

Exhibit No.:
Issue(s): Charge Ahead –
Electric Vehicles and
Business Solutions Programs
Witness: Byron M. Murray
Sponsoring Party: MoPSC Staff
Type of Exhibit: Rebuttal Testimony
Case No.: ET-2018-0132
Date Testimony Prepared: October 1, 2018

MISSOURI PUBLIC SERVICE COMMISSION

COMMISSION STAFF DIVISION

TARIFF/RATE DESIGN

REBUTTAL TESTIMONY

OF

BYRON M. MURRAY

**UNION ELECTRIC COMPANY,
d/b/a AMEREN MISSOURI**

CASE NO. ET-2018-0132

*Jefferson City, Missouri
October 2018*

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OF

BYRON M. MURRAY

**UNION ELECTRIC COMPANY,
d/b/a AMEREN MISSOURI**

CASE NO. ET-2018-0132

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1 **REBUTTAL TESTIMONY**

2 **OF**

3 **BYRON M. MURRAY**

4 **UNION ELECTRIC COMPANY,**
5 **d/b/a AMEREN MISSOURI**

6 **CASE NO. ET-2018-0132**

7 Q. Please state your name and business address.

8 A. Byron M. Murray, MPA, Missouri Public Service Commission, 200 Madison
9 St., Jefferson City, MO 65101.

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

11 A. I am employed by the Missouri Public Service Commission (Commission) as a
12 Regulatory Economist III in the Tariff/Rate Design Department, Commission Staff Division.

13 Q. Please describe your education, work experience and any cases in which you
14 have previously filed testimony before the Commission.

15 A. I graduated from Lincoln University in May 1996 with a Bachelor of Science.
16 I graduated from the University of Missouri – Columbia in May 2004 with a Master of Public
17 Administration. I have approximately 29 years of regulatory enforcement experience with the
18 Department of Natural Resources and other state agencies. I have been employed with the
19 Commission since October 2013. I have attached my case participation as Schedule BMM-r1.

20 **I. EXECUTIVE SUMMARY**

21 Q. What is the purpose of your rebuttal testimony in this proceeding?

22 A. The purpose of my rebuttal testimony is to address Ameren Missouri's
23 ("Company") requested approval of the tariff revisions and Distribution System Line

1 Extension and the Charge Ahead – Electric Vehicles and Business Solutions Programs
2 (collectively, “Programs”)

3 **II. RESPONSE TO CHARGE AHEAD – BUSINESS SOLUTIONS**

4 Q. What is the purpose of the Business Solutions Program as stated in the tariff?

5 A. The purpose of the program is to promote the use of more efficient electrically
6 – powered equipment for transportation and other commercial and industrial applications.¹

7 The table below provides Ameren Missouri’s requested measures and applicable incentives
8 offered under this program.²

9

Measure	Description	Incentive
Forklifts	A vehicle with two power-operated prongs at the front that can be slid under heavy loads and then raised for moving and stacking materials in warehouses, shipping depots, distribution centers, etc. Incentives available for Class 1 and 2 forklifts only. Class 1 forklifts are standard electric motor lift trucks; Class 2 are narrow aisle electric motor lift trucks.	Conventional Charge: \$1,500 Rapid Charge: \$1,700
Electric-standby Truck Refrigeration Units (E/S-TRUs)	A tractor trailer that is parked and plugged into the utility grid while perishable items are unloaded/loaded.	\$1,600
Truck Stop Electrification (TSE)	TSE gives heavy-duty vehicles (large commercial trucks, etc.) the ability to shut off their engines to reduce idling emissions, and allows the truck to perform adequate heating, cooling, electricity, and communications functions.	\$1,200
Pushback tugs	Pushback tugs are mainly used to push an aircraft away from the gate when it is ready to leave.	\$1,900
Tugs/Tow Tractors	Tugs/tow tractors are used to move airport equipment that cannot move itself. This includes: bag carts, mobile air conditioning units, air starters, lavatory carts, and other equipment.	\$900

¹ ET-2018-0132, Tariff Sheet No. 166.

² ET-2018-0132, Tariff Sheet No. 166.1.

