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MISSOURI PUBLIC SERVICE COMMISSION

CASE NO. ER-2019-0335

REBUTTAL TESTIMONY

OF

EMILY PIONTEK

ON BEHALF OF

RENEW MISSOURI

January 21, 2020

Renew MO Exhibit No. 400
Date 3/4/20 Reporter
File No. ER-2019-0335

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 Electric Service.	)))	File No. ER-2019-0335

AFFIDAVIT OF EMILY PIONTEK

STATE OF MISSOURI	)	
	)	ss
COUNTY OF BOONE	)	

COMES NOW Emily Piontek, and on her oath states that she is of sound mind and lawful age; that she prepared the attached rebuttal testimony; and that the same is true and correct to the best of her knowledge and belief.

Further the Affiant sayeth not.

Emily Piontek

Subscribed and sworn before me this 21st day of January 2020.

Notary Public

My commission expires: 8-16-23

James M. Owen
Notary Public - Notary Seal
State of Missouri
Boone County
Commission #15637358
My Commission Expires: August 16, 2023

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I. Introduction

Q. State your name, business name, and address.

A. My name is Emily Piontek and I am a Policy Research Clerk at Renew Missouri Advocates, Inc. ("Renew Missouri") located at 409 Vandiver Drive, Suite #5- 205, Columbia, Missouri 65202.

Q. On whose behalf are you appearing in this case?

A. I am appearing as a witness on behalf of Renew Missouri, a 501(c)(3) focusing on renewable energy and energy efficiency policy in the State of Missouri.

Q. What are your qualifications in commenting on this rate case?

A. I have served as a renewable energy policy researcher for Renew Missouri since May of 2018. In my time at Renew Missouri, I have appeared as a witness before the House Utilities Committee to testify in favor of securitization legislation, I have assisted with comments delivered by Renew Missouri on the Integrated Resource Plans of all the investor-owned utilities in the state, and have conducted a broad range of research on renewable energy and energy efficiency issues pertinent in Missouri. Additionally, I have earned a Graduate Certificate in Public Policy from the Truman School of Public Affairs at the University of Missouri and will graduate with a Masters of Science in Human Dimensions of Natural Resource Management from the School of Natural Resources at the University of Missouri-Columbia in May 2020. My Master's research is centered on the intersection of environmental and social justice, and has been presented at the 2019 National Environment & Recreation Research Symposium as well as accepted for presentation at The Academy of Leisure Sciences 2020 Conference. Additionally, my research has been submitted for publication in the journal, *Urban Forestry & Urban Greening.* In 2012, I earned my B.A. in History and in Political Science from Washington University.

II. Purpose of Testimony & Summary of Conclusions

Q. What is the purpose of your rebuttal testimony?

A. The purpose of my rebuttal testimony is to respond to proposed changes to the residential tariff of Ameren Missouri (sometimes referred to as "Ameren" or "the Company" depending on the context.). Specifically, I am responding to the direct testimony of Dr. Ahmad Faruqui who supports the Company's proposed tariff as well as the direct testimony of Company president Steve Wills on residential customer charges, including time of use ("TOU") rates and demand charges.

Q. What conclusions have you drawn regarding the proposed tariff?

A. The proposed rate changes do accommodate certain sound principles for rate design. Modernized rate design that implements TOU pricing can potentially assign the cost of electric service to customers more efficiently and more equitably. However, the Company should remove the demand charge from its residential rate pilot, or "Residential Ultimate Saver Service" (R - TOUUS). Although applicable to commercial-class electric customers, demand charges are inappropriate for the residential customer class. Extensive research implemented by utilities across the country shows how TOU rates smooth peak load by shifting and - in some cases - reducing customer electric usage. The TOU rates should be sufficient without resorting to problematic demand charges.

