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**MISSOURI PUBLIC SERVICE COMMISSION**

**FILE NO. ER-2019-0335**

**REBUTTAL TESTIMONY**

**OF**

**AHMAD FARUQUI, Ph.D.**

**ON**

**BEHALF OF**

**UNION ELECTRIC COMPANY**

**D/B/A AMEREN MISSOURI**

**St. Louis, Missouri**

**January 2020**

*Ameren* Exhibit No. 024  
Date 3/4/20 Reporter JMB  
File No. ER-2019-0335

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**REBUTTAL TESTIMONY**

**OF**

**AHMAD FARUQUI, Ph.D.**

**FILE NO. ER-2019-0335**

1 **Q. Please state your name and upon whose behalf you testify.**

2 A. My name is Ahmad Faruqui. I am a Principal with The Brattle Group, and am providing rebuttal  
3 testimony on behalf of Union Electric Company d/b/a Ameren Missouri (Ameren Missouri or the  
4 Company).

5 **Q. Did you submit direct testimony on behalf of Ameren Missouri in this case?**

6 A. Yes, I did.

7 **Q. What issues are you going to address in your rebuttal testimony?**

8 A. I am addressing the following issues that have been raised by several witnesses in their testimony in  
9 this case: (1) What should be the default rate for residential customers? (2) What should be the  
10 differential between peak and off-peak rates in a time-of-use (TOU) rate? (3) What should be the duration  
11 of the on-peak period in a TOU rate? (4) Should dynamic pricing be offered to customers along with TOU  
12 rates? (5) Should demand charges be offered to residential customers?

13 **Q. Which witnesses have raised these issues?**

14 A. Staff witness, Sarah L. K. Lange, Sierra Club witness, Avi Allison, and Missouri Department of Natural  
15 Resources' Division of Energy witness, Martin R. Hyman.

16 **Q. How is your testimony organized?**

17 A. It is organized by witness, and within the rebuttal of each witness, it follows the issues they have raised  
18 in the order in which they have raised them.

1 **I. ISSUES RAISED BY STAFF WITNESS, SARAH L. K. LANGE**

2 **Q. On page 3 of the Staff Report, Staff recommends that once an AMI system is in place, new customers**  
3 **be placed on a default TOU rate, unless they specifically request otherwise. Do you agree with this**  
4 **recommendation?**

5 A. No, I do not. I agree with Staff that AMI provides Ameren Missouri an opportunity to modernize rates.  
6 Making a modern rate a default rate is a good way to make the transition. However, the default rate  
7 should be a cost-reflective three-part rate and not just a two-part TOU rate. Ameren Missouri is proposing  
8 to study a three-part rate in a pilot. The results from that pilot will inform any decisions to change the  
9 default rate structure in the future. I think just transitioning new customers to a new default rate is too  
10 cautious of an approach. The three-part rate at some point should be offered as the default rate to all  
11 residential customers. Of course, they should be educated and informed about how best to take  
12 advantage of the rate, and be told they have the option of picking other rates.

13 **Q. On page 32, Staff says that TOU rates should have the same pricing periods throughout the year. Do**  
14 **you agree?**

15 A. No, I do not. While having the same pricing period year-round would make it easy to remember when  
16 the peak period and the off-peak period occur, it would not necessarily be cost-reflective. Cost causation  
17 should be given priority over simplicity. Ameren Missouri customers experience the four seasons of the  
18 year and experience daylight savings time. It should not be too difficult to explain why pricing periods vary  
19 by season.

20 **Q. On page 33, Staff recommends that the on-peak period begin at 9 a.m. and conclude at 9 p.m. across**  
21 **all months. Do you agree?**

22 A. No, I do not. In my experience, a 12-hour peak period is very long for most customers to deal with.  
23 Households cannot curtail or shift their normal on-peak period activities out of such a long peak period to  
24 the off-peak period. Many utilities have historically offered TOU rates with similarly long peak periods and  
25 the take rate of those TOU rates has been very low.

1 Q. On page 34, Staff proposes a time-of-use rate with an on- to off-peak ratio of 1.03 in the summer  
2 months and 1.46 in the non-summer months.<sup>1</sup> Do you believe that such low on- to off-peak price ratios  
3 will motivate customers to reduce peak usage and encourage them to raise off-peak usage?

4 A. No, they will not. No purpose will be served by offering such diluted peak to off-peak ratios. The  
5 summer ratio will not even register with customers. Basically, a customer could shift their entire peak load  
6 to off-peak periods and save just a few pennies. In the winter, they will be motivated to shift usage from  
7 peak to off-peak periods, but not much. Such a low price ratio is unlikely to provide any savings  
8 opportunities to customers. TOU rates with low ratios will only succeed in aggravating customers. It is  
9 worth recalling the example of Puget Sound Energy ("PSE"), a utility that serves customers in the suburbs  
10 of Seattle. PSE deployed TOU rates with mild ratios in the 2000/2001 window to some 300,000 customers  
11 who were being metered through an AMR system. Customers saved next to nothing despite engaging in  
12 significant lifestyle changes. A customer backlash ensued, forcing the utility to shut the program down.

