

Exhibit No.: 300  
Issues: Charge Ahead – Electric Vehicles Program, Electric Vehicle and Electric Vehicle Charging Station Market Development; Utility Involvement with Electric Vehicle Charging Station Deployment; Considerations for Underserved Residents  
Witness: Cherylyn Kelley  
Sponsoring Party: Missouri Department of Economic Development – Division of Energy  
Type of Exhibit: Rebuttal Testimony  
Case No.: ET-2018-0132

MISSOURI PUBLIC SERVICE COMMISSION

UNION ELECTRIC COMPANY d/b/a AMEREN MISSOURI

CASE NO. ET-2018-0132

REBUTTAL TESTIMONY

OF

Cherylyn Kelley

ON

BEHALF OF

MISSOURI DEPARTMENT OF ECONOMIC DEVELOPMENT

DIVISION OF ENERGY

Jefferson City, Missouri

October 1, 2018

DEO Exhibit No. 300  
Date 12-4-18 Reporter TK  
File No. ET-2018-0132

BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI

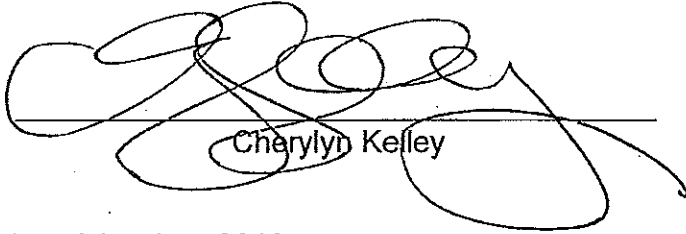
In the Matter of the Application            )  
of Union Electric Company d/b/a            )  
Ameren Missouri for Approval of            )     Case No. ET-2018-0132  
Efficient Electrification Program         )

AFFIDAVIT OF CHERYLYN KELLEY

STATE OF MISSOURI            )  
  )     ss  
COUNTY OF COLE            )

Cherylyn Kelley, of lawful age, being duly sworn on her oath, deposes and states:

1. My name is Cherylyn Kelley. I work in the City of Jefferson, Missouri, and I am employed by the Missouri Department of Economic Development as a Planner II, Division of Energy.
2. Attached hereto and made a part hereof for all purposes is my Rebuttal Testimony on behalf of the Missouri Department of Economic Development – Division of Energy.
3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct to the best of my knowledge.

  
Cherylyn Kelley

Subscribed and sworn to before me this 1<sup>st</sup> day of October, 2018.

LAURIE ANN ARNOOLD  
Notary Public - Notary Seal  
State of Missouri  
Commissioned for Callaway County  
My Commission Expires: April 26, 2020  
Commission Number: 16808714


  
Notary Public

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1 I. INTRODUCTION

2 Q. Please state your name and business address.

3 A. My name is Cherylyn Kelley. My business address is 301 West High Street, Suite  
4 720, PO Box 1766, Jefferson City, Missouri 65102.

5 Q. Please describe your educational background and employment experience.

6 A. In December 2015, I graduated from the School of Natural Resources at the  
7 University of Missouri - Columbia with a Bachelor of Science in Environmental  
8 Science. While there, I took part in several groups and volunteer organizations that  
9 supported community gardens, stream cleanups, and invasive species removal.  
10 My coursework concentrated on math and science as well as social science topics  
11 such as environmental sociology and rural sociology.

12 I was first employed with the Division of Energy ("DE") in August of 2016,  
13 as an Energy Specialist in the Energy Efficiency group. I coordinated DE's Missouri  
14 Home Energy Certification program, which involved conducting outreach and  
15 education on energy efficiency topics to target audiences such as homeowners  
16 and real estate agents. I also developed an accredited continuing education course  
17 for real estate agents on the subject of energy efficiency in the home buying  
18 process to be presented throughout the state.

19 In August of 2017, I accepted a position as a Planner II in the Energy Policy  
20 and Resources group. My duties within this group include participation in  
21 discussions regarding various energy-related matters, participation in program  
22 collaboratives, coordinating fiscal note response drafting and tracking, attending

1 State Senate and House Committee hearings, and conducting technical and policy  
2 research on energy related topics including electric vehicles (“EVs”).