I describe them as problematic because, despite numerous pilot tests in utility service territories from across the United States, little evidence exists to suggest residential demand charges meet the sound principles of modern rate design (e.g., equity, efficiency; see p.6 of this testimony for further discussion). For example, demand charges likely impose a substantial burden on vulnerable populations such as low-income households, households with young children, customers with disabilities, and seniors. Furthermore, demand charges are not tied to meaningful customer behavior change in regards to energy efficiency or energy conservation patterns. As demand charges do not have the intended price-signaling effect that would lead customers to implement changes in their energy usage, demand charges are an improper course of action for the Company.

III. Residential rate changes

Q. Why does the company believe it is necessary to redesign its residential rates?

A. Utilities across the country are moving to modernize their rate designs to better reflect the actual costs of generating electricity. Modern technologies such as "smart" appliances, residential net-metered solar, and electric vehicles have altered the consumption patterns of individual electric customers. This technology can facilitate customer responses to price signals. Electric utilities are moving away from volumetric rate designs, which poorly reflect the actual costs of generating power and supplying the consumer across a particular customer class. The total cost incurred by the utility in providing power and servicing its customers can be subdivided into categories: customer-related, demand-related, and energy-related. Generation, distribution, and transmission costs are typically included in, and recovered by, the volumetric charge for a specific customer class. However, these charges are not directly related to fees assessed through a customers' bill.

Therefore, the relationship between energy-related and demand-related charges is not clear to a customer under a volumetric rate.

Additionally, utilities are increasingly taking advantage of advanced metering infrastructure (AMI) that enables modern and more sophisticated cost recovery.[1] Traditional volumetric pricing structures, which utilize high customer charges and straight fixed variable rates, reduce customer incentives to conserve energy or to use energy more efficiently and ultimately reduce the ability of the customer to contribute to demand-side management. Since AMI is crucial to TOU rates, this technology makes such rate design more feasible.

In 2019, Ameren Missouri filed a requests for (1) a ***Waiver of Various Tariffs and Regulations to Enable the Deployment of Automated Metering Infrastructure Beginning in 2020*** (Case# EE-2019-0382) and (2) a ***Waiver of Meter Testing Requirements in Anticipation of Automated Metering Infrastructure Deployment Beginning in 2020*** (Case# EE-2019-0383). AMI leads to system-wide benefits, including a more balanced load distribution throughout the day that shifts customer use from peak to non-peak hours.[2] Smart meters provide real-time data on customer electric usage, allowing the utility to collect a time-varied rate. Two-way smart meters fitted with a customer-facing monitor even give customers access to their electric consumption data. Ultimately, AMI allows an entire customer class to shift its overall usage pattern as those customers respond to price signals accordingly.

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[1] Regulatory Assistance Project, Smart Rate Design for a Smart Future, July 2015, p. 15, *available at* http://www.raponline.org/wp-content/.../rap-lazar-gonzalez-smart-rate-design-july2015.pdf
[2] Rocky Mountain Institute, A Review of Alternative Rate Designs, May 2016, p. 54, *available at* https://rmi.org/insight/review-alternative-rate-designs/

Based on the price signals available through AMI technology, customers can experience billing fluctuations and the utility will see an altered load pattern throughout the day. For example, say a utility sets a TOU rate with a high peak price during system-peak hours of 3PM - 6PM Monday through Friday and complements that with a low off-peak price. Customers who shift electric consumption to before 3PM or to after 6PM will be assessed for that usage at the lower off-peak price, which may cause their electric bill to be reduced overall if all other things remain equal. However, if that customer does not shift electric use from the peak period, then (if all other things remain equal) their overall bill will increase due to the higher rate assessed for that peak-period usage. Based on customer response and behavior, the utility will see peak load smoothing if customers do in fact reduce consumption at peak times. There is no guarantee peak load smoothing will occur, particularly if TOU rates are assessed over non-coincident peak periods, or do not provide actionable price signals.[3] In other words, TOU rates – like any other rates - must be designed and implemented soundly.