Rebuttal Testimony of
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Measure	Description	Incentive
Belt Loaders	Belt loaders are vehicles with movable belts for unloading and loading of baggage and cargo of aircraft.	\$800
Ground Power Units (GPUs)	A GPU is a vehicle capable of supplying power to aircraft parked on the ground. GPUs may also be built into the jetway, making it easier to supply electrical power to aircraft while parked at the gate.	\$15,600

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2 Q. What is Staff’s position regarding Ameren Missouri’s Business Solutions
3 program?

4 A. Staff recommends the Commission reject the Charge Ahead – Business
5 Solutions tariff in its entirety. Even though the Company requested a variance from the
6 promotional practices regulations, the stated purpose of this program raises serious questions
7 as to the reasonableness of the waiver of the applicable promotional practice regulations.
8 Staff finds that this program is in direct competition with energy sources provided by other
9 Commission regulated utilities. Ameren Missouri should not be granted a waiver from the
10 applicable promotional practices prohibitions, as requested.

11 Q. Since February 22, 2018, are other programs available in Missouri that provide
12 incentives for the electrification of gas/diesel powered equipment?

13 A. Yes. The State of Missouri is a beneficiary of the VW Environmental
14 Mitigation Trust Agreement (“VW Trust”) resulting from the consent decree between
15 Volkswagen AG, et al, California and the United States. The Missouri Department of Natural
16 Resources developed a 10-year Beneficiary Mitigation Plan for awarding the \$41,152,051.74
17 in proceeds to Missouri-specific projects.³ Below is a list of the award categories.⁴

³ Missouri’s Beneficiary Mitigation Plan, Missouri Department of Natural Resources, August 6, 2018, page 1.

⁴ If applications for eligible projects are not received for categories below the bold line, unspent award money will be equally redistributed to the three categories above the bold line.

**VW Environmental Mitigation Trust Funding Opportunities
for the Electric Vehicle (EV) Collaborative**

Award Categories		Overview	Amount ¹ (Millions)
Vehicle Replacement Programs	1. School Buses	School buses with 2009 and older engines can be replaced with a new bus or engine	\$12
	2. Government Trucks	Large and medium government-owned trucks with 1992 to 2009 engine can be replaced with a new vehicle or engine	\$6
	3. Transit and Shuttle Buses	Transit and shuttle buses with 2009 and older engines can be replaced with a new bus or engine	\$4
	4. Nongovernment Trucks	Large and medium nongovernment-owned trucks with 1992 to 2009 engine can be replaced with a new vehicle or engine	\$6
	5. Locomotive and Marine	Older switchyard locomotives can be replaced or repowered; older ferries and tugs can be repowered	\$2
	6. Airport and Cargo Equipment	Older airport ground support equipment can be replaced with electric vehicles or electric engines; forklifts can be replaced with electric vehicles or electric engines	\$2
	7. DERA Option	The Department can use VW Trust funds as their non-federal voluntary match for the federal DERA program, which expands allowable project types for this category to include all DERA-eligible projects.	\$3
8. Electric Vehicle Charging Stations	Electric vehicle charging stations can be built for light-duty vehicles near highways, workplaces, or multi-unit dwelling.	\$6	

Q. If the Commission were to approve Ameren Missouri's Charge Ahead-Business Solutions tariff as proposed, does Staff have additional concerns with the design of the program?

A. Yes.

1 Q. What are Staff's concerns regarding the design of the program?

2 A. Aside from Staff's concerns already mentioned above, Staff is concerned that:

- 3 • The program does not limit the amount of incentives spent on any one
4 measure type; and
- 5 • As currently designed approximately 44% of the program budget of
6 \$7 million is for implementation of the program leaving only
7 approximately \$3.8 to be spent on incentives.

8 Q. Do electric alternatives of some of the measure types included in Ameren
9 Missouri's Business Solution's program have greater market penetration than others?

10 A. Yes. For example, electric forklifts already comprise approximately 54% of
11 annual forklift sales in Ameren Missouri's service territory.⁵ In addition, at the St. Louis
12 airport approximately 16 of the 33 GPUs are electric powered.⁶ However, St. Louis airport
13 reported no electric powered pushback/tugs or tow/baggage loaders.⁷ Based on Ameren
14 Missouri's requested Business Solution's tariff, there is a limit of one incentive per measure
15 per customer, but there is not a cap on the amount of incentives spent on any one measure.

16 Q. Even though the market in the St. Louis area isn't saturated with electric
17 versions of the various commercial and industrial (C&I) equipment, are the various
18 companies interviewed on behalf of the Company aware of the electric alternatives?

