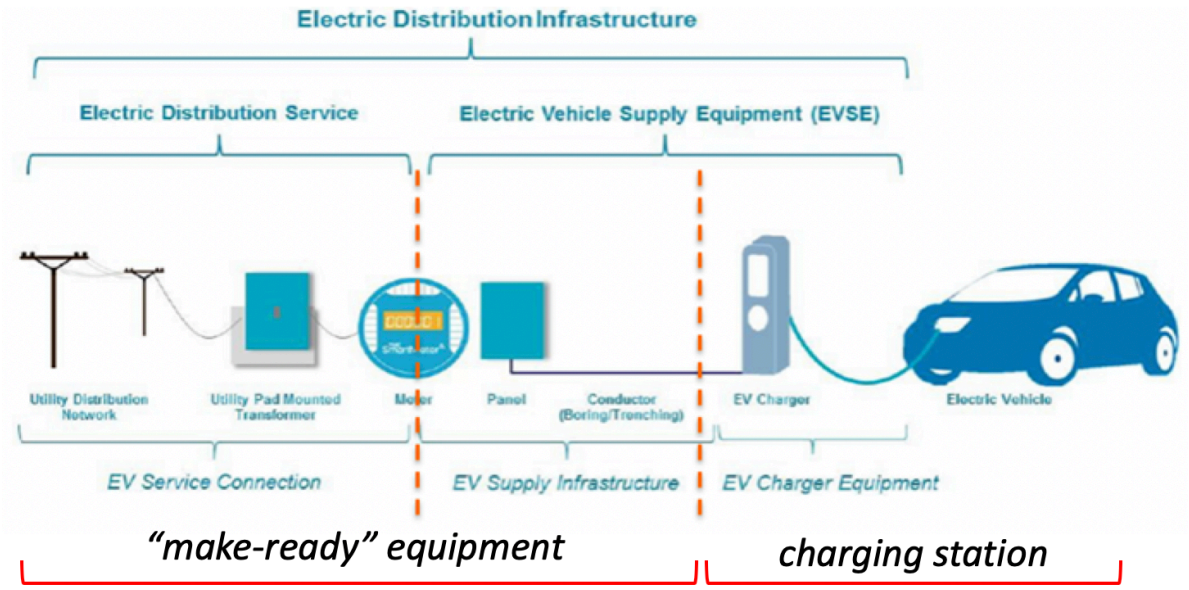
> the utility invests in the "EV Supply Infrastructure," as well as any necessary distribution upgrades that fall into the "EV Service Connection." [⋯] In addition, to offset the cost of the EV Supply Equipment, the utility provides a rebate to the Site Host for a percentage of its cost. The Site Host retains ownership of the EV Supply Equipment and is responsible for its upkeep, and the utility recovers the rebate cost as an expense.[11]

See below diagram for an illustration of the terms referenced above, which are defined here:

- The EV Service Connection refers to that common utility distribution infrastructure, including transformers, utility services, and meters, which is ordinarily part of the regulated asset base.
- The EV Supply Infrastructure consists of the panels, conduits and wiring that support the EVSE.
- The EV Charger Equipment refers to the charging station itself (referred to elsewhere in these comments as "EVSE"). The software and hardware that comprise the EVSE are the locus of innovation in vehicle charging technology and business models.

https://cleanvehiclerebate.org/eng/survey-dashboard/ev, visited Oct. 24, 2018).

[11] Item No. 15, Comments of Sierra Club & Natural Resources Defense Council on Electric Vehicles at 5, EW-2017-0245 (filed May 2, 2017).



Make-ready infrastructure investments are very similar to other distribution system investments and line extension services. The rationale for line extension services largely applies here, and the benefits to the overall grid provided by the unique nature of EV load generally justify a smaller portion of the costs being paid by the individual customer or site-host.

IV. Ownership Models

In contrast to the "make-ready model described above, a utility program could also be structured with an "end-to-end" ownership model, a pure "rebate" program, or some combination thereof.

In an end-to-end ownership program, the utility invests in and owns the "EV Charger Equipment" in addition to the "EV Supply Infrastructure" and any needed distribution upgrades. The utility retains ownership and responsibility for operation and maintenance. In a rebate program, the utility issues rebates for select, approved charging stations within determined market segments and on terms with participating site hosts to ensure ongoing station maintenance, support grid integration and data collection, among other things.

We urge the Commission to avoid pre-ordaining one utility program ownership model. There is no consensus on what utility program model is best, and different program solutions are needed for different infrastructure challenges. At the same time, it is worth noting that, under rebate-only programs (and, to an extent, under make-ready programs), the responsibility of researching, purchasing and acquiring the EVSE, hiring and managing installation contractors, maintaining the equipment and coordinating administrative and rebate logistics, in addition to handling potential warranty issues, could fall entirely or in various significant parts upon the site host. These challenges can represent a significant barrier to adoption, especially in disadvantaged

communities and MUDs, and end-to-end ownership programs have been more successful in these market segments.[12]

V. Cost Recovery Options

Throughout these comments, we have discussed the various grid benefits that EVs can provide, including placing downward pressure on rates to the benefit of all electricity customers, whether they own an EV or not. These benefits are in addition to the public health, environmental, regional economic, and energy security benefits of EVs.

Given these benefits, we believe that utilities should be permitted to bring proposals forward to support vehicle electrification, and, where the Commission finds that those proposals are in the public interest and satisfy any other criteria identified in the course of this proceeding, it should approve them with allowance for cost recovery.

As a general matter, we submit that, for ratemaking purposes, steel-in-the-ground utility expenditures (e.g., meters, paneling, conduit, actual charging stations) should be treated as capital investments, and non-capital expenditures (e.g., program administration or education and outreach) should be treated as expenses. However, as with utility program ownership models, we urge the Commission to avoid pre-ordaining one ratemaking treatment. Instead, the Commission should provide for flexibility and, recognizing that utility transportation electrification programs can be a good proving ground for performance-based ratemaking, encourage innovative program proposals.

Performance-based ratemaking can tie shareholder rewards to the realization of the benefits upon which a utility-driven investment in transportation electrification is premised (e.g., shifting load to off-peak, delivering fuel cost savings, meeting deployment goals, particularly for communities over-burdened with transportation pollution). Moreover, performance-based ratemaking can support fair earnings opportunities even for non-capital-intensive programs, like those that are built on rebates as opposed to utility charging station ownership.

Respectfully submitted,

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[12] Multi-unit dwellings only accounted for three percent of the charging ports deployed in SCE's Charge Ready pilot, which utilized a make-ready model. See SCE, *Charge Ready and Market Education Programs Pilot Report*, submitted April 2, 2018, p. A-14. By contrast, about 40 percent of SDG&E's participating site-hosts in the "Power Your Drive" pilot, which also targets MUDs and workplaces, but includes utility ownership of charging stations, are MUDs. See SDG&E, *Electric Vehicle-Grid Integration Pilot Program (Power Your Drive) Semi-Annual Report of San Diego Gas & Electric Company*, March, 2018, p. 2.