3 **Q. Have you previously filed testimony before the Missouri Public Service**  
4 **Commission (“Commission”) on behalf of DE or any other party?**

5 **A. No.**

6 **II. PURPOSE AND SUMMARY OF TESTIMONY**

7 **Q. What is the purpose of your Rebuttal Testimony in this proceeding?**

8 **A.** The purpose of my testimony is to provide an overview of the EV market, describe  
9 the current landscape of EV charging station (“EVCS”) infrastructure, and examine  
10 utility involvement in infrastructure development and deployment. I discuss current  
11 barriers to EV adoption as well as the potential benefits that could result from  
12 allowing utility investment in EV charging infrastructure. Finally, I discuss the role  
13 of electric utilities in ensuring underserved areas of the state have comparable  
14 access to EV infrastructure.

15 **Q. What materials did you review prior to submitting this testimony?**

16 **A.** I reviewed Union Electric Company d/b/a Ameren Missouri’s (“Ameren Missouri”  
17 or “Company”) filings in Case No. ET-2018-0132, including the tariff sheets that  
18 reflect the Charge Ahead – Electric Vehicles program and the Application for  
19 Approval. I reviewed information provided by Ameren Missouri through their  
20 technical conferences as well as Direct Testimony in the case. Additionally, in my  
21 work at DE I have reviewed numerous reports that examine EVCS development in  
22 multiple regions across the U.S.

1 **III. ELECTRIC VEHICLE MARKET DEVELOPMENT**

2 **A. INFRASTRUCTURE NECESSITIES**

3 **Q. What is the Charge Ahead – Electric Vehicles program?**

4 **A.** The Company's Charge Ahead – Electric Vehicles program aims to stimulate the  
5 development of EVCS infrastructure by offering incentives to customers in  
6 Ameren's service territory. The four groups eligible to receive incentives include  
7 workplaces, public places, multifamily units, and vehicle corridors such as  
8 highways. In total, the Company is asking for a budget of no more than \$11  
9 million.<sup>1</sup> The program adheres to the "make-ready" model in that the company  
10 would provide the infrastructure buildout to the charging station but would not  
11 own the station itself.

12 **Q. What is the current state of electric vehicle charging station (EVSC)**  
13 **infrastructure?**

14 **A.** According to the U.S. Department of Energy's Alternative Fuels Data Center  
15 (AFDC), there are about 370 publicly available charging stations in Missouri.<sup>2</sup>  
16 While the Electric Vehicle Infrastructure Projection Tool provided by the AFDC  
17 indicates this number could be adequate for the number of electric vehicles in the  
18 state, the issue in Missouri is EVCS location rather than total number of stations.<sup>3</sup>  
19 EVCSs are more common in Missouri's largest urban areas, however,  
20 infrastructure is lacking elsewhere, such as along highways and in rural areas –

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<sup>1</sup> Ameren Missouri, Charge Ahead – Electric Vehicle Program Tariff Sheets, ET-2018-0132.

<sup>2</sup> Alternative Fuels Data Center, *Electric Vehicle Charging Station Locations*, U.S. Department of Energy, [https://www.afdc.energy.gov/fuels/electricity\\_locations.html#/analyze?region=US-MO&show\\_map=true&fuel=ELEC&ev\\_levels=all](https://www.afdc.energy.gov/fuels/electricity_locations.html#/analyze?region=US-MO&show_map=true&fuel=ELEC&ev_levels=all)

<sup>3</sup> *Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite*, <https://www.afdc.energy.gov/evi-pro-lite>

1 see Figure 1 below. Inability to access charging infrastructure while traveling  
2 across the state could hinder travel resulting in drivers becoming stranded, fewer  
3 EV travelers coming into and through the state, and lower EV market penetration  
4 in Missouri's rural areas.