19 A. Yes, the St. Louis airport has electric versions of the forklifts, belt loaders and
20 GPUs. Based on information provided by Ameren Missouri there are approximately 39 bays

⁵ Schedule DP-D2-12.

⁶ Ameren Workpapers, Ameren BE OA Support File_3-6-18 Confidential, A4 Airport GSE, Existing Population – Technical Potential.

⁷ The Airport Cooperative Research Program (ACRP), in coordination with FAA, estimates that 10% of airport ground service equipment is electric.

1 with truck stop electrification (TSE) capability available in Ameren Missouri's service
2 territory and truck refrigeration unit (TRU) dealers reported sales of 1% to 20% of electric
3 stand-by TRUs.

4 The market isn't saturated with electric versions of C&I internal combustion engine
5 but that doesn't equate to millions of dollars in ratepayer financed load building programs
6 proposed by the Company for the electrification of C&I equipment and vehicles.

7 **III. RESPONSE TO PROPOSED CHARGE AHEAD – ELECTRIC VEHICLE**
8 **PROGRAM**

9 Q. What is the EV program in the tariff as proposed?

10 A. The EV program consists of the following Sub-Programs:

- 11 1. Corridor Charging
- 12 2. Multi-Family Charging
- 13 3. Public Charging
- 14 4. Workplace Charging

15 The Company has proposed a tariff to offer rebates to third-party vendors of EV charging
16 stations with the intent to promote the adoption of EVs. Staff witness Sarah L.K. Lange will
17 address the multi-family, public, and workplace charging programs and I will address the
18 corridor charging program.

19 **IV. RESPONSE TO AMEREN MISSOURI'S REQUESTED CHARGE AHEAD –**
20 **CORRIDOR CHARGING PROGRAM**

21 Q. What is Staff's recommendation regarding the Company's tariff for the
22 proposed Programs?

23 A. Staff recommends the Commission reject the corridor program ("program")
24 entirely. As stated in the requested tariff, the purpose of the corridor charging sub-program is

1 to stimulate the development of a public minimum practical network of EV corridor charging
2 infrastructure, including level 3 DC Fast Charging (DCFC), across the Company's service
3 territory so that EV drivers can travel throughout the area and have sufficient practical options
4 to recharge their vehicles when needed.

5 The following specifications, as defined by Ameren Missouri, include important
6 requirements to achieve the "minimum practical network" goal⁸:

- 7 • Minimum of two fast chargers having the following capability:
- 8 • 150kW charging rate, but minimum of 50 kW, DC output
- 9 • Can connect to all fast charging-compatible EVs
- 10 • Minimum of two Level 2 ports having ~7kW AC output
- 11 • Credit card capability
- 12 • Spacing of islands no less than 25 miles and no more than 75 miles apart
- 13 • Located in communities within approx. 3 miles of interstates or multi-lanes
- 14 • Located on real estate having a "no cost easement"
- 15 • Located within walking distance of amenities
- 16 • High reliability/availability

17 The rebate offered under the program is not necessary given other electric vehicle charging
18 station programs. The Company is already providing electricity service to businesses and
19 homes that can be used to charge EVs. The majority of EV charging is done at the home or
20 work if the employer has EV charging available.

21 Q. What other EV Infrastructure projects has the Company participated in?

22 A. The Company has developed a group⁹ referred to as the Missouri EV
23 Collaborative ("Collaborative") with City Utilities of Springfield, Clean Cities of Kansas

⁸ ET-2018-0132, Direct Testimony of Ameren Missouri witness, Patrick E. Justis, page 33, line 1.

⁹ ET-2018-0132, Direct Testimony of Ameren Missouri witness, Patrick E. Justis, Schedule PEJ-04-4, page 4.

1 City, Columbia Water and Light, Empire District Electric Company, Independence Power and
2 Light, Kansas City Power and Light Company, Kirkwood Electric, Missouri Public Utility
3 Alliance, NRDC and the Sierra Club. The Collaborative has submitted an application for the
4 development of a minimum practical network for corridor charging and requests consideration
5 for funding for the full 15%, or approximately \$6M, allowed under the settlement agreement
6 for development and installation of electric vehicle (EV) charging stations.

