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Issues:	Residential Rate Design
Witness:	Martin R. Hyman
Sponsoring Party:	Missouri Department of Economic Development – Division of Energy
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Case Nos.:	ER-2018-0145 ER-2018-0146

MISSOURI PUBLIC SERVICE COMMISSION

KANSAS CITY POWER & LIGHT COMPANY

KCP&L GREATER MISSOURI OPERATIONS COMPANY

CASE NOs. ER-2018-0145 and ER-2018-0146

DIRECT TESTIMONY

OF

MARTIN R. HYMAN

ON

BEHALF OF

MISSOURI DEPARTMENT OF ECONOMIC DEVELOPMENT

DIVISION OF ENERGY

Jefferson City, Missouri
July 6, 2018

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Kansas City Power & Light Company's Request for Authority to Implement a General Rate Increase for Electric Service	))))	Case No. ER-2018-0145
In the Matter of KCP&L Greater Missouri Operations Company's Request for Authority to Implement a General Rate Increase for Electric Service	))))	Case No. ER-2018-0146

AFFIDAVIT OF MARTIN R. HYMAN

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

Martin R. Hyman, of lawful age, being duly sworn on his oath, deposes and states:

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

Martin R. Hyman

Subscribed and sworn to before me this 29th day of June, 2018.

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

Notary Public

My commission expires: 4/26/20

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I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Martin R. Hyman. My business address is 301 West High Street, Suite 720, PO Box 1766, Jefferson City, Missouri 65102.

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

A. I am employed by the Missouri Department of Economic Development – Division of Energy ("DE") as a Planner III.

Q. Please describe your educational background and employment experience.

A. In 2011, I graduated from the School of Public and Environmental Affairs at Indiana University in Bloomington with a Master of Public Affairs and a Master of Science in Environmental Science. There, I worked as a graduate assistant, primarily investigating issues surrounding energy-related funding under the American Recovery and Reinvestment Act of 2009. I also worked as a teaching assistant in graduate school and interned at the White House Council on Environmental Quality in the summer of 2011. I began employment with DE in September, 2014. Prior to that, I worked as a contractor for the U.S. Environmental Protection Agency to coordinate intra-agency modeling discussions. Since joining DE, I have been involved in a number of utility cases and other proceedings before the Missouri Public Service Commission ("Commission") as DE's lead policy witness and have assisted DE on legislative issues and the development of the Comprehensive State Energy Plan. Topics that I address as a part of my duties include rate design, demand-side programs, in-state energy resources, renewable energy, electric vehicles ("EVs"), and grid modernization.

Q. Have you previously filed testimony before the Commission on behalf of DE or any other party?

A. Yes. Please see Schedule MRH-Dir1 for a summary of my case participation.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your Direct Testimony in this proceeding?

A. The purpose of my testimony is to provide general information about residential rate design. I also describe DE's proposals to 1) continue the transition away from the declining block rates employed by Kansas City Power & Light Company ("KCP&L") and KCP&L Greater Missouri Operations Company ("GMO") (collectively, "Companies") for residential general use[1] customers during the winter, as well as 2) implement inclining block rates for GMO's residential general use customers during the summer. These transitions, which should be based on bill impact analyses, will provide better price signals to residential customers and thereby encourage energy efficiency.

To address potential impacts on electric vehicle users from inclining block rates, DE recommends outreach by the Companies to identify EV drivers so that they may be informed of potentially beneficial time-of-use rates. DE also recommends customer education for the broader residential general use classes.

[1] I use the phrase "general use" to refer to the rate that serves most residential customers.

III. RESIDENTIAL RATE DESIGN CONSIDERATIONS

Q. What are some of the principles involved in evaluating rate designs?

A. There are many factors to consider when evaluating rate design proposals. Some of the chief considerations involve efficiency, affordability, gradualism, and relating rates charged to the costs incurred by their causers ("cost-causation").