5 The cost of building a charging station can be high and few incentives are  
6 currently available. A level two charging station, which provides roughly 10-25  
7 miles of range in an hour of charging, can cost anywhere from \$2,300 to \$6,000  
8 for hardware and installation.<sup>4,5</sup> DC fast chargers can charge a battery to around  
9 80% capacity in 30 minutes and can cost between \$50,000 and \$100,000 for  
10 hardware and installation.<sup>6</sup> These costs are an impediment to creating an  
11 environment in which Missourians feel comfortable using electric vehicles – or in  
12 which non-residents (e.g., tourists, shippers) can feel confident in driving EVs  
13 through the state.

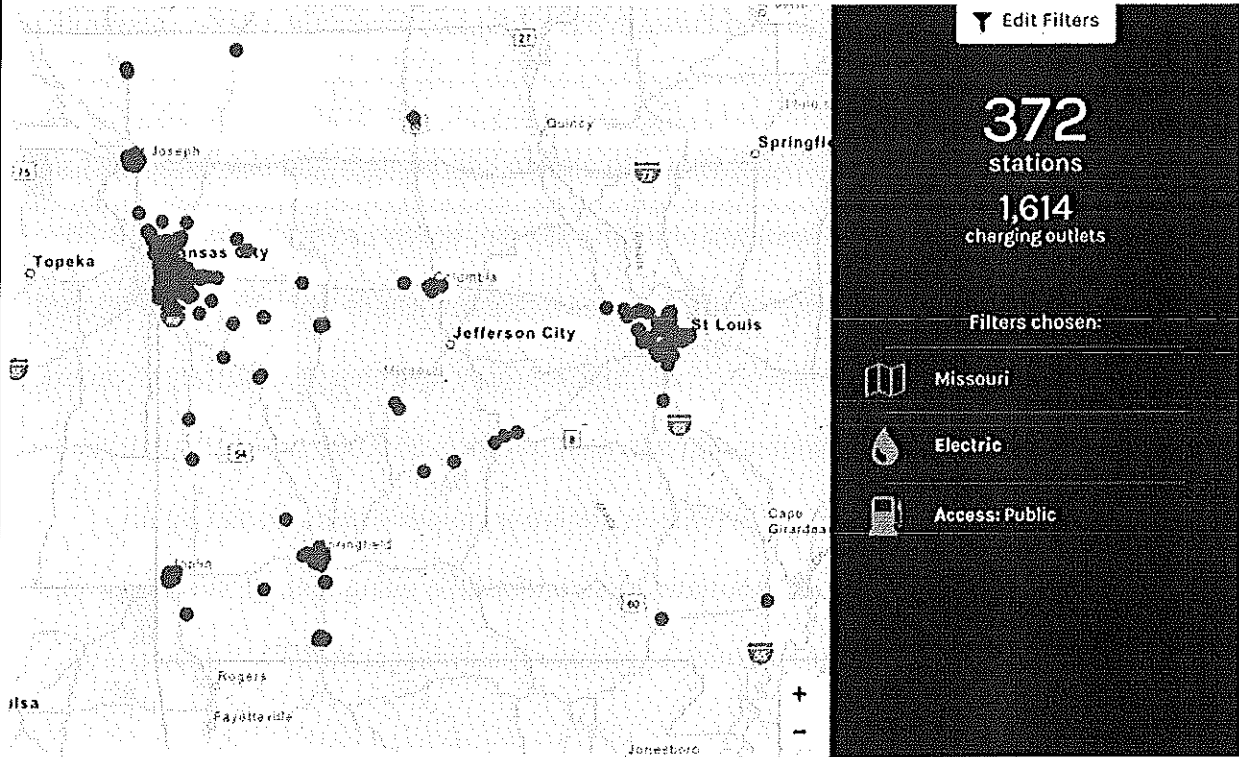
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<sup>4</sup> Eric Schaal, *A Simple Guide to Electric Vehicle Charging*, Fleet Carma, <https://www.fleetcarma.com/electric-vehicle-charging-guide/>

<sup>5</sup> Rocky Mountain Institute, *Pulling Back the Veil on EV Charging Station Costs*, <https://rmi.org/pulling-back-veil-ev-charging-station-costs/>

<sup>6</sup> *Ibid.*

1 **Figure 1. Publicly available electric vehicle charging stations in Missouri – all  
charging levels.<sup>7</sup>**



2  
3 **Q. Should it be assumed that there is disinterest in EVs based on their limited  
4 presence in the state?**

5 No. While only about 4,450 of the approximately 5.6 million vehicles registered in  
6 Missouri are EVs,<sup>8 9</sup> EV sales are continuing to rise. Between 2016 and 2017  
7 alone there was a 32.2% year-over-year vehicle sale increase.<sup>10</sup> The lack of

<sup>7</sup> U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy. 2018. "Alternative Fueling Station Locator." Alternative Fuels Data Center.