13 Q. On page 34, Staff writes, "A low-impact, low-differential, long time period time-of-use rate design is  
14 an excellent customer education opportunity. As provided below, Staff's rate design recommendation  
15 is intended to produce little to no bill variation to customers." Do you agree that such a design provides  
16 a useful education opportunity to customers?

17 A. No, I do not. Successful TOU rates around the country have two noteworthy features. First, they have  
18 short peak periods and long off-peak periods. Second, they have rates with high peak to off-peak ratios  
19 — meaning that the opportunity to save money by using less in peak and more in off-peak periods is high.  
20 Such rates make it easy for customers to benefit from the TOU structure of the rate. The longer the off-  
21 peak period, the greater the opportunity for customers to benefit from the discounted rates. And the  
22 higher the peak to off-peak ratio, the greater the gain by buying more power in the off-peak period and  
23 buying less power in the peak period. As Mr. Hyman from the Division of Energy also explains:

24 TOU rates should have cost-based, short, high-impact peak price signals to encourage  
25 load shifting. A pricing differential that is too low may not encourage changes in customer

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<sup>1</sup> Calculated as \$0.1277/kWh divided by \$0.1245/kWh in the summer months and \$0.0876/kWh divided by \$0.0600/kWh in the non-summer months.

1 usage, and a peak price period that is too long may discourage customer participation,  
2 since changing usage patterns would be too cumbersome.<sup>2</sup>

3 Staff readily admits that their rate will produce little to no bill variation. If that is the case, and I agree that  
4 it is, customers will have little motivation to engage with the utility's educational efforts around this rate.  
5 Offering a TOU rate at all could easily become an exercise in futility.

6 **Q. Currently, Ameren Missouri employs a declining block rate in the winter months and a flat volumetric**  
7 **rate in the summer months. On page 37 of the Staff Report, Staff recommends that any reductions to**  
8 **rates ordered in this proceeding be applied only to usage under the first 750 kWh block. The effect is a**  
9 **flatter declining block rate in winter, and the creation of an inclining block rate in the summer. Do you**  
10 **believe that inclining block rates such as the one proposed provide the correct price signal for**  
11 **customers?**

12 A. No. Ameren witness Steven Wills describes many problems with inclining block rates in his direct  
13 testimony. Inclining block rates are no longer relevant in today's market environment, which is focused  
14 on decarbonization of the energy system. A significant portion of the decarbonization initiative involves  
15 electrification of the economy, including home and commercial buildings, industrial processes, and  
16 transportation. The higher prices in the tail blocks of the inclining block rates will represent a barrier to  
17 electrification.

18 Inclining block rates for residential customers were introduced originally to incentivize electricity  
19 conservation. Even for that purpose, they were not successful. Many states, beginning with California, and  
20 including Colorado and Michigan, are rethinking their inclining block rates. The Sacramento Municipal  
21 Utilities District has eliminated them. So has Arizona Public Service.

22 I helped analyze the impact of inclining block rates in California and found that there was no clear evidence  
23 of conservation that those rates were inducing electricity conservation. Based on this work, I filed  
24 testimony on behalf of the three investor-owned utilities before the California Public Utilities Commission.  
25 I published an article based on my testimony in the Public Utilities Fortnightly. The article appears as a  
26 schedule to this rebuttal testimony, Schedule AF-R1.

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<sup>2</sup> File No. ER-2019-0335, Direct Testimony of Martin R. Hyman on Behalf of Missouri Department of Natural Resources Division of Energy, December 18, 2019, p. 9.

1 Utilities are beginning to replace inclining block rates with time-of-use rates. States are considering other  
2 rates that are better suited to the new energy setting.

3 In Canada, the province of Ontario replaced inclining block rates with time-of-use rates once smart meters  
4 were rolled out about a decade ago. In the last couple of years, the province of British Columbia approved  
5 the elimination of inclining block rates for one of the utilities in the province. Another utility is considering  
6 applying to the British Columbia Commission for the elimination of its inclining block rates.