Q. What changes to its rate design does Ameren propose?

A. In addition to maintaining its traditional residential rates model ("R-Basic"), the Company proposes a series of small opt-in pilots that will differently allocate the costs of producing and supplying power. Currently, the Company offers basic residential service ("R-Basic") across its service territory that utilizes (1) a fixed, basic monthly service charge and (2) a monthly energy charge based on usage (kWh) that varies seasonally, but not otherwise by time-of-use or demand. In addition to continuing to offer this existing

[3] Southern Environmental Law Center, A Troubling Trend in Rate Design: Proposed Rate Design Alternatives to Troubling Fixed Charges, December 2015, *available at:* https://www.southernenvironment.org/uploads/news-feed/A_Troubling_Trend_in_Rate_Design.pdf

residential rate, the Company proposes three separate modifications to this rate design. In this case, the company proposes two optional rates ("R-TOU" & "R-TOUEV") that each utilize (1) a basic monthly service charge, and (2) a monthly energy charge based on usage (kWh) that varies seasonally and by time-of-use. R-TOU utilizes a three-part TOU rate composed of on-peak, off-peak, and intermediate pricing periods, and is only available to customers already fitted with AMI. R-TOUEV utilizes a two-part TOU with on-peak and off-peak pricing periods. Unlike R-TOU, R-TOUEV is available to customers who are not currently fitted with AMI; however, in such an instance, an additional monthly service charge will apply. Finally, the Company proposes an opt-in pilot program ("R-TOUUS") that implements a fixed charge, a demand charge, and a TOU rate to participating customers. See Table 1 for a basic comparison of each optional tariff.

Table 1. Cost components for R-TOU, R-TOUEV, & R-TOUUS

Charge	*Description*	*Tariff*
Customer service charge(s)	Monthly, non-varying service charge.	• R-TOU • R-TOUEV* • R-TOUUS
Energy charge	Variable; based on time-of day, season, & kW used.	• R-TOU • R-TOUEV • R-TOUUS
Demand charge	Variable; based on time-of-day, season, & kW used during demand billing period.	• R-TOUUS

**Additional monthly service of $1.50 charge will apply to customers without AMI.*

Q. Please describe the R-TOUUS tariff in more detail.

A. As proposed, R-TOUUS introduces a three-part rate that includes (1) a basic service charge, or "fixed" charge, to cover the incremental cost of providing service to each additional customer (e.g., meter, postage, etc.); (2) an energy charge that will vary (a) seasonally (four summer months of June - September and eight winter months from October - May) and (b) by on-peak and off-peak hours that also vary seasonally; and (3) a monthly demand charge, which will be assessed on the customer's maximum usage over the course of one hour from the period between 6am and 10pm.[4] In Table 2 ("Mapping of Cost Categories to Rate Elements", p.26) of his direct testimony, Mr. Wills shows the purpose of the demand charge in the tariff TOUUS is to allocate the demand costs of producing and distributing power. This charge will be assessed differently by season (summer vs. non-summer) and by period (peak vs. non-peak). See Table 2.

Table 2. Cost components of R-TOUUS

Charge	*Objective*	*Rate*	
Customer service charge	Recover customer-related costs (e.g., postage, billing).	$11.00/month	
Energy charge	Recover energy-related costs (based on time-of day, season, & kW used)	*Summer Peak:* 25.15¢/kWh	*Summer Off-peak:* 4.27¢/kWh
		Winter Peak: 14.05¢/kWh	*Winter Off-peak:* 3.89¢/kWh
Demand charge	Recover demand-related costs (e.g., production & distribution)	*Summer:* $6.86/monthly kW of billing demand	*Winter:* $2.93/monthly kW of billing demand

Q. Please describe the differences between R-TOU and R-TOUEV.

[4] See Tariff Revision (YE 2020-0001), Sheet No. 54.10-54.12. Missouri Public Service Commission, Docket No. ER-2019-0335.