<sup>8</sup> *State Motor-Vehicle Registrations – 2016*,  
<https://www.fhwa.dot.gov/policyinformation/statistics/2016/mv1.cfm>

<sup>9</sup> Huiqi Xu, CHART: Electric vehicles and charging stations in Missouri, July 2018,  
<http://www.missouribusinessalert.com/industries/96929/2018/07/20/chart-electric-vehicles-and-charging-stations-in-missouri/>

<sup>10</sup> EV Market Share by State, <http://evadoption.com/ev-market-share/ev-market-share-state/>



1 EVCS in necessary locations and the funds to build out the infrastructure  
2 threatens our preparedness to meet the growing market trend toward EVs. The  
3 lack of infrastructure can also make purchasing an EV in rural or suburban areas  
4 less feasible to potential buyers, and those who travel long distances may also  
5 see EVs as an impractical option and/or choose not to travel through Missouri.

6 Automakers are reacting to these changes in consumer preference. For  
7 example Ford has pledged to invest \$4.5 billion over five years on all-electric  
8 vehicles and plans to release thirteen new models by 2023.<sup>11</sup> General Motors is  
9 planning for an “all-electric future,” starting with twenty all-electric vehicles by  
10 2023.<sup>12</sup>

11 **Q. Why is it appropriate to allow investor-owned utilities to provide incentives**  
12 **for the development of EV infrastructure rather than leaving market growth**  
13 **to the private sector?**

14 **A.** The electric vehicle industry faces a “chicken or egg” paradox – consumers are  
15 hesitant to invest in the nascent technology and potential EVCS operators are  
16 not installing equipment because of an apparent lack of market uptake of the  
17 vehicles.<sup>13</sup> A study from 2015 examined three simulations, each with different  
18 infrastructure availability: home charging; home and work charging; and, home,

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<sup>11</sup> *Ford Adding Electrified F-150, Mustang, Transit by 2020 in Major EV Push; Expanded U.S. Plant to Add 700 Jobs to Make EVs, Autonomous Cars*,  
<https://media.ford.com/content/fordmedia/fna/us/en/news/2017/01/03/ford-adding-electrified-f-150-mustang-transit-by-2020.html>

<sup>12</sup> *GM Outlines All-Electric Path to Zero Emissions*,  
<https://media.gm.com/media/us/en/gm/news.detail.html/content/Pages/news/us/en/2017/oct/1002-electric.html>

<sup>13</sup> Till Gnann, Patrick Plotz, Martin Wietschel, *How to address the chicken-egg-problem of electric vehicles? Introducing an interaction market diffusion model for EVs and charging infrastructure*,  
<https://www.researchgate.net/publication/279187975/download>

1 work, and public charging. The study found that EV market diffusion would only  
2 occur with a mixture of home and public charge points, and that public charge  
3 points would only be economically viable for private sector investment before  
4 2030 with financial assistance. Workplace charging points would be the second-  
5 best option to encourage EV adoption if public charging was not available.<sup>14</sup> Left  
6 to the private sector, EVCS investment would inevitably and understandably  
7 result in the stations being installed in densely populated areas – probably those  
8 that are more affluent – so that investors could turn a profit.

9 By contrast, investor-owned utilities have access to the necessary capital  
10 to invest in areas that would otherwise not see EVCS development for many  
11 years. Investor-owned utilities can also leverage economies of scale that reduce  
12 investment costs. These considerations, combined with the utility's  
13 understanding of the demands EV charging would place on the grid, mean that  
14 utilities are logical investors in this sector. Further, the Western District Court of  
15 Appeals in Case No. WD80911 (*In the Matter of: Kansas City Power and Light*  
16 *Company's Request for Authority to Implement A General Rate Increase for*  
17 *Electric Service v. Missouri Public Service Commission and Midwest Energy*  
18 *Consumers Group*), recently affirmed that EVs are electric plant which may be  
19 subject to Commission jurisdiction.