7 **Q. On page 36, Staff writes that demand charges “cannot be expected to be understandable to**  
8 **customers at this time.” As such, Staff recommends a two-part rate, including a customer charge and**  
9 **volumetric charge. Do you believe that a two-part rate is appropriate at this time?**

10 A. No, I believe the best rate design is a three-part rate including a customer charge for recovering revenue  
11 cycle services such as metering, billing and customer care; a demand charge (\$/kW) for recovering  
12 capacity costs, and a volumetric charge (cents/kWh) for recovering energy costs. As shown in Schedule  
13 D2 of my direct testimony, more than 60 such rates are being offered around the country to residential  
14 customers. These deployments are accompanied with simple informational sheets and website postings  
15 that highlight the appliances and end-use loads associated with high demand numbers and thus should  
16 not be run simultaneously. I recommend adoption of Ameren Missouri's proposed three-part rate pilot as  
17 a more appropriate step to transitioning to modern rates.

## 18 II. ISSUES RAISED BY SIERRA CLUB WITNESS, AVI ALLISON

19 **Q. On page 10, Sierra Club witness, Allison, cites your testimony to state that you support the use of the**  
20 **basic customer charge method rather than the MDS method used by Ameren Missouri. Do you agree**  
21 **with that interpretation of your testimony?**

22 A. No, I do not. I did not say that there is only one way of determining customer-related costs. I cited one  
23 method in my direct testimony. In that method, the customer charge is based on recovering the full costs  
24 of billing, metering, and customer service. Regulatory practice for recovering customer costs varies across  
25 jurisdictions. The MDS is a valid method for recovering such costs.

26 **Q. On page 21 of his testimony, Mr. Allison cites the Company's proposed summer peak energy charge**  
27 **of 32 cents per kWh and its off-peak energy charge of 5 cents per kWh, and says that he is “concerned**  
28 **that such a large differential in rates, driven by an on-peak price that is nearly three times the current**  
29 **residential basic rate, will discourage customers from signing up due to the fear of high bills if they**  
30 **cannot shift load away from on-peak hours.” Do you agree with this concern?**

1 A. No, I do not. The higher the differential, the greater the savings opportunity for customers. Conversely,  
2 the lower the differential, the lower the savings opportunity for customers. Most of the hours with a time-  
3 of-use rate tend to be off-peak hours. If customers are provided examples of how to shift and/or curtail  
4 peak load, they will figure out ways to save money. Ameren Missouri is proposing opt-in time-of-use rates.  
5 Customers who will not save money will not sign up for the rate. However, those who will potentially  
6 benefit from the rate will have every reason to sign up. With the right kind of customer education and  
7 marketing, I would expect many customers would sign up for the rate.

8 **Q. On page 23 of his testimony, Mr. Allison cites your direct testimony to argue that Ameren Missouri**  
9 **should offer a TOU rate with a 4:1 ratio rather than a 6:1 ratio. Do you agree with his interpretation of**  
10 **your testimony?**

11 A. While I agree with witness Allison that a 4:1 rate will generate considerable demand response, and that  
12 the incremental effect of going from 4:1 to 6:1 will not result in a proportionate increase in demand  
13 response relative to the change from flat rates to a 4:1 ratio, I disagree with his recommendation that  
14 Ameren Missouri ramp down on the price ratio. I believe the 6:1 price ratio conveys the right price signal  
15 to customers. The primary objective of rate design should be cost-reflectivity and a secondary objective  
16 should be demand response. That way both economic efficiency and equity will be optimized.

17 **Q. On page 24 of his testimony, Mr. Allison suggests expanding the summer on-peak window from four**  
18 **to five hours. Does increasing the duration of the on-peak period affect the opportunity for savings?**

19 A. Yes, it does and adversely. The longer the on-peak window, the more difficult it becomes for customers  
20 to take advantage of lower off-peak rates. The longer on-peak window means that higher on-peak prices  
21 affect the operation of more activities inside the house than a shorter on-peak window.

22 **Q. On page 25 of his testimony, Mr. Allison justifies shifting the start of the summer on-peak period**  
23 **from 3 p.m. to 2 p.m. based on an analysis of hourly load data. Do you agree with his approach?**

24 A. A time-of-use rate that does not include a demand charge should reflect the cost of energy and also  
25 the cost of capacity in the prices that are charged during the peak and off-peak periods. Therefore, system  
26 load is only one part of the equation. Also important to consider is the cost of generation. For instance, in  
27 Arizona and California, increased solar generation has depressed energy prices in the early afternoon,  
28 leading on-peak periods to be pushed back later into the evening hours.



1 Q. On page 24 of his testimony, Mr. Allison proposes the addition of critical-peak pricing to the time-of-  
2 use rate. Do you believe it is appropriate for Ameren Missouri to introduce critical-peak pricing at this  
3 time?

4 A. No. It is premature to introduce a critical-peak pricing element at this time since such a rate has not  
5 been tested in Missouri. Introducing a time-of-use rate with a steeply differentiated peak to off-peak  
6 pricing ratio as Ameren Missouri has proposed is a good first step in modernizing rates. Once customers  
7 get the necessary experience in Missouri with a time-of-use rate, a dynamic pricing element (either a  
8 rebate or a price) can be added as an option.

