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MISSOURI PUBLIC SERVICE COMMISSION

FILE NO. ET-2021-0020

DIRECT TESTIMONY

OF

PATRICK E. JUSTIS

ON

BEHALF OF

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

St. Louis, Missouri

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DIRECT TESTIMONY

OF

PATRICK E. JUSTIS

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Patrick E. Justis. My business address is One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri 63103.

Q. By whom are you employed?

A. I am employed by Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri" or "Company").

Q. What is your position with Ameren Missouri?

A. I am the Manager of Efficient Electrification Development.

Q. Please describe your educational background and employment experience.

A. I received a Bachelor of Science in Mechanical Engineering from the University of Missouri-Columbia ("University of Missouri") in 1989. During that time I worked one semester as a co-op student at Union Electric's Callaway Nuclear Plant in the Systems Engineering Group. After graduating from University of Missouri, my first professional position was with a small manufacturing company in the St. Louis area, Turmatic Systems, Inc., which designs and manufactures rotary transfer machines. While working there I enrolled in graduate school to study environmental science, and graduated from Indiana University's School of Public and Environmental Affairs in Bloomington

with a Master of Science in Environmental Science and Policy in 1993. The summer between graduate school years and after graduation, I was hired by Shannon and Wilson, Inc. where I worked as an environmental consultant on a variety of remediation projects. In 1994, I was hired by the Missouri Department of Natural Resources ("MDNR") and held a few different positions over 14 years. Initially, my work at MDNR was as an Environmental Specialist with oversight responsibilities over the dioxin remediation of the Times Beach Superfund site in Eureka, Missouri. That project was completed and I moved to MDNR's St. Louis Regional Office in 1997 to work as an Environmental Engineer on Missouri's implementation of Clean Air Act section 112(r), which is essentially an extension of The Emergency Planning and Community Right-to-Know Act of 1986. In 2000, I transferred to MDNR's Outreach and Assistance Center in the City of St. Louis as an Energy Engineer where I collaborated with utilities, businesses, schools, colleges, local governments, the federal government, code officials, and the general public on energy efficiency, renewable energy, and green building projects and issues. I received my Missouri Professional Engineer license in 2007, and then joined Ameren Missouri in 2008 as a Senior Program Manager. My initial responsibilities included launching the Company's first formal portfolio of energy efficiency programs for business customers and I managed that area for six years. The next two years I focused primarily on Ameren Missouri's solar rebate program, natural gas energy efficiency program, and some limited electric vehicle ("EV") promotion. In March of 2016, my primary duties shifted to electric vehicles and I now work entirely on efficient electrification with a focus on electric transportation, including overall management responsibility for the Charge Ahead

incentive programs that were approved by the Commission in 2019 and are successfully operating today.

I am a founding member of the Missouri Gateway Chapter of the U.S. Green Building Council, having chaired the Chapter in 2008, and am currently the Chair of the City of St. Louis Clean Energy Development Board that has oversight responsibility for the City's Set the PACE St. Louis program.

II. PURPOSE OF TESTIMONY

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

A. My testimony describes the benefits of efficient electrification, and the rationale for a pilot program that would modestly expand upon our current efforts in transportation electrification. In combination with the testimony of Steve Wills, my testimony will explain why implementing these programs, that cost-effectively increase the use of efficient electrification technologies, is in the interest of all Ameren Missouri customers as well as all Missourians. Given the increasing concerns and focus, nationally and internationally, on climate change impacts and mitigation, our state should encourage the contributions that efficient electrification technologies bring to immediately address this great challenge.

I address the historical context of this proposal in contrast with our original Business Solutions proposal in File No. ET-2018-0132 (that case commonly referred to, and in this testimony, as "Charge Ahead"). Specifically, I describe how we have addressed the concerns raised in that matter and describe how the proposed programs would operate.