Q. What are the typical components of a residential electric utility bill?

A. Currently, Missouri residential customers of investor-owned electric utilities are charged through two components. The first is a "customer charge," a fixed monthly amount that represents the costs incurred for connecting an individual customer to the utility's system irrespective of usage. The second component is a series of "energy charges" which vary by season and amount of energy used. Other classes may have a larger number of (or different) billing components based on factors such as demand and reactive power needs.

Q. How do general rate design considerations affect the determination of customer charges?

A. Customer charges customarily represent the costs for a utility to serve an additional customer regardless of usage. Since it is a fixed amount, the customer charge cannot be avoided by customers absent disconnection from a utility's system. Consequently, customer charges do not encourage efficient usage and have disproportionate impacts on low-use customers and low-income customers as a group.

Q. In what ways do general rate design considerations factor into determining energy charges?

A. Traditionally, residential customers in Missouri have paid "declining block" energy charges in the winter – i.e., they have paid less per amount of energy used after a certain threshold or thresholds of usage. In the summer, these customers may have paid a "flat" rate, or the same charge per amount of energy used for all amounts of usage. As discussed below, KCP&L's residential general use customers are served under "inclining block" rates during the summer.

Q. What price signals do customers receive from declining block rates?

A. A declining block rate sends inappropriate efficiency signals to customers, since the effective price signal of a declining block rate is that higher amounts of usage cost less; the more energy the customer uses, the less they pay per unit of energy. Customer bills based on declining block rates move energy efficiency away from the forefront of customer awareness because their bills do not "connect" to their higher consumption. Flat rates provide slightly better price signals than declining block rates.

Q. Why are inclining block rates more successful in encouraging energy efficiency?

A. Inclining block rates, which charge more per amount of energy used after a certain threshold or thresholds of usage, serve to connect the customer and their electric bills with increased usage. Such a "customer bill and usage connection" better serves to inform the customer that to lower their bills, they must lower their usage. Inclining block rates signal to customers that higher use incurs higher costs,

encouraging greater energy efficiency. The best efficiency-inducing price signals are provided by inclining block rates.

Q. Are there cost-based justifications for inclining block rates?

A. Yes. Some claim that a low customer charge necessitates the recovery of "fixed" costs (in the accounting sense) through the first block of volumetric rates. However, the long-run view of utility costs is that they are all variable – lower demand results in lower plant investment.[2] The recovery of historic costs, while important for utilities, should not "lock in" future utility spending decisions by encouraging higher use and a subsequent need for greater investment in plant. Inclining block rates can not only be used to recover short-run "fixed" costs, but signal to customers that higher usage spurs greater investment in future plant; this signal will reduce the magnitude of future rate increases and provide benefits to all customers. Further, higher customer charges may have an adverse impact on low-income and low-use customers. I explore this topic more fully below.

Q. How has the Commission ruled on the issue of inclining block rates in the context of KCP&L?

A. In Case No. ER-2016-0285, the Commission stated in its Report and Order:

> A declining block rate sends poorer efficiency signals to customers, since the effective price signal is that higher amounts of usage cost less.
>
> Flat rates provide slightly better price signals, but the best efficiency-inducing price signals, sponsored by DE, are provided by inclining block

[2] Lazar, Jim, et al. 2016. *Electricity Regulation in the US: A Guide.* 2nd ed. Montpelier, VT: The Regulatory Assistance Project. http://www.raponline.org/wp-content/uploads/2016/07/rap-lazar-electricity-regulation-US-june-2016.pdf. Pages 185-186.