The Company is also proposing an optional tariff for residential customers already fitted with advanced meters.[5] R-TOU, or "Residential Smart Saver Service," utilizes a two-part rate that also includes (1) a basic service charge or "fixed" charge to cover the incremental cost of providing service to each additional customer (e.g., meter, postage, etc.); (2) an energy charge that will vary (a) seasonally (four summer months of June - September and eight winter months from October - May) and (b) a three-tired Time-of-Use rate that varies seasonally according to on-peak, intermediate peak, and off-peak hours. R-TOU does not include a demand charge. See Table 3.

Table 3. Cost components of R-TOU

Charge	*Objective*	*Rate*		
Customer service charge	Recover customer-related costs (e.g., postage, billing).	$11.00/month		
Energy charge	Recover energy-related costs (based on time-of day, season, & kW used)	*Summer Peak* 3pm - 7pm 32.14¢/kWh	*Summer Intermediate* 6am - 10pm 8.45¢/kWh	*Summer Off-peak* 10pm - 6am 5.37¢/kWh
		Winter Peak 6am - 8am 6pm - 8pm 16.36¢/kWh	*Winter Intermediate* 6am - 10pm 5.90¢/kWh	*Winter Off-peak* 10pm - 6am 4.78¢/kWh

Additionally, the Company proposes another optional tariff for residential customers that will require advanced meters. As does R-TOU, R-TOUEV utilizes a two-part rate that also includes (1) a basic service charge or "fixed" charge to cover the incremental cost of

[5] Customers who opt-in to R-TOU will have two service options to choose from: (1) Option A = year round or (2) Option B = summer seasonal billing under the R-TOU rate & winter seasonal billing under R-Basic.

providing service to each additional customer (e.g., meter, postage, etc.) and (2) an energy charge that will vary seasonally (four summer months of June - September and eight winter months from October - May). However, this Time-of-Use rate is only two-tiered and will vary seasonally according to on-peak and off-peak hours. R-TOU does not include a demand charge. See Table 4.

Table 4. Cost components of R-TOUEV

Charge	*Objective*	*Rate*	
Customer service charge	Recover customer-related costs (e.g., postage, billing).	$11.00/month	
Energy charge	Recover energy-related costs (based on time-of day, season, & kW used)	*Summer Peak** 13.55¢/kWh	*Summer Off-peak*** 5.39¢/kWh
		*Winter Peak** 16.36¢/kWh	*Winter Off-peak*** 4.78¢/kWh

**Peak pricing hours: 6am - 10pm; **Off-peak pricing hours: 10pm - 6am.*

Based on the duration of the peak period and its coupling with intermediate or "shoulder" pricing periods, R-TOU presents more opportunities for customers to respond to price signals than does R-TOUEV. That makes it an optimal option.

<u>IV. Rate Design Principles</u>

Q. What are the traditional parameters that policymakers consider in rate design?

A. There are a number of traditional principles that policymakers use in developing electric rates. Efficiency, fair apportionment of costs, and revenue requirements are key factors around which such principles have been traditionally organized and are based on Bonbright's <u>Principles of Public Utility Rates</u> (1961) and Garfield and Lovejoy's principles from Public Utility Economics (1964). However, due to the changing nature of the electric grid and the increased penetration of distributed energy resources, including demand-side management (of which TOU and demand charge rates are a component), these traditional parameters must be expanded and modified.

Today's utilities rely on a mixed-resource portfolio that can generate power from variable energy resources (e.g., wind and solar), as well as from customers themselves (e.g., through net metering). Time-varied resources should be accounted for by time-varied rates that assign the costs of power and service proportionate to the amount of - and time of - electric consumption.[6] Notably, Karl Rábago (formerly of Pace Energy and Climate Center, Pace Law School) writes that modern rates "must be designed to account for the incentives they create for utilities, customers, and non-utility market participants".[7] In regards to time-varied rates, including TOU and demand charges, utilities must consider how effectively the structure of the rates signals or incentivizes a customer to participate in demand-side management, rather than whether these rates meet revenue requirements alone.