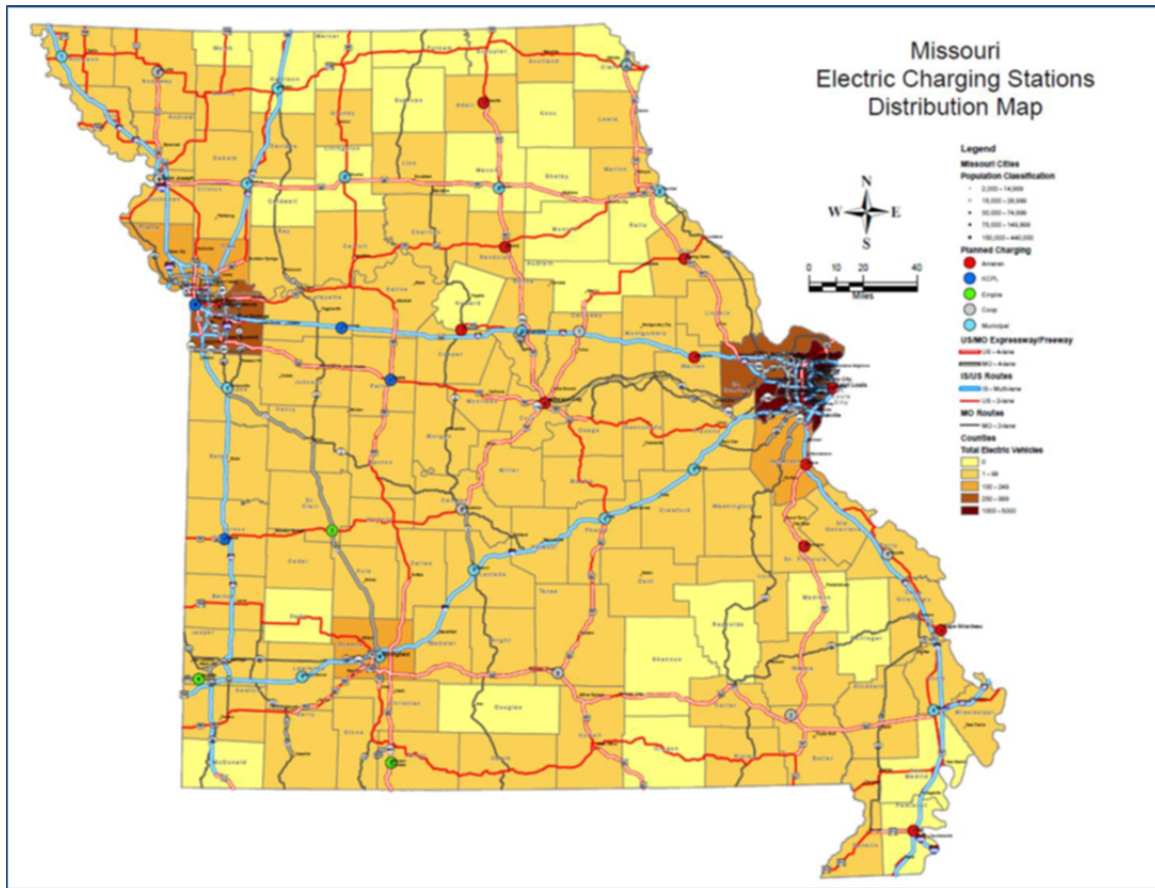
7 The Collaborative has been working together to promote the development of
8 EV charging station infrastructure throughout Missouri's highways since November 2016.
9 The Collaborative has applied for funding from the VW Mitigation Trust being administered
10 by the Department of Natural Resources, Air Pollution Control Program (APCP).
11 The Collaborative has drafted the map below of recommended DCFC island locations to
12 cover the majority of Missouri.¹⁰

13 The red dots are proposed EV charging stations in Ameren Missouri's service
14 territory. The blue dots are proposed EV charging stations in KCPL's service territory.
15 The green dots reflect the proposed EV charging stations in the Empire Electric District's
16 service territory. The light blue dots are the proposed EV charging stations within municipal
17 electric utilities service territories.

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22 *continued on next page*

¹⁰ ET-2018-0132, Ameren Missouri witness Patrick E. Justis, Schedule PEJ-04-07, page 7.