> rates ("IBR") (which charge more per amount of energy used after a certain threshold or thresholds of usage).
>
> Inclining block rates signal to customers that higher use incurs higher costs, encouraging greater energy efficiency.
>
> Inclining block rates can not only be used to recover short-run "fixed" costs, but signal to customers that higher usage spurs greater investment in future plant; this signal will reduce future rate increases and provide benefits to all customers.
>
> ...
>
> An inclining block structure would also effectuate the public policy of the state as enacted in the Missouri Energy Efficiency Investment Act. The IBR would do so by incenting energy efficiency and demand response due to the second block of energy being more expensive than the first block during the summer.
>
> Such energy savings and peak demand reduction reduces costs to the utility, and, ultimately, also to its customers. (Citations omitted.)[3]

The Commission ultimately ordered the rate structure recommended by DE in that case, which moved residential general use customers' winter volumetric rates towards a flatter rate design and created an inclining block rate in the summer for these same customers.[4]

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[3] Missouri Public Service Commission Case No. ER-2016-0285, *In the Matter of Kansas City Power & Light Company's Request for Authority to Implement a General Rate Increase for Electric Service*, Report and Order, May 3, 2017, pages 53-54 and 55.
[4] *Ibid*, page 57.

Q. How do different volumetric rate designs affect low-use, low-income, and electric space heating and/or cooling customers?

A. The effects of volumetric rate designs on low-use and low-income customers depend on the specifics of the rates. Generally, however, low-use and low-income customers would fare the worst under declining block rate designs, since – compared to service under other rate designs – they would be paying more per unit of energy than high-use customers (and, consequently, paying disproportionately more for short-run "fixed" costs than high-use customers). By contrast, electric space heating and cooling customers – who generally use more electricity than customers with other energy sources for space heating and cooling, such as natural gas – benefit from traditional declining block rates. Based on these considerations, an appropriately designed inclining block rate would set the first, lowest block such that it charged for the most basic amounts of usage (e.g., some space heating and cooling, cooking, and lighting). Determining what constitutes "basic" usage takes careful research and assessment, and separate rates may need to be designed for space heating (and potentially for space cooling for vulnerable households).

Q. You have addressed low-use and low-income customers together several times. Is there evidence that low-income customers tend to use less electricity?

A. Yes. Regional data show that, on average, low-income households in the Midwest generally use less electricity than non-low-income households.[5] This conclusion is understandable for a number of reasons, which could generally include the fact that relative total energy use is lower in smaller houses and apartments and that customers may undertake conservation measures through thermostat control or eliminating usage in various rooms. Low-income customers may face particular pressure to conserve energy because of financial difficulties that force a choice between electricity, rent, medicine, food, and/ or other necessities.

The same data show that customers receiving assistance through the Low Income Home Energy Assistance Program ("LIHEAP") use more electricity than the general low-income population,[6] which is a logical outcome of receiving a bill credit. The Commission acknowledged that low-income customers tend to use less electricity in its Report and Order in Case No. ER-2016-0285.[7, 8]

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[5] U.S. Department of Health and Human Services, Administration for Children and Families, Office of Community Services, Division of Energy Assistance. 2016. *LIHEAP Home Energy Notebook For Fiscal Year 2014*. Appendix A. Table A-2, page 95, https://www.acf.hhs.gov/sites/default/files/ocs/hen_final_508_compliant_fy14.pdf.

[6] *Ibid.*

[7] ER-2016-0285, Report and Order, page 55.

[8] For additional discussion of the relationship between income and electricity usage, please see the Direct Testimony of DE witness Ms. Sharlet E. Kroll filed in the current rate cases.

Q. Is there an inconsistency in promoting flat or inclining block rates and time-differentiated (or "demand response") rates?

A. No, there is not necessarily a conflict between the consideration of demand response rates and non-time-differentiated rate designs. The latter encourage shifting usage to off-peak periods, while the former can support more efficient usage overall. Demand response rates seek to shift usage away from peak usage periods by reducing the relative rates charged during off-peak usage periods. Flat or inclining block rates can be seen as important for generally increasing efficiency-inducing price signals absent time-varying rates by signaling that higher usage incurs higher system costs. Unless and until all residential customers are served on time-varying rates, flat or inclining volumetric rates can encourage efficient consumption by residential customers more generally. DE will respond to the Companies' time-differentiated rate proposals in Rebuttal Testimony.

Q. What do you mean when you reference "gradualism?"

A. "Gradualism" refers to the concept that rates should not change suddenly, and introducing rates gradually minimizes extraordinary bill impacts. This is closely related to the avoidance of "rate shock."