The Rocky Mountain Institute suggests several key design choices for demand charge rates that reflect the Bonbright Principles for good design. Notably, such principles ensure that *(1)* customers are able to connect to the grid for no more than the cost of connecting to the grid, and *(2)* customers pay for power supply and grid services

[6] Regulatory Assistance Project, "Demand Charges: Pathway or Detour?" webinar, December 10 2015, *available at* https://www.raponline.org/event/demand-charges-pathway-or-detour-webinar/
7 Rábago, K. R., & Valova, R. (2018). "Revisiting Bonbright's principles of public utility rates in a DER world." *The Electricity Journal,* 31(8), 9-13.

based on how much energy these customers use and when they use it.[8] Four of the recommended eight are particularly applicable to rate efficacy*:* *(1)* Cost Components & Allocation (which determines the magnitude of the demand charge price); *(2)* Peak Coincidence (peak prices and hours)*;* *(3)* use of a Ratchet Mechanism (which bases demand charges upon maximum demand over customer's historic, or sometimes seasonal, use)*;* and *(4)* the presence of Enabling Technology that can affect the customer's ability to respond to the price signals introduced by the rate.[9]

Q. Please explain how these four principles apply to the rate design changes proposed by the Company in R-TOUUS.

Of course. I believe this works better as visualized in a graph. See Table 5.

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[8] Regulatory Assistance Project, Smart Rate Design for a Smart Future, July 2015, p. 15, *available at* http://www.raponline.org/wp-content/.../rap-lazar-gonzalez-smart-rate-design-july2015.pdf
[9]Rocky Mountain Institute, A Review of Alternative Rate Designs, May 2016, p. 76, *available at* https://rmi.org/insight/review-alternative-rate-designs/

Table 5. Rate design principles applied to R-TOUUS

Principle	*Definition*	*Example from R-TOUUS*
Cost Components & Allocation	• Recovers customer-related, energy-related, & demand-related costs	• Service charge (monthly fee) • Energy charge (per kWh) • Demand charge (fee/kW of billing demand)
Peak Coincidence	• Recovers energy-related costs based on daily & seasonal use; based on peak prices & hours.	• Energy charge (per kWh) • Demand charge (fee/kW of billing demand) *Each of these rates varies based on hourly & seasonal use.*
Enabling Technology (AMI & "smart" appliances)	• Enables utility to recover costs based on time of energy use • Enables customer to respond to price signals	• Energy charge (per kWh) • Demand charge (fee/kW of billing demand) *Each customer eligible for pilot will be equipped with AMI.*
Ratchet Mechanism	• Bases demand charges upon maximum customer demand during billing period	• Not included in the design of the R-TOUUS demand charge.

Q. Are there policy risks to the R-TOUUS rate design changes proposed?

A. Yes. There is a potential the R-TOUUS tariff will result in negative impacts that include: inequitable and burdensome impacts to vulnerable customers (e.g., low-income households, households with young children, customers with disabilities, and seniors)[10], and detrimental impacts on energy efficiency and energy conservation, as load shifting

[10] White, L. V., & Sintov, N. D. (2019). Health and financial impacts of demand-side response measures differ across sociodemographic groups. *Nature Energy*, 1-11.

does not equate with energy efficiency or conservation on its own. I will address these concerns in more detail below.

Q. How would demand charges impact vulnerable populations?

A. Demand charges have the potential to cause adverse economic and health impacts to vulnerable customers, including to low-income customers, seniors, to households with young children, and to customers with disabilities, who may be unable to manage highly volatile recurring bills. In order to manage household utility bills, evidence shows customers will reduce electrical usage at the expense of their heating and cooling needs.[11] Customers with disabilities or with medical conditions may not be able to respond to price signals at all, as medical devices may not be adaptable to peak period timing.[12] Finally, residential demand charges are not sensitive to the system requirements among diverse customer classes. For example, low-income customers are more likely to reside in multi-family apartments, yet apartments historically have the lowest cost of service of any customer class due to the fact that multiple units can be served through a single delivery point.[13] Despite their lesser demand upon the system, apartment dwellers may be unfairly assigned demand-related costs in the R-TOUUS scenario.[14] This will increase costs to these customers when they literally can do nothing about it.