III. EFFICIENT ELECTRIFICATION BENEFITS AND THIS PROPOSAL

Q. What is efficient electrification?

A. Efficient electrification is the conversion of powered equipment from a less-efficient non-electric energy source to a more-efficient electric energy source. A fairly well-known example of this is the electric vehicle ("EV"). According to the latest figures provided by the U.S. Department of Energy, EVs convert over 77% of grid energy to power at the wheels, while conventional gasoline vehicle convert only 30% or less of energy stored in gasoline to power at the wheels.[1] Similarly, there are many other efficient electrification technologies that are available now that are far more efficient than incumbent combustion technologies. These efficiencies are key to unleashing the two key benefits that are foundational in this case: downward pressure on electric rates and improved environment health. While not detailed in this case, efficient electrification also provides economic benefits to industrial competitiveness in that such technologies also offer the advantage of performance in terms of process precision, and controllability in many instances.[2]

Ameren Missouri is proposing to incentivize two efficient electrification technologies in this proposal: High Capacity Lift Trucks and Electric Ports for Truck Refrigeration Units ("TRU Ports").

Q. What are the benefits of Ameren Missouri engaging the marketplace to encourage adoption of efficient electrification technologies?

A. The benefits of efficient electrification are fundamentally the same as those of EVs and transportation electrification. Really, anytime we electrify an internal combustion engine, such as in this proposed program, the benefits are the same as those

[1] https://www.fueleconomy.gov/feg/evtech.shtml
[2] Description of Electrification in Electric Power Research Institute, Overview found on https://www.epri.com/research/programs/105741

attributed to EVs, and fall into three categories: Economic, Environmental, and Performance.

Economic benefits occur in many ways:

- The end user experiences lower overall fuel and maintenance costs;
- The utility experiences increased utilization of existing infrastructure;
- The utility's customers experience downward rate pressure--as demonstrated in Mr. Wills' testimony, the RIM test for the proposed programs is in the range of 1.3-1.8;
- Given that Missouri is not a petroleum-producing state, the Missouri economy benefits from reduced fuel imports and more use of "home grown" electric generation;
- Modernizing through electrification enhances Missouri's business climate profile as Missouri competes nationally for business and job growth.

Environmental benefits occur in several ways:

- Health and safety of workers is enhanced due to zero emissions at ground level, and also for residential neighborhoods adjacent to warehouses and docks where there is a lot of material handling and/or refrigerated trucks idling;
- NOx emissions, a precursor to smog, are greatly reduced and CO_2 emissions are also reduced based on Ameren Missouri's generating fleet today;
- There is a promise of even more reductions in NOx and CO_2 emissions over time as Ameren Missouri transitions its generating fleet to renewable sources per our 2020 Integrated Resource Plan;[3]
- Reduced reliance on fossil fuels translates into fewer spills on water and land.

Performance benefits are specific to measure types, and are significant for this program:

- Electric lift trucks are more responsive, and have better torque, less vibration and noise, and much less waste heat. In addition, computerized controls offer better traction in snow and ice and programmability options specific to the driver;
- Electrically powered TRUs are less noisy as they allow diesel engines that would normally power the refrigeration system to shut down.

[3] https://www.ameren.com/missouri/company/environment-and-sustainability/integrated-resource-plan

Q. Has Ameren Missouri previously filed a proposal that was considered by the Commission and that is similar to this new proposal?

A. Yes, though the previous proposal was significantly larger in scope than the current proposal. In 2018, Ameren Missouri filed a proposed Business Solutions program under the Company's broader "Charge Ahead" filing that included changes to the Company's line extension policy as well as EV charging station incentives for business customers.

The three programs that were filed together under the Charge Ahead umbrella – line extension policy, EV charging station incentives, and the Business Solutions efficient electrification incentives – were thematically linked by the concept that new load introduced on to the Company's system, under the right conditions, can be economically beneficial for all customers. This is because many of the costs of the system are fixed, and do not vary with the amount of electricity delivered. Therefore, increased usage of the system improves utilization of those assets and spreads their fixed costs over more kilowatt-hours, driving down unit costs and ultimately customer rates.