Q. Please summarize your discussion of rate design.

A. Rates should be set in a manner that induces efficiency, ensures affordability, maintains gradualism, and reflects cost-causation. This is best accomplished through low monthly customer charges that only recover the costs to serve individual customers irrespective of usage, coupled with a flat or inclining volumetric rate that accounts for basic customer usage.

IV. RESIDENTIAL BLOCK RATE DESIGN PROPOSALS

Q. Have the Companies proposed a continuation of their current residential general use rate designs?

A. Generally, yes. As shown below, residential customers would incur both a fixed monthly customer charge and pay declining block rates in the winter; however, it should be noted that GMO's proposal would effectively create a third winter block rate that would decline slightly from the second block rate. KCP&L customers would continue to pay under inclining block rates in the summer as they currently do, while GMO customers would pay a flat rate in the summer. Customer charges would also increase for residential customers under the Companies' rate design proposals. DE will respond to the Companies' residential general use customer and volumetric charge proposals in Rebuttal Testimony.

Q. What are the Companies' proposals for residential general use rates?

A. KCP&L's and GMO's proposals are shown below in Tables 1 and 2, respectively, along with comparisons to the Companies' current rates.

Table 1. KCP&L's current and proposed residential general use rates.[9]

			Current	Proposed	Change
Customer Charge			$12.62	$15.17	20.21%
Volumetric Charge (per kWh)	Summer	First 600 kWh	$0.12893	$0.13044	1.17%
		Above 600 kWh	$0.14916	$0.15090	1.17%
	Winter	First 600 kWh	$0.12231	$0.12374	1.17%
		Next 400 kWh	$0.07396	$0.07483	1.18%
		Above 1000 kWh	$0.06561	$0.06638	1.17%

Table 2. GMO's current and proposed residential general use rates.[10]

			Current	Proposed	Change
Customer Charge			$10.43	$14.50	39.02%
Volumetric Charge (per kWh)	Summer (all kWh)		$0.12050	$0.12089	0.32%
	Winter	First 600 kWh	$0.10625	$0.10660	0.33%
		Next 400 kWh	$0.07800	$0.07826	0.33%
		Above 1000 kWh	$0.07800	$0.07825	0.32%

Q. Does DE have recommendations for residential general use volumetric rates that support efficiency?

A. Yes. As a step toward rates that send improved price signals for efficiency, DE recommends that the Companies move further towards the adoption of flatter volumetric rates for residential general use customers during the winter, and that GMO implement an inclining block rate for residential general use customers during the summer. DE also recommends that the Commission set a goal of

[9] Missouri Public Service Commission Tariff No. YE-2017-0235, Kansas City Power & Light Company, Schedule of Rates for Electricity, June 8, 2017, Sheet No. 5A.
Missouri Public Service Commission Case No. ER-2018-0145, *In the Matter of Kansas City Power & Light Company's Request for Authority to Implement a General Rate Increase for Electric Service*, Minimum Filing Requirements for Utility Company General Rate Increases, Appendix 1 – Proposed Tariff Sheets, January 30, 2018, Sheet No. 5A.
[10] Missouri Public Service Commission Tariff No. YE-2017-0068, KCP&L Greater Missouri Operations Company, Schedule of Rates for Electricity, February 22, 2017, Sheet No. 146.1.
Missouri Public Service Commission Case No. ER-2018-0146, *In the Matter of KCP&L Greater Missouri Operations Company's Request for Authority to Implement a General Rate Increase for Electric Service*, Minimum Filing Requirements for Utility Company General Rate Increases, Appendix 1 – Proposed Tariff Sheets, January 30, 2018, Sheet No. 146.1.

moving towards completely flat (i.e., no different charges for different usage blocks) and/or inclining block rates for residential general use customers during the winter in subsequent cases, ideally on an incremental basis. All such rate design movement should be predicated on analyses of customer bill impacts.