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<sup>14</sup> *Ibid.*

1                   Finally; though the Company's current plan is based on the "make-ready"  
2                   model, this does not mean a utility could not own EVCSs themselves. Utilizing  
3                   both can ensure that there is equitable EVSC deployment.

4   **Q.   What benefits could EVs provide for a utility's ratepayers?**

5   **A.**   Both the utility and its customers have the potential to benefit from the increase  
6           in load provided by a robust EV market if such vehicles are charged at  
7           appropriate times. New load from EVs is flexible: EVs can connect to the grid any  
8           time they need a charge. EV charging when energy demand is low – such as at  
9           night – can actually result in more efficient use of the grid and allow for greater  
10          deployment of wind energy. This form of load management that spreads utility  
11          distribution costs across a larger volume of electricity sales has the effect of  
12          putting downward pressure on electricity rates for all customers.<sup>15</sup> These benefits  
13          would not be readily apparent to customers, so educational resources should be  
14          provided to make the case for overnight charging. Eventually, time-of-use  
15          ("TOU") rates that provide a discount for charging during off-peak hours could  
16          promote efficient use of the grid, but likely would not be necessary on a  
17          mandatory basis until there is high EV market penetration and significantly  
18          increased on-peak demand.

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<sup>15</sup> *Accelerating the Electric Vehicle Market*, March 2017,  
[https://www.mjbradley.com/sites/default/files/MJBA\\_Accelerating\\_the\\_Electric\\_Vehicle\\_Market\\_FINAL.pdf](https://www.mjbradley.com/sites/default/files/MJBA_Accelerating_the_Electric_Vehicle_Market_FINAL.pdf)

1 Q. Are there other benefits associated with EVs?

2 A. Yes. EVs produce fewer emissions than vehicles with internal combustion  
3 engines ("ICEs"), even when powered by fossil fuel-using resources.<sup>16</sup> Emissions  
4 from driving EVs will decline further as utilities such as Ameren Missouri continue  
5 to transition to renewable energy resources. The Company's 2017 Integrated  
6 Resource Plan stated a goal of adding 700 MW of wind generation to its portfolio  
7 by 2020.<sup>17</sup> Improved air quality can result in lower healthcare costs as well:  
8 exposure to pollution such as that resulting from ICE-powered vehicles can lead  
9 to higher rates of cancer, asthma, emphysema, heart disease, inhibited child  
10 development, and premature death.<sup>18</sup>

11 Supporting the EV market also has positive economic implications. For  
12 example, fewer healthcare costs from improved air quality and significantly lower  
13 operating costs mean more money can be spent in other sectors of the  
14 economy.<sup>19</sup> Missouri does not produce a large number of fossil fuels, so  
15 widespread use of vehicles that do not require these products could reduce the  
16 amount of oil imported into Missouri, creating a more energy-independent  
17 economy.<sup>20</sup> Higher demand for EVs could also result in job creation, not only in  
18 auto manufacturing but also in scientific research, engineering, and vehicle

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<sup>16</sup> Union of Concerned Scientists, *Cleaner Cars from Cradle to Grave*, 2015, <https://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions#.W2yuAaqotCo>

<sup>17</sup> Chapter 1, *2017 Integrated Resource Plan*.

<sup>18</sup> U.S. Environmental Protection Agency, [www.epa.gov/pm-pollution](http://www.epa.gov/pm-pollution)

<sup>19</sup> Michael Sivak and Brandon Schoettle, *Relative Costs of Driving Electric and Gasoline Vehicles in the Individual U.S. States*, January 2018, [http://www.umich.edu/~umtriswt/PDF/SWT-2018-1\\_Abtract\\_English.pdf](http://www.umich.edu/~umtriswt/PDF/SWT-2018-1_Abtract_English.pdf)

<sup>20</sup> U.S. Energy Information Administration. 2018. "Missouri – State Energy Profile Analysis." State Energy Data System. <https://www.eia.gov/state/analysis.php?sid=MO>.