The Commission approved the line extension policy changes relatively early in the process based on a Stipulation and Agreement among the parties. After a hearing, the Commission approved a portion of the EV charging program related to the development of charging stations in strategic locations along Missouri's highway corridors, and referred the remainder of the Company's proposal for additional local EV charging station incentives to a workshop process. Eventually, several parties submitted another Stipulation and Agreement in the Charge Ahead case that advanced these additional EV charging

station incentives. Ameren Missouri has implemented the revised line extension policy, and the charging station incentive programs are underway.

In approving these portions of the Charge Ahead filing, the Commission affirmed the underlying premise that the Company has a role to play in advancing the adoption of efficient electrification in the form of electric vehicles, and also specifically acknowledged the potential of efficient electrification to benefit all customers by spreading the fixed costs of the system over more usage.

The Business Solutions proposal, which is the predecessor to this proposal, was rejected at that time. This was not due to any conceptual dispute as to the potential benefits of efficient electrification; but the rejection was related to specific concerns about the details of that proposal and how it was to be implemented. In particular, the Commission was concerned with the potential for free ridership under the program, about the level of administrative costs estimated for delivering the program, and finally about cost effectiveness of the program given the mix of measures offered and the uncertainty regarding which measures would be ultimately delivered. In this revised proposal, the Company has made adjustments that should alleviate Commission's concerns. This new proposal is also smaller in scope and budget, as described in more detail, below.

Q. In general terms, how is this proposal different from the Charge Ahead Business Solutions proposal that the Commission previously considered?

A. Ameren Missouri's Business Solutions program filed in the Charge Ahead case included the following efficient electrification measures:

- Lift trucks (forklifts) in Classes 1 and 2 (there are several varieties of lift trucks even within these two classes)
- Truck Refrigeration Unit Electric Ports (TRUs)
- Truck Stop Electrification

- Airport Ground Support Equipment, including:
  - Push-backs
  - Tug/Tow Tractors
  - Belt Loaders
  - Ground Power Units

Business Solutions had a proposed budget of $7 million, with about 44% for administrative/marketing costs and 56% for incentives. In contrast, the new pilot program proposal is of a much smaller scale, with a total proposed budget of $1.9 million, and allocates 25% for administrative/marketing costs and 75% for customer incentives. The proposal also offers only two measures, with limited risk of free ridership:

- TRU Electric Ports
- Class I Electric Lift trucks having capacity >6,000 lbs. (a narrow segment of the market)

Additionally, the current proposal is for a term of three years, as compared to five years in the original proposal.

The following table summarizes these differences:

	Current Proposal	Previous Proposal
Number of Measures	2	8+ [4]
Budget	$1.9 million	$7 million
Admin/Marketing portion	25%	44%
Incentives portion	75%	56%
Term	3 years	5 years

Q. Please describe in more detail the proposed measures: High Capacity Electric Lift Trucks (6,000-12,000 lb.) and Truck Refrigeration Unit Electric Ports (TRU).

A. First, I will describe the lift truck proposal, and then the TRU Port proposal.

High Capacity Lift Trucks

Commonly referred to as fork lifts, lift trucks are designed for a variety of tasks and can be powered by internal combustion engines or electric technologies. Because of the many varieties of end uses, lift trucks have been sorted by classes, as set out in the table below. Note that all classes have been listed below to emphasize the small portion of the lift truck universe that has been targeted in this proposal, namely, Class 1 lift trucks of capacity > 6,000 lbs.

	Lift Truck Class	Description
Eligible Lift Truck Class	Class 1	A counter balance electric lift designed to do a variety of indoor and outdoor lifts. These lift trucks come in a wide range of capacities, but **only those considered "high capacity"—with a capacity of more than 6,000 lbs.--will be eligible for the program incentives.**
Ineligible Lift Truck Classes	Class 2	An electric specialty lift truck found in most warehouse applications. The design is specific for narrow isle high reaching applications.