Q. Why not immediately transition to inclining winter block rates for residential general use customers?

A. First, as noted above, rate design should follow the principle of gradualism, avoiding sudden changes to rate designs. Gradualism mitigates the level of "rate shock" experienced by customers. Second, an inclining block rate design requires careful analysis in order to identify typical basic customer usage, determine the number of blocks in the rate, evaluate bill impacts, avoid adverse impacts to low-income and low-use customers, allocate costs based on cost causation, and ensure that the utility has a reasonable prospect of meeting its revenue requirement. Movement away from declining block rates and towards flat volumetric rates in the winter provides for a more gradual transition.

Q. How might an inclining summer block rate be structured?

A. As noted above, a summer inclining block rate should be structured such that the initial block of usage encompasses basic customer end-uses, such as space heating, cooling, and cooking. This approach can not only support revenue neutrality (i.e., have a neutral impact on the utility's revenues), but improve bill affordability for low-use and low-income customers. The second and/or third blocks should be designed to send an efficiency-inducing price signal without creating unduly adverse bill impacts on the highest use customers. For example, rates

could be designed such that, on a revenue-neutral basis, customers at the 95th percentile of bill impacts do not experience single-month bill impacts of greater than five percent; this methodology is consistent with prior testimony filed by DE, excludes unusually high bill impacts, and accounts for the fact that summer usage is relatively flexible.[11] To the extent that current block cut-offs meet such requirements, their continued use could improve customer understanding and rate stability.

Q. If customers respond to these revised rate structures by reducing usage, will the Companies need to revise billing unit estimates to factor in this reduced usage in establishing rates?

A. Yes, potentially. In economics, the concept of "price elasticity of demand" refers to customers' consumption changes based on different prices. Estimates of the price elasticity of demand for electricity vary, and the price elasticity of demand can change over different time frames. For example, in 2013, The Brattle Group used elasticities of -0.130 and -0.260 (i.e., 0.130 and 0.260 percent declines in consumption for a one percent price increase) when evaluating an inclining block rate for Union Electric Company d/b/a Ameren Missouri.[12] It is my understanding that the Companies' most recent triennial Integrated Resource Plans incorporated

[11] Missouri Public Service Commission Case No. ER-2016-0285, *In the Matter of Kansas City Power & Light Company's Request for Authority to Implement a General Rate Increase for Electric Service*, Direct Testimony of Martin R. Hyman on Behalf of Missouri Department of Economic Development – Division of Energy, December 14, 2016, page 21, lines 10-18.
[12] Faruqui, Ahmad, and Hledik, Ryan. 2013. "The Potential Impact of Demand-Side Rates for Ameren Missouri: Final Report." The Brattle Group. Slide 23.

elasticities.[13] The Companies would need to use reasonable estimates of the price elasticity of demand for residential customers to adjust the residential general use rates such that they collect revenues at a level of consumption reflecting changes in demand. However, if the new rates are expected to result in relatively small variations in revenues, then an elasticity-based adjustment may not be needed.

Q. Can revenue-neutral adjustments be made to the Companies' rates regardless of the particular revenue requirement approved?

A. Yes. Revenue-neutral adjustments maintain the Companies' present revenues absent any accompanying changes in customer behavior. These adjustments can be made either before or after the inclusion of revenue requirement-based changes in customer rates. Nonetheless, DE recommends that the Commission base its decision on bill impact analyses that incorporate both the potential revenue-neutral changes in rate designs and any possible changes in revenue requirements in order to gain a fuller understanding of overall impacts to customers.

[13] Missouri Public Service Commission Case No. EO-2018-0268, *In the Matter of Kansas City Power & Light Company's 2018 Triennial Compliance Filing Pursuant to 4 CSR 240 – Chapter 22*, Volume 5 – Demand-Side Resource Analysis, April 2, 2018, Page 43.
Missouri Public Service Commission Case No. EO-2018-0269, *In the Matter of KCP&L Greater Missouri Operations Company's 2018 Triennial Compliance Filing Pursuant to 4 CSR 240 – Chapter 22*, Volume 5 – Demand-Side Resource Analysis, April 2, 2018, Page 43.