9 Q. On page 34 of his testimony, Mr. Allison suggests that the Commission "develop and apply tools and  
10 personalized tips to help customers improve their understanding of rate options, and that the Company  
11 take further education and outreach steps as needed to maximize enrollment in TOU rates." Do you  
12 agree?

13 A. Yes. Education and outreach are critical to the success of any utility program that is customer-focused.  
14 Rate design is by definition a customer-focused activity. Experience elsewhere has shown that if modern  
15 rate designs are explained in plain language to customers, they will be successful in recruiting customers.

16 Q. On pages 43 and 44 of his testimony, Mr. Allison says that residential demand charges are  
17 "unnecessarily complex" and "poorly understood." Do you believe demand charges are too complex for  
18 residential customers?

19 A. No, I do not. Across the U.S., utilities have deployed more than 60 demand charges to residential  
20 customers in more than 20 states. Many of the demand charges are based on the concept of maximum  
21 demand, which is similar to Ameren Missouri's proposal. Demand is actually a simpler concept to explain  
22 to customers than energy. The size of a light bulb is expressed in watts and customers understand that a  
23 100-watt light bulb draws more power than a 60-watt bulb and thus it shines more brightly. A 100-watt  
24 bulb left on for 10 hours uses 1,000 watt-hours (or 1 kWh). Thus, if electricity is priced at 10 cents per  
25 kWh, running that 100-watt bulb for 10 hours will cost 10 cents. That is the type of explanation used by  
26 utilities today to explain to customers how their bill is computed. In other words, the explanation begins  
27 with watts, which every customer intrinsically understands since it is the label on the light bulb, and then  
28 it progresses to watt-hours. All that is needed to explain demand charges to customers is to tell them the  
29 kW ratings of typical residential loads and rank order them. In particular, they should be told the kW  
30 ratings of their biggest loads, such as central air conditioning, clothes dryers, cook tops, and ovens. Once  
31 they understand the kW (or demand) ratings of those loads, all they have to do is to remember not to run

1 all those big loads at the same time. By so doing, they will be able to manage their maximum demands  
2 and lower their bills. Another benefit of three-part rates (with demand charges) is that they come with  
3 lower energy charges. This provides customers with an incentive to invest in electrification technologies.

4 **Q. On page 36 of his testimony, Mr. Allison says, “the NCP demand charge that is the distinctive  
5 element of Ameren’s proposed three-part rate is not cost-reflective.” Do you agree?**

6 A. No. An NCP demand charge is the best way of conveying to customers the cost of the distribution  
7 system that plays an essential role in delivering electricity to customers. In principle, a perfectly cost-  
8 reflective rate would include coincident peak (CP) and non-coincident peak (NCP) demand charges. That  
9 is often the case for rates by paid by commercial and industrial customers. However, it might be confusing  
10 to send two sets of demand charges to residential customers. A big advantage of an NCP charge over a CP  
11 charge is that it mitigates the potential for unproductive cost-shifting. In some jurisdictions with  
12 sufficiently high CP charges, sophisticated customers have installed behind-the-meter microgeneration  
13 that allows them to completely avoid the demand charge. This type of behavior does little to reduce  
14 overall distribution system costs, and merely shifts costs from the customers who can afford to install  
15 microgeneration to those who cannot.

16 **Q. How would you summarize your rebuttal testimony?**

17 A. The rates proposed by Ameren Missouri are in step with a national movement toward rate  
18 modernization. The differential between peak and off-peak prices proposed by Ameren Missouri is cost-  
19 reflective, and it should promote economic efficiency and equity. The duration of the peak period should  
20 incentivize behavioral change. The inclusion of a demand charge in the three-part rate proposed for the  
21 delay is appropriate and cost-reflective. Inclining block rates should be disregarded since they will stand  
22 in the way of electrification.

23 **Q. Does that conclude your rebuttal testimony?**

24 A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION  
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren )  
Missouri's Tariffs to Decrease Its Revenues for ) File No. ER-2019-0335  
Electric Service. )

AFFIDAVIT OF AHMAD FARUQUI

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

COMES NOW Ahmad Faruqui, and on his oath declares that he is of sound mind and lawful age; that he has prepared the foregoing *Rebuttal Testimony*; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

  
\_\_\_\_\_  
Ahmad Faruqui

Subscribed and sworn to before me this 21<sup>st</sup> day of January, 2020.

\_\_\_\_\_  
Notary Public

My commission expires:

Please see attached sheet  
for CA Acknowledgment/Jurat  
As per CA civil codes:  
8202, 8205, 8207, 1189

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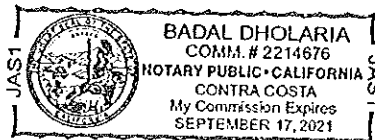
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