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[11] Vote Solar, "Guidance for utility commissions on Time of Use rates: A shared perspective from consumer and clean energy advocates", Electricity Rate Design Review Paper No.2, July 15, 2017, *available at* https://votesolar.org/files/9515/0039/8998/TOU-Paper-7.17.17.pdf

[12] White, & Sintov, (2019). Health and financial impacts of demand-side response measures differ across sociodemographic groups. *Nature Energy*, 1-11.

[13] Lazar, J. (2016) "Use great caution in design of residential demand charge rates". Regulatory Assistance Project, *available at* https://www.raponline.org/wp-content/uploads/2016/05/lazar-demandcharges-ngejournal-2015-dec.pdf

[14] Chernick, P., Colgan, J., Gilliam, R., Jester, D., LeBel, & M. Vote Solar. "Charge without a Cause? Assessing Electric Utility Demand Charges on Small Consumers." Electricity Rate Design Review Paper No.1, July 18, 2016, *available at* https://votesolar.org/files/6414/6888/3283/Charge-Without-CauseFinal_71816.pdf

Jim Lazar of the Regulatory Assistance Project believes TOU rates are a more equitable way to both recover system costs and shift customer behavior. If cost recovery and peak load smoothing are at the heart of the Company's proposed rate modifications, then the demand charge portion of the pilot should be dropped.

Q. How would this demand charge impact system-wide energy usage?

A. A customer's period of highest usage isn't automatically associated with system peak so impacts to the grid will not be coordinated with high electric usage on an individual basis.[15] Lazar calls demand charges a "second-best" approach to reducing demands upon the system when compared to time-varying rates like TOU rate designs.[16] According to Lazar, demand charges were originally designed when the power system was more uniform in composition and relied more fully on peaking power plants than it does today. Additionally, demand charges only approximate a customer's highest usage regardless of whether it occurs during the system peak.[17] Modern metering infrastructure, such as AMI, enables utilities to more accurately assign the cost of energy production and distribution to customers on an individual basis (e.g., through TOU rates). Demand charges are a much less sophisticated approach – "second best" if you will - to utility cost recovery overall.

Furthermore, the demand charge in this case is assessed over a fourteen-hour period. This is too long. Many rate design experts suggest that a three-hour demand

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[15] Southern Environmental Law Center, A Troubling Trend in Rate Design: Proposed Rate Design Alternatives to Troubling Fixed Charges, December 2015, *available at:* https://www.southernenvironment.org/uploads/news-feed/A_Troubling_Trend_in_Rate_Design.pdf

[16] Regulatory Assistance Project, "Demand Charges: Pathway or Detour?" webinar, December 10 2015, *available at* https://www.raponline.org/event/demand-charges-pathway-or-detour-webinar/

[17] Lazar, J. (2016) "Use great caution in design of residential demand charge rates". Regulatory Assistance Project.

billing period is the optimal length of time over which a demand charge may be incurred. Beyond that, it may simply be too difficult for customers to meaningfully shift behavior to accommodate the system peak.[18]

Consider the following scenario: a family of four has a typical, 8am-5pm school and work schedule and likely gone from the home before and after that time period due to travel. After a long day working and attending to daily needs, the family is in bed by 10pm, only to start all over again around 6am the next day. With such a schedule, it is unlikely laundry, dishes, or other highly consumptive electric appliances can be deployed in such a way that demand charges would be minimized. The only times that customers may have to do these chores may be as they are preparing to leave the house in the morning or as they are ending their days and preparing for the next. Thus, it is unlikely customer behavior could be meaningfully shifted in this scenario. For customers who have less traditional schedules, such as many service and healthcare workers, or those without children in school, behavior shifts that accommodate this fourteen-hour demand charge period may be possible. Regardless, these demand charges lead to detrimental customer impacts that are highly likely to accrue over such a long time period.[19]