[4] The "+" designation is to be clear that the previous proposal included Class 1-2 forklifts, while the current proposal includes only a limited portion of Class 1 forklifts that has very low electric market saturation, namely those having capacity >6,000 lbs.

	Class 3	An electric walk behind lift truck commonly referred to as a "walkie." Normally low lifting, light load applications.
	Class 4	A combustion engine lift truck with cushion tires. This type of lift truck works warehouse dock doors, loading and unloading trailers.
	Class 5	A combustion engine lift truck with pneumatic tires. The tire composite make them ideal for outdoor use on uneven terrain but it is not uncommon to see them indoors at very large warehouses.
	Class 6	Both combustion and electric versions, a class 6 truck is commonly referred to as a tow motor. They can be found pulling carts of supplies through an assembly plant or tugging luggage carts at an airport.
	Class 7	Today, this lift truck is available only with internal combustion engines. This class is properly suited with telescoping booms and outriggers in order to hoist building materials for construction projects.

Electric lift trucks are commonplace throughout Europe, with lifting capacities as high as 25 tons. The United States has been much slower to adopt electric technology, especially in the Midwest. While electric lifts have ~62% market share below capacities of 6,000 lbs., there is just an 18% market share up to 8,000 lbs. and insignificant share at 12,000 lbs. However, today's electric lift trucks in this 6,000-12,000 lbs. capacity range operate more efficiently, are safer, and are less costly to maintain than the internal combustion engine options. Because the greater sales volumes occur in the less than 6,000 lbs. units, manufacturers choose to focus market efforts there where they can realize the greatest return. For this reason, Ameren Missouri proposes to focus this pilot program on the extremely low-penetration market of >6,000 lbs. capacity lift trucks.

Q. What incentives is the Company proposing to offer to encourage the use of high capacity lift trucks?

A. The proposed incentives are the same as in the original proposal, which is $2,500 per eligible lift truck purchased, and $1,250 per eligible lift truck leased. The proposed budget would support incentivizing 375 lift trucks. To ensure that one large company with many locations does not consume all of the allocated incentives for this measure, there is a proposed limit of 20 incentivized lift trucks for affiliated entities.

Truck Refrigeration Unit Electric Ports

Truck refrigeration units, commonly referred to as TRUs, are a part of either a box truck or an enclosed semi-trailer that keeps products chilled or frozen while in transport. Traditionally, TRUs are powered only by a small auxiliary diesel engine during transport and while at idle, waiting to be loaded or unloaded. Two alternatives to the diesel engine have been developed but acceptance of these technologies has been slow, primarily due to up front infrastructure cost: All-electric and hybrid electric/diesel options (eTRUs). Both of these alternative options are relevant here because they require TRU electric ports to be available at the docks or in a holding area; these TRU electric ports are what Ameren Missouri proposes incentivizing. Use of this electric technology can offer operational savings to customers in terms of fuel costs and reduced run time and wear on the diesel engines.

The hybrid eTRU, while en route, operates on the auxiliary diesel powered engine whenever it is moving and at idle when an electric port is not available. While at rest, the truck/trailer has an option to plug into a 240v or 480v electric port and terminate the diesel operation. This conserves fuel while eliminating refrigeration system engine emissions and

noise. The use of electric standby reduces operating costs by 40-70%.[5] The fully electric option uses a generator, fixed to the axle, to power the eTRU while en route. The unit can then plug into TRU electric ports at the dock while at rest.

Q. What incentives is the Company proposing to offer to encourage the use of electric TRUs?

A. The proposed incentives are the same as in the original proposal, which is $1,600 per port that supports electric TRUs. The proposed budget would support incentivizing 300 ports. To ensure that one large company with many locations does not consume all of the allocated incentives for this measure, there is a proposed limit of 45 incentivized ports for affiliated entities.