1 maintenance.<sup>21</sup> In 2017, nearly 1,600 people worked in the EV job sector in  
2 Missouri – that is a 31% increase over 2016.<sup>22</sup> Furthermore, businesses with  
3 sustainability goals may be more inclined to locate or grow in Missouri if EV  
4 infrastructure is supported.

5 **Q. Should there be consideration as to how incentives for EVCS deployment**  
6 **are allocated?**

7 **A.** Since the utility would benefit from the increased load from EV charging, and  
8 because the funds for the charging station incentives would be sourced from  
9 ratepayers, access to the stations should be equitable to the extent possible. The  
10 utility is responsible for ensuring that underserved areas (such as low income,  
11 rural, and inner city areas) and disadvantaged communities in particular have  
12 access to EV charging.<sup>23</sup> Disadvantaged communities disproportionately  
13 experience the impacts of vehicle pollution and can face greater health risks as a  
14 result; these communities would benefit the most from the clean air and cost-  
15 savings benefits of EVs.<sup>24</sup> Community outreach and education will be important in  
16 conveying the benefits of EVs and encouraging system-beneficial charging and  
17 should be a main focus in any outreach and education campaign. It will be  
18 necessary to involve community leaders and community-based organizations

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<sup>21</sup> Bureau of Labor Statistics, *Electric vehicle careers: On the road to change*, 2012,  
<https://www.bls.gov/careeroutlook/2012/summer/art02.pdf>

<sup>22</sup> *Clean Energy Jobs in Missouri*, <https://www.cleanjobsmidwest.com/state/missouri>

<sup>23</sup> "Disadvantaged community" defined as those that disproportionately struggle with a combination of economic, health, and environmental burdens, including poverty, high unemployment, health conditions like asthma, as well as air and water pollution and nearby hazardous waste disposal.

<sup>24</sup> Cheryl Katz, *People in Poor Neighborhoods Breathe More Hazardous Particles*,  
<https://www.scientificamerican.com/article/people-poor-neighborhoods-breathe-more-hazardous-particles/>

1 throughout this process as they are key to understanding a community's current  
2 level of knowledge, knowing what methods of communication would be most  
3 effective, and coordinating successful outreach activities.

4 Eversource in Massachusetts is addressing the underserved by dedicating  
5 up to ten percent of funds to charging infrastructure in environmental justice  
6 communities, such as those that are considered low income.<sup>25</sup> This is a feature  
7 that should be commonplace in utility EV incentive programs, including Ameren  
8 Missouri's proposal. The cost of a new EV can be high, and the federal tax credits  
9 cannot be used by everyone; however, EV prices continue to decline every year  
10 and, over time, more EVs will become available at used car dealerships. Used car  
11 markets and lower prices for new EVs may improve EV access for low-income  
12 consumers, making charging station accessibility in such communities of  
13 increasingly greater importance. Charging infrastructure needs to be in place in  
14 anticipation of near-future needs.

15 **IV. CONCLUSIONS**

16 **Q. Please summarize your conclusions and the positions of DE.**

17 **A.** The benefits made possible through EV deployment outweigh the challenges of  
18 creating a supportive infrastructure system. If left only to the private sector,  
19 investment in EVCS infrastructure will be limited and inequitable, necessitating  
20 utility involvement. DE recommends that Ameren consider targeting a minimum of  
21 10% of charging stations incentives to low income and disadvantaged

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<sup>25</sup> EPA definition of environmental justice: "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

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1 communities. Education and outreach should be emphasized in low-income and  
2 disadvantaged areas in addition to the general population. These campaigns  
3 should include, but should not be limited to, the financial and health benefits that  
4 EVs provide, in addition to how to maintain the vehicle, how to find charging  
5 stations, how to utilize financial incentives for the purchase of EVs, and information  
6 on the best times to charge an EV to efficiently utilize the grid and improve benefits  
7 for all ratepayers.

8 **Q. Does this conclude your Rebuttal Testimony in this case?**

9 **A. Yes.**