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3 The EV Collaborative anticipates that Electrify America¹¹ will provide charging
4 islands at some locations in Missouri on highway corridors but the locations have not been
5 publicly identified. The Electrify America program by Volkswagen (VW) and the
6 EV Collaborative organizations will buildout EV charging stations throughout Missouri
7 highway corridors.

8 The draft plan includes up to 40 public charging “islands” that could serve all types of
9 EVs and will be distributed strategically to enable EV travel throughout Missouri. The initial

¹¹ Electrify America is investing \$2 billion over the next 10 years in Zero Emission Vehicle (ZEV) infrastructure, education/outreach, and access/exposure representing the largest commitment of its kind to date. We are building a nationwide network of workplace, community, and highway chargers that are convenient and reliable. Our investment will enable millions of Americans to discover the benefits of electric driving. <https://www.electrifyamerica.com>.

1 estimated cost of such a project is in the broad range of \$6.8 – \$14.4 M with utilities and
2 communities making investments leveraged by the settlement funding and maximizing impact
3 of mitigation funds on behalf of Missourians.¹²

4 If approved by the APCP, the Collaborative would begin building EV charging
5 stations in 2019. Based on this massive undertaking by the VW Settlement – Mitigation Trust
6 to buildout EV charging stations throughout the Missouri highway system, without cost to
7 ratepayers, Staff finds that the Company’s requested Corridor Charging program is not
8 necessary to provide a public minimum practical charging network.

9 Q. Does Staff have any additional concerns with the corridor charging program?

10 A. Yes. In order to qualify for the program, EV Charging Infrastructure plans
11 must include at least two (2) DCFC Charging Ports and two (2) Level 2 Charging Ports per
12 site. Each site is eligible for incentives not to exceed \$240,000 in total, except where planned
13 DCFC Charging Ports have capacity of 150 kW or greater, in which case individual site
14 incentives shall not exceed \$360,000 in total.¹³ In response to Staff Data Request No. 0015,
15 the Company provided the below table regarding a summary of the costs included in
16 developing the \$240,000 and \$360,000 cost estimates.

17

Infrastructure for Charging Islands	Low Cost Est	High Cost Est	# of units
Cost of 50kW DCFC	\$ 25,000	\$ 30,000	2
Cost of 150kW DCFC	\$ 75,000	\$ 90,000	2
Cost of Dual Port L2	\$ 6,000	\$ 10,000	1
Cost of Service Extension	\$ 20,000	\$ 45,000	
Cost of Real Estate and Design Services (not real estate purchase)	\$ 10,000	\$ 20,000	
Cost of Civil & Electrical Construction	\$ 80,000	\$ 100,000	
Cost of Installation (setting EVSE and commissioning)	\$ 4,000	\$ 5,000	
Total Cost Per Island (150kW)	\$ 270,000	\$ 360,000	
Total Cost Per Island (50kW)	\$ 170,000	\$ 240,000	

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¹² ET-2018-0132, Direct Testimony of Ameren Missouri witness Patrick E. Justis, Schedule PEJ-04-03, page 3.

¹³ Ameren Missouri’s requested Tariff Sheet No. 165.2.

1 Staff is concerned that costs included in the cost categories of real estate and design services
2 (not real estate purchase), the costs of civil and electrical construction beyond those costs
3 included in the service extension, and costs of installation are outside of what the Commission
4 had contemplated as a “Make-Ready” model in Case No. ER-2016-0285.

5 Additionally, a customer with a demand of 150 kW would be served on Ameren
6 Missouri’s Large General Service tariff. Depending on its location, a charging station that is
7 not separately metered could have the potential to double the electricity consumption of the
8 existing commercial business and require significant distribution system upgrades. Even if
9 the charging station is separately metered, the additional demand on the system could still
10 lead to additional distribution system upgrades.

11 Lastly, the requested tariff requires that corridor charging incentive recipients commit
12 to meeting operational performance criteria specified by the Company for a minimum of
13 5 years and up to a maximum of 10 years in order to receive an incentive. However, there are
14 no operational performance criteria provided in the tariff and the tariff does not outline an
15 annual review process to make sure a charging station continues to meet the operational
16 performance criteria. The tariff also does not provide a process for if a station fails to meet
17 the operational performance criteria in a year following the initial startup.