Q. What does Ameren Missouri expect to learn from this pilot program?

A. This pilot program seeks not only to drive increased adoption of the two measures, but also to inform Ameren Missouri about several questions related to customer attitudes and behavior regarding these electrification technologies:

- Are small incentives sufficient, when combined with customer education, to drive measure adoption?
- What are the primary barriers to adoption of these technologies?
- What is the best way to target incentives to encourage customers to electrify this equipment?
- What are the actual load shapes of the measures (depends on ability to monitor);

Q. Has Ameren Missouri addressed the specific issues cited in the Commission order[6] in the previous Charge Ahead – Business Solutions case?

[5] From a recent conversation with David Brondum of Carrier Transicold, a manufacturer of TRUs.
[6] Report and Order for File No. ET-2018-0132, issued February 6, 2019

A. Yes, this proposal responds to the concerns the Commission previously raised about the Business Solutions proposal from the Charge Ahead case. Specifically, we have addressed the following concerns:

- Free ridership
- Administrative Costs
- Cost effectiveness calculations

Free Ridership

The proposed pilot program is inherently low-risk in terms of free ridership due to the current market status of the specific measures incentivized. As described above, the limited portion of the Class I lift trucks eligible in the program are those having lift capacity >6,000 lbs. Electric-powered lift trucks are a modest 18% of the market today for Class 1 lift trucks between 6,000 and 8,000 lbs. capacity, and the electric market share is virtually non-existent for capacities higher than 8,000 lbs., far from a saturated market.[7] Also, customers must get preapproval from the program *before purchasing or leasing* the equipment and, as stated in the proposed tariff, the program design is such that the purchase or lease of a new lift truck "…must be replacing a gasoline, diesel or propane unit OR be a new addition OR expansion to an existing fleet." All three of these program elements contribute to limiting free ridership.

Similarly, according to staff at the Electric Power Research Institute, TRU electric ports are relatively uncommon, with a high-end estimate of approximately 5% of trucking docks having been outfitted with such equipment. Given the low price of diesel fuel and

[7] The saturation level for the high capacity Class I lift trucks was provided during conversation between Ameren Missouri staff and the Material Handling Equipment Distributors Association ("MHEDA") and the Industrial Truck Association ("ITA").

the fact that the vast majority of refrigerated trucks include diesel-fueled auxiliary engines to power the truck's refrigeration units, the cost of upgrading docks to include the TRU Electric Ports is a barrier, despite the overall cost-effectiveness of the measure being positive in terms of Ratepayer Impact Measure ("RIM") and modified Total Resource Cost tests ("mTRC").

Administrative Costs

The administrative costs associated with this program will include the costs of managing the program through implementation contractors as needed, database and web portal management costs, and marketing and education costs. As stated earlier in this testimony, the costs for administering the program has been limited to 25%. This is a very reasonable administrative allocation for a relatively small program that will require significant outreach through trade allies as well as hands-on consultations with customers, and is substantially lower than the 44% from the Business Solutions program that gave rise to Commission concerns related to that proposal.

Cost Effectiveness Calculations

Unlike the previous case having more measures, the much simpler two-measure proposal has straightforward calculations, as explained in Mr. Wills' testimony. The two proposed measure types are cost-effective for both the mTRC and RIM tests, even when including the administrative costs. Previously, the Commission concluded that "…because the analysis hinged on assumptions regarding the number of pieces of electric equipment installed under various incentive types and the evidence shows that the incentive costs and kWh saved vary greatly depending on which measure is utilized, the Commission finds it

is not reasonable to rely on this analysis."[8] The Company's new proposal is far simpler because it is limited to just two measures, and the calculations demonstrate that, regardless of varying uptake of the two measures, the program is cost-effective as long as administrative costs are limited to 25% of the program. For this reason, the Company requests flexibility in the program budget allocations between the two measures so that if the market responds more to one measure over the other, Ameren Missouri has the discretion to allocate more of the total incentive funds to the more popular measure.