In contrast, TOU pricing periods tend to be shorter. In this case, it is only four hours. The TOU rate proposed within the R-TOUUS tariff serves within the energy-related category of customer charges. This energy charge will vary seasonally, like the demand charge. However, the peak pricing period is significantly shorter. During the four

[18] Regulatory Assistance Project, Smart Rate Design for a Smart Future, July 2015, p. 15, *available at* http://www.raponline.org/wp-content/.../rap-lazar-gonzalez-smart-rate-design-july2015.pdf
[19] Vote Solar, "Guidance for utility commissions on Time of Use rates: A shared perspective from consumer and clean energy advocates", Electricity Rate Design Review Paper No.2, July 15, 2017, *available at* https://votesolar.org/files/9515/0039/8998/TOU-Paper-7.17.17.pdf. See pp. 9-14.

summer months (June - September) and eight winter months (October - May), an energy charge will be applied to on-peak and off-peak hours. These pricing periods will also vary seasonally (3pm - 7pm in summer; 6am - 8 am & 6pm - 8pm in winter), but the peak charge (per kWh) will never be assessed for more than four hours in a day.

A recent review of dynamic pricing models - that include demand charge rates - found that "prices alone do not necessarily create the conditions needed to achieve effective peak demand management that could be reliably deployed to reduce the need to build more generation and transmission infrastructure." [20] Additionally, the authors recommend "the range of signals for residential demand response leave customers with room to act on voluntary bases, based on their capacity to respond." The substantially shorter duration of the peak period will enable customers to respond to the TOU proposed by R-TOUUS. If we return to the previous example regarding an "average" customer's day, it's clear a family could meaningfully shift their behavior to take advantage of the lower off-peak rate without drastically altering its schedule to shift energy usage that intrudes on sleeping hours as response to the demand charge could require.

Finally, the Company argues smart appliances will assist the customer in shifting behavior as a cost-saving response to the demand charge. Additionally, a variety of information and control technologies provided by AMI can enable customers to automate their residential energy usage through use of in-home displays, web portals, and text or email messaging that provide energy use data to guide customers toward beneficial

[20] Gyamfi, S., Krumdieck, S., & Urmee, T. (2013). Residential peak electricity demand response—Highlights of some behavioural issues. *Renewable and Sustainable Energy Reviews*, 25, 71-77, p.76.

actions that reduce energy bills.[21] While it is true that technological innovations make it possible for customers to respond to electric prices in real time and facilitate customer control over when and how appliances operate, it is not possible to equitably and feasibly implement a demand charge that relies so heavily on customer engagement. First, upgrading appliances to their "smarter" versions may be prohibitively expensive for many customers, including already-struggling low-moderate income or energy-burdened households. For example, a Samsung three-door "non-smart" refrigerator costs roughly $1,199 while the cost of its "smart" counterpart is nearly doubled in price, at $2,299.[22] Additionally, the average kitchen remodel costs $150/square foot, but a remodel that includes modernized appliances could cost up to $250/square foot.[23] If these costs are burdensome to homeowners, they may be even more so for landlords, who are not bound by policy incentives to upgrade appliances to "smarter" or more energy efficient versions that would facilitate a renter's response to price signals that rely upon "smart" appliances.

Furthermore, the average utility customer is unlikely to actively participate in monitoring their energy usage on a daily basis, as such intensive involvement is unfeasible for modern working families. Additionally, the Company is only at the initial stage of its campaign to implement widespread AMI. Thus, it is unproductive for the Company to head down this path of rate design in testing out a demand charge when such a fee is so crucially dependent upon every home being a "smart" home, with every customer having access to the benefits of AMI.