Q. Why modify the Companies' current rate designs when advanced metering infrastructure will enable time-varying rate designs?

A. The Companies' proposed time-varying rate designs are only pilot program proposals.[14] Since only a small number of customers will be able to voluntarily participate in the pilot programs, other residential customers should still be served under rate designs that encourage efficient use.

DE anticipates that, in the future, most residential general use customers will be served on demand response rates. These rates can support shifting consumption towards off-peak periods. However, the Companies' proposed pilot time-of-use rates are generally a reasonable transition step that will allow the Commission to learn more about the implementation of demand response rates. An immediate switch to time-of-use rates for all customers would violate the principle of gradualism and would not be feasible where sufficient metering and billing infrastructure does not yet exist. Time-differentiated rate implementation should also be coupled with extensive customer education.

Q. Will customer education be important during the transition to flat or inclining block rates?

A. Yes. Absent customer awareness of the rate designs under which they are served, price signals will not be as obvious to customers and there will be less movement on their parts towards efficiency. The Companies must educate customers about

[14] ER-2018-0145, Minimum Filing Requirements for Utility Company General Rate Increases, Appendix 1 – Proposed Tariff Sheets, Sheet No. 7; ER-2018-0146, Minimum Filing Requirements for Utility Company General Rate Increases, Appendix 1 – Proposed Tariff Sheets, Sheet No. 146.5.

changes in rate designs and about measures to mitigate bill impacts, such as energy efficiency programs.

Q. Could inclining block rates create a disincentive for residential customers to use EVs?

A. To the extent that residential customers' energy usage for EV charging reaches past the first tier of an inclining block rate design during the summer, such customers would pay more under inclining block rates. This concern could be mitigated if the Companies work to identify EV drivers and inform them of the option to switch to time-of-use rates, which – if properly structured – could provide EV drivers with cost savings in exchange for charging during "off-peak" times of overall system load. This would benefit both the EV-owning customers and the utility system by moving EV charging away from on-peak hours in order to mitigate increases to system peak load and to fill in time periods of lower system utilization, thereby reducing costs associated with peak demand and underutilized infrastructure.

Q. What steps might the Companies take to identify its customers who are EV drivers?

A. The Companies might consider every way that they presently seek information from and educate their customers. Some considerations might be: working through local EV dealerships to inform KCP&L and GMO customers of time-of-use-rates; potential identification of EV customers through the Companies' call center when customers call in and via automated outbound calling; and, via information

provided on the Companies' website, through social media campaigns, in bill inserts, and in public notices (such as through local newspapers).

Q. The Companies have proposed caps on participation in their time-of-use rate pilots.[15] How does DE's proposal regarding EV drivers fit into the Companies' proposed caps?

A. Although DE will respond to the Companies' time-of-use rate proposals in Rebuttal Testimony, DE recommends in this testimony that the Companies expand or eliminate their proposed participation caps in order to accommodate additional participants with EVs and allow for other interested customers to participate in the pilots. Expanded participation by non-EV-owning customers will also support more robust pilot results by avoiding "oversampling" customers with EVs.

Q. Is DE proposing any revisions to rates for Small General Service ("SGS") customers?

A. Not at this time. SGS customers are billed under a different tariff structure than residential customers, so different analyses would be required to determine appropriate rate designs. DE recommends that the Commission order the consideration of new rate designs for SGS customers in the Companies' next general rate cases.

[15] *Ibid.*

V. CONCLUSIONS

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

A. DE supports continued movement towards flatter residential winter general use rates, as well as the implementation of an inclining block rate structure in the summer for GMO's residential general use customers. These rate designs, which should be based on bill impact analyses, will better encourage customers to undertake efficiency actions. In conjunction with these rate design changes, DE also recommends proactive outreach by the Companies to identify EV users who may benefit from time-of-use rates. Additionally, DE recommends customer education for the residential general use classes more broadly regarding rate designs and energy efficiency.

Q. Does this conclude your Direct Testimony?

A. Yes.