IV. NEW BUSINESS SOLUTIONS PILOT PROGRAM DETAILS

Q. How would the new pilot incentive program operate in terms of customer engagement and processing customer applications?

A. Ameren Missouri plans to manage this program in a similar way as our other business customer programs such as Charge Ahead – Local Incentives (for EV charging stations) and Business Energy Efficiency, though with very limited support from outside implementation contractors. Internal staff will largely run the program with the potential for some level of assistance from outside contractors to support marketing materials development, educational webinar administration, portal and database development for intake and management of applications (if determined necessary), and load measurement (as feasible).

Marketing efforts will focus on industry trade allies that are engaged in manufacturing, sales, installation and service of the eligible measures and that already have trusted relationships with customers. By enabling these trade allies through education and incentives, we are able to develop a "sales force" that more actively engages with customers

[8] Report and Order for File No. ET-2018-0132, issued February 6, 2019, p. 42.

on the electrification options. Additionally, we will work with our internal customer-facing staff that have relationships with our customers to introduce the program and solicit meetings with our internal program staff.

As stated in the proposed tariff, customers will be required to get pre-approval for incentives prior to purchasing or installing the equipment. Our application process will require the necessary information to define the customer (address and contact information, Ameren Missouri account number), the proposed equipment and quantities, and address where the equipment would be utilized. Ameren Missouri will review the application and respond to the customer via email with either pre-approval or another response, such as requesting clarifying information or informing the customer why the application cannot be pre-approved.

Q. How will customers receive their incentive payments?

A. Customers will have three choices for receiving their incentives: 1) Check payment direct to the customer; 2) bill credit direct to the customer's Ameren Missouri electric bill, or; 3) via the application process, assign the incentive to a contractor working on the project. These are the same options available to customers under the existing Charge Ahead – Local Incentives program.

V. SUMMARY AND CONCLUSIONS

Q. In summary, why do you think the Commission should approve this proposal?

A. There are three primary reasons that the Commission should approve this proposal. First, Ameren Missouri has proposed a pilot program that offers new options for customers, is small scale, and addresses Commission concerns raised in the previous case.

The second reason is economics. The program's cost-effectiveness is beneficial not only to participating customers, but for all Ameren Missouri customers as well as Ameren Missouri. Moreover, offering additional cost-effective programs can help Missouri's business climate as the State competes for new business growth as well as retention of existing business. Similar to the case for EVs, this is an economic win-win-win.

Finally, this proposal is a win for community health and the greater environment. I would encourage the Commission to consider Ameren Missouri's commitment to a clean energy future, as demonstrated in the Company's recently filed 2020 Integrated Resource Plan, and recognize the value that efficient electrification, especially when coupled with renewable energy, brings to our local efforts to create an environmentally sustainable future. Again, given the increasing concerns and focus by experts, nationally and internationally, on climate change impacts and mitigation, our state should encourage, whenever possible, the contributions that efficient electrification technologies bring to immediately address this great challenge.

Q. Does this conclude your direct testimony?

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.	)))	File No. ET-2021-0020

AFFIDAVIT OF PATRICK E. JUSTIS

STATE OF MISSOURI)
) ss
CITY OF ST. LOUIS)

Patrick E. Justis, being first duly sworn on her oath, states:

1. My name is Patrick E. Justis. I work in the City of St. Louis, Missouri, and I am employed by Ameren Services Company as Manager of Efficient Electrification Development.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Union Electric Company d/b/a Ameren Missouri consisting of 17 pages, of which have been prepared in written form for filing in the above-referenced docket.

3. Further, under the penalty of perjury I hereby swear and affirm that the information contained in the attached testimony to the questions therein propounded is true and correct.

/s/Patrick E.Justis
Patrick E. Justis

Sworn to on this 27th day of October, 2020.