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[21] Gold, R. Water, C. & York, D. (2020). "Leveraging Advanced Metering Infrastructure to Save Energy." The American Council for an Energy Efficient Economy.

[22] https://www.samsung.com/us/home-appliances/refrigerators/3-door-french-door/

[23] https://www.homeadvisor.com/cost/kitchens/remodel-a-kitchen/#appliances

I would caution against a pilot so reliant on advanced technology being used later on to make generalizations for the larger population. A U.S. Department of Energy review of an opt-in dynamic pricing pilot in Sacramento, CA, found that such customers (i.e., those choosing to participate in a pilot) perform better than the average customer, which renders the generalizability of such a pilot to the broader customer base unreliable.[24] In addition to this finding, the Company's customers who are eligible and choose to opt-in to R-TOUUS will already be differentiated from other customers. Participants in the study will be cherry-picked to ensure that they can even enable the implementation of time-varying charges, including the demand charge. This is because only those customers who have been fitted with AMI, or who will be fitted with AMI by the start of the program, will be able to participate in R-TOUUS. Finally, significant differences exist between those who choose to opt-in to a rate program (such as R-TOUUS) and those who are defaulted onto that rate. Those who choose to opt-in (as will participants in the R-TOUUS pilot) are more likely to actively manage their energy usage while those who are defaulted onto a rate are more likely to be passive users.[25]

By making eligible only customers who already have AMI and by prohibiting customers who utilize residential net metering from participating in the pilot, the Company almost guarantees that its R-TOUUS tariff will successfully deliver benefits to customer-related, energy-related, and demand-related cost recovery.[26] R-TOUUS

[24] 16 USDOE, Sacramento Municipal Utility District Smart Pricing Final Evaluation, September, 2014.
[25] George, S., Bell, E., Savage, A., Dunn, A., & Messer, B. Nexant Inc. and *Research into Action*, "California statewide opt-in Time-of-Use pricing pilot: Interim evaluation." April 11, 2017, see Executive Summary, p.2.
[26] Net metering customers are disproportionately impacted by demand charges requisite to the reduced demand placed by them on the system. See Vote Solar Electricity Rate Design Review Paper No. 1, "Charge without a Cause?" *available at* https://votesolar.org/files/6414/6888/3283/Charge-Without-CauseFinal_71816.pdf or Regulatory Assistance Project, "Demand Charges: Pathway or Detour?" webinar, December 10 2015, *available at* https://www.raponline.org/event/demand-charges-pathway-or-detour-webinar/

excludes those customer segments that would be most negatively impacted by demand charges, making this a flawed pilot with significant bias. The Company will then likely apply this tariff model more broadly, and the underlying demand charge will impose a substantial burden on all but the "perfect" customer, such as those who will participate in this demand charge pilot.

V. Recommendation and Response to Ameren

Q. What policies would need to be in place before any kind of demand charge should even be considered?

A substantial list of policies would need to be developed before a default demand charge should be implemented, if at all. These policy changes could include: utility revenue regulation that addresses misalignment between energy-costs, customer-costs, and distribution-costs; updated state building codes that reflect energy conservation goals so that less-efficient rentals and low-income households are not punished by burdensome energy usage over which they have little control; and federally-implemented appliance standards that require control technologies to enable customer response to time-varying price signals, such as TOU rates that include reasonable peak pricing periods similar to what the Company has proposed in its R-TOU tariff.

Since none of these policies are being proposed by the Company, and in some cases are far outside the purview and jurisdiction of the PSC, the demand charge proposal should not be considered as proposed under the R-TOUUS tariff.

Q. What is your recommendation to Ameren?

Numerous policy shortcomings associated with demand charges have been identified here, and are pertinent to R-TOUUS. Renew Missouri believes the Company should be taking steps to pursue rate design modernization through TOU rates but should not pursue a residential demand charge pilot.

Q. Does this conclude your testimony?

A. Yes.