18 **V. STAFF RECOMMENDATION SUMMARY**

19 Q. Please summarize Staff’s recommendation in this case.

20 A. Staff recommends:

- 21 1. The Commission should reject Ameren Missouri’s requested Charge
22 Ahead – Business Solution Program.
- 23 2. The Commission should reject Ameren Missouri’s Charge Ahead –
24 Electric Vehicles Programs Corridor Charging Sub-Program.

25 Q. Does this complete your rebuttal testimony?

26 A. Yes it does.

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 Efficient Electrification Program) Case No. ET-2018-0132

AFFIDAVIT OF BYRON M. MURRAY

STATE OF MISSOURI)
)
COUNTY OF COLE) ss.

COMES NOW BYRON M. MURRAY and on his oath declares that he is of sound mind and lawful age; that he contributed to the foregoing *Rebuttal Testimony*; and that the same is true and correct according to his best knowledge and belief.

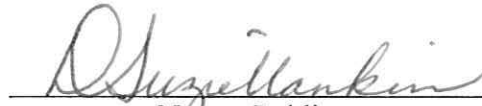
Further the Affiant sayeth not.



BYRON M. MURRAY

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 27th day of September 2018.



Notary Public

D. SUZIE MANKIN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: December 12, 2020
Commission Number: 12412070

BYRON M. MURRAY CREDENTIALS

PRESENT POSITION

I am currently employed as a Regulatory Economist III in the Tariff/Rate Design Unit, Operational Analysis Department within the Commission Staff Division of the Missouri Public Service Commission. I have been employed at the Missouri Public Service Commission since October 2013.

EDUCATION

I received my Bachelor of Science in Agricultural Business from Lincoln University in Jefferson City, MO in May 1997. I completed my Master of Public Administration from the University of Missouri – Columbia in Columbia, MO in May 2004.

EMPLOYMENT BACKGROUND

Prior to joining the Commission, I worked as an Energy Planner II for the Division of Energy, Department of Economic Development. I was a Unit Chief/Fiscal and Administrative Manager, in the Water Protection Program of the Department of Natural Resources responsible for the management of fee collections. I also worked as a Management Analyst Specialist II in the Administration Division and the Solid Waste Management Program of the Department of Natural Resources. I was employed as a Planner II/State Project Manager for the Scrap Tire Unit in the Solid Waste Management Program of the Department of Natural Resources. I have approximately 28 years of professional regulatory enforcement experience with the State of Missouri.

This will be my fourth participation in a rate case before the commission. Please see the table below of case proceedings:

Case Number	Company Name	Testimony Type	Type of Case	Issue
ER-2014-0370	KCP&L	Direct/Rebuttal/Surrebuttal	Electric Rate Case	Tariff/Rate Design
ET-2016-0246	Ameren Missouri	Rebuttal	Electric Vehicle Tariff	Tariff/Rate Design for Electric Vehicle Charging Station Network
ET-2018-0132	Ameren Missouri	Rebuttal	EV Tariff	Tariff / Rate Design for Electric Vehicle
ER-2016-0179	Ameren Missouri	Rebuttal	Electric Rate Case	Tariff/Rate Design for Electric Vehicle Charging Stations
EW-2016-0123	Electric Vehicle Working Docket	Staff Report	Working Group	Tariff/Rate Design Electric Vehicle Charging Station

cont'd Byron M. Murray

Case Number	Company Name	Testimony Type	Type of Case	Issue
ER-2016-0285	KCP&L	Rebuttal	Electric Rate Case	Tariff/Rate Design Electric Charging TOU Rates for EV Charging Station Network
ER-2018-0145 / 0146	KCP&L/GMO	Rebuttal	Electric Rate Case	Tariff / Rate Design for Electric Vehicle
EW-2016-0313	A Working Case To Consider Policies To Improve Electric Utility Regulation	Staff Report	Working Group	Tariff / Rate Design to improve regulation
EW-2017-0245	A Working Case To Explore Emerging Issues in Utility Regulation: Smart Non-Residential Rate Design	Staff Report	Working Group	Electric Vehicle Infrastructure
GA-2017-0016	Summit Natural Gas of Missouri	Staff Recommendation	CCN Application	CCN Application
GA-2018-0220	Summit Natural Gas of Missouri	Staff Report and Recommendation	CCN Application	CCN Application
GR-2016-0099	The Empire Electric District – Gas	Staff Recommendation	Winter PGA	Scheduled Winter